

Automatically Generated theorems

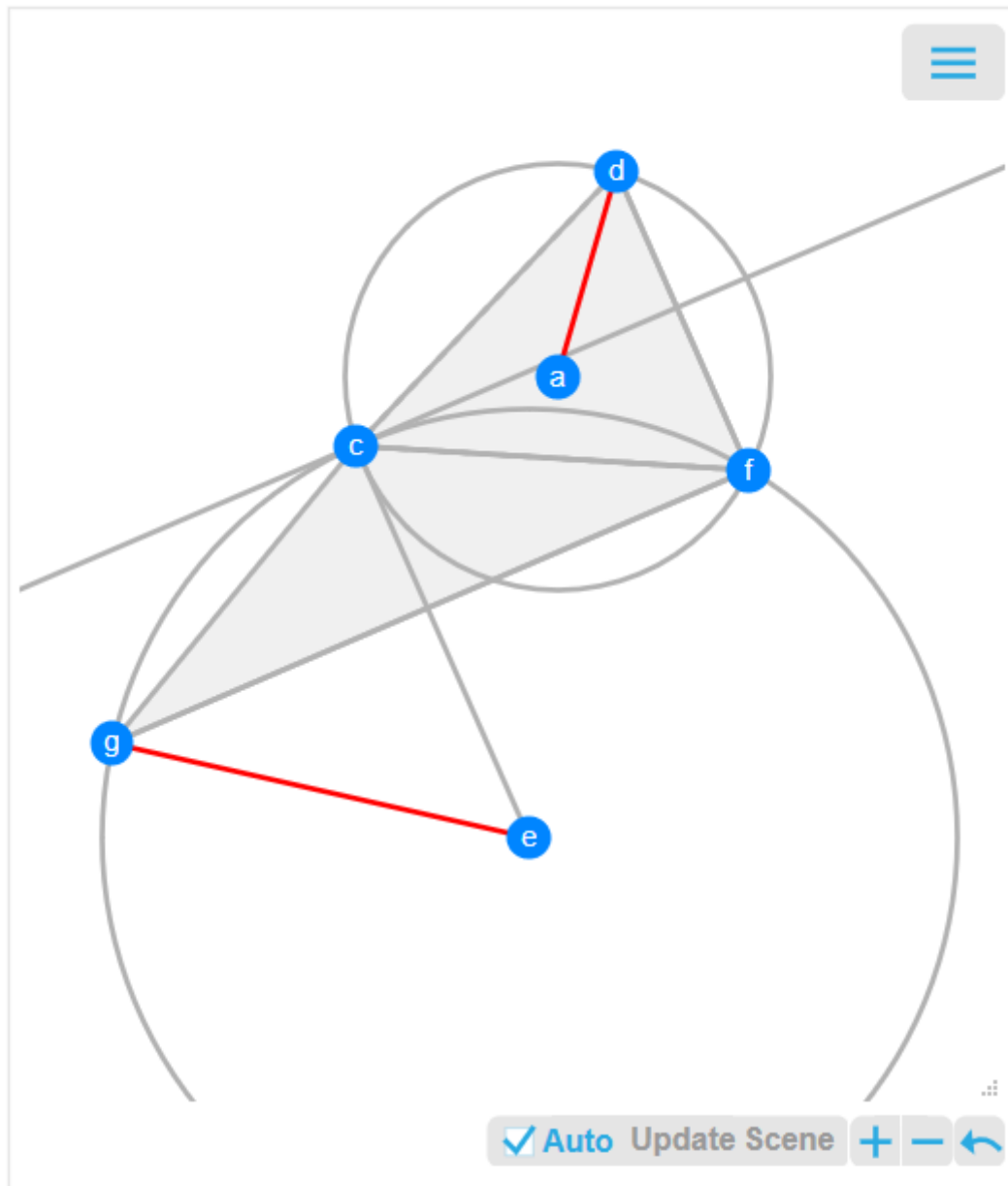
Saltire technical Report 22-1

In this document, we present a number of theorems generated by a prototype angle theorem generator. The prototype generator has a limited palette of options for varying the geometry, hence a certain thematic sameness about these theorems.

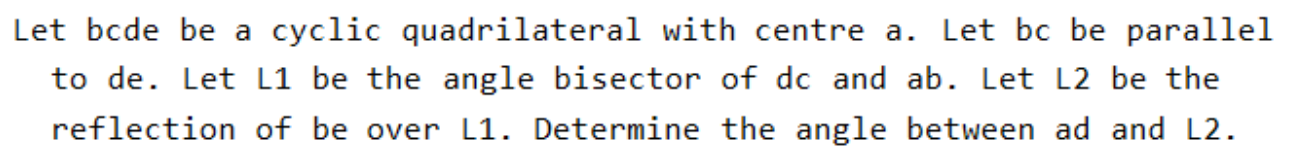
Outputs are all presented in the form of Mathematica Geometric Scenes. In places we present a GXWeb model to illustrate how a little hand alteration can make a theorem more compelling

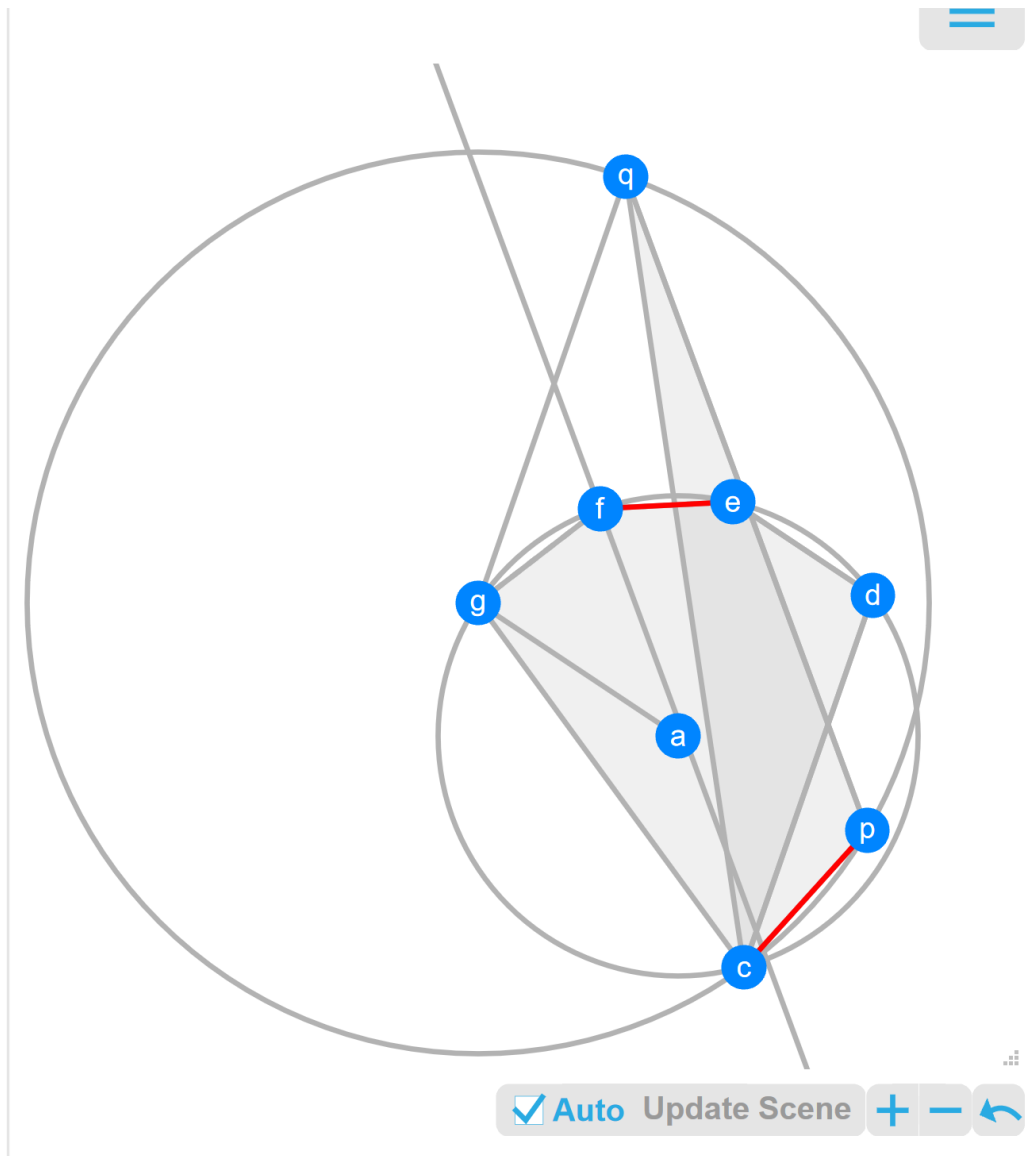
We use the 6,8,10,12,and 14 row matrices. The models are from various stages in the evolution of the automated theorem generator, so the text of the theorem statement does vary.

We have limited the number of runs which use the 6 and 8 row matrices, as there are relatively few theorems produced by these and there would be a lot of repetition. We have not so limited the 10, 12 and 14 row matrices, but neither have we checked for duplication. There will be some.

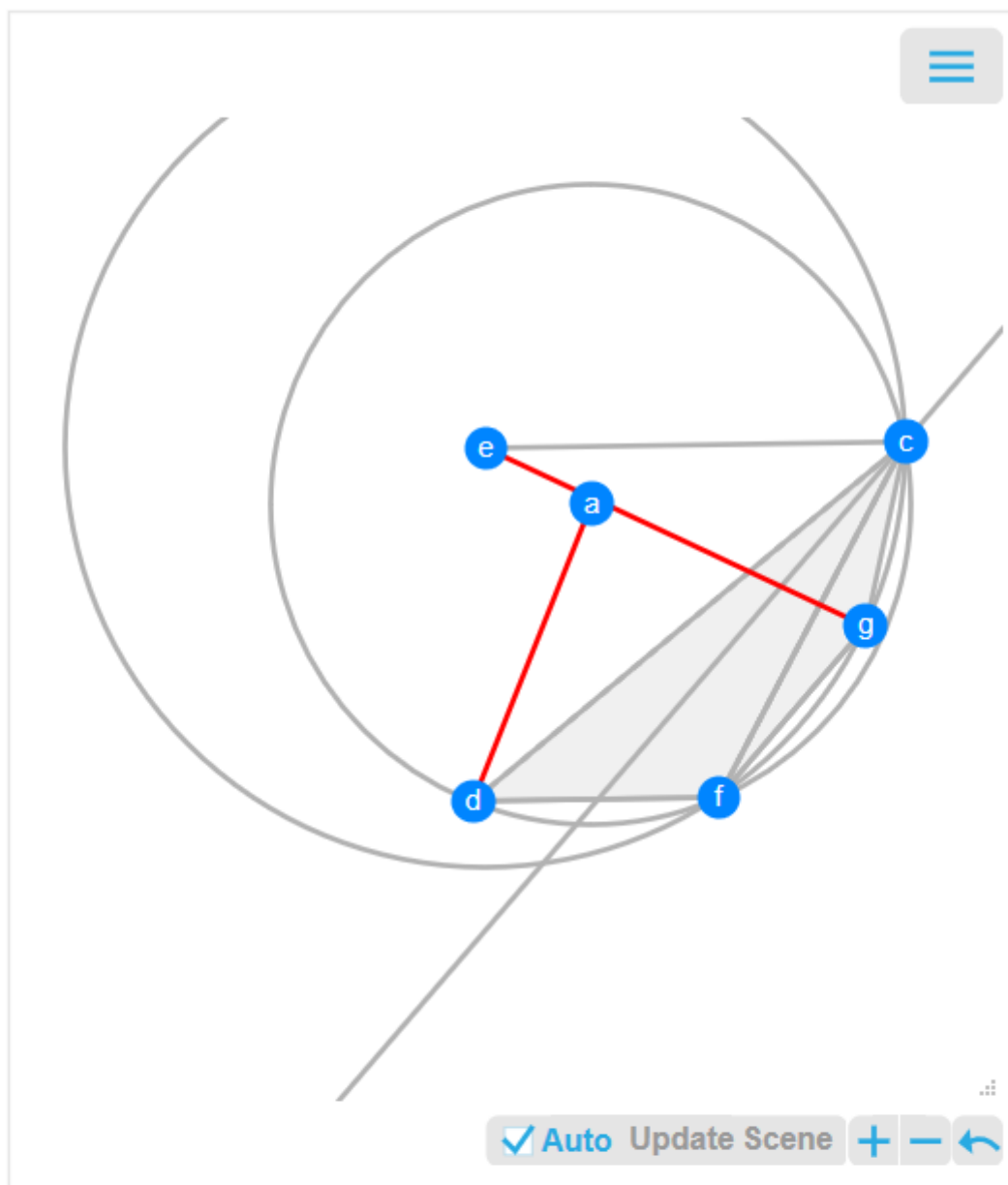


Let fcd be a triangle with circumcentre a . Let fgc be a triangle with circumcentre e . Let fd be parallel to ec . Let $L1$ be the angle bisector of dc and fc . Let fg be parallel to $L1$. Determine the angle between ad and eg .

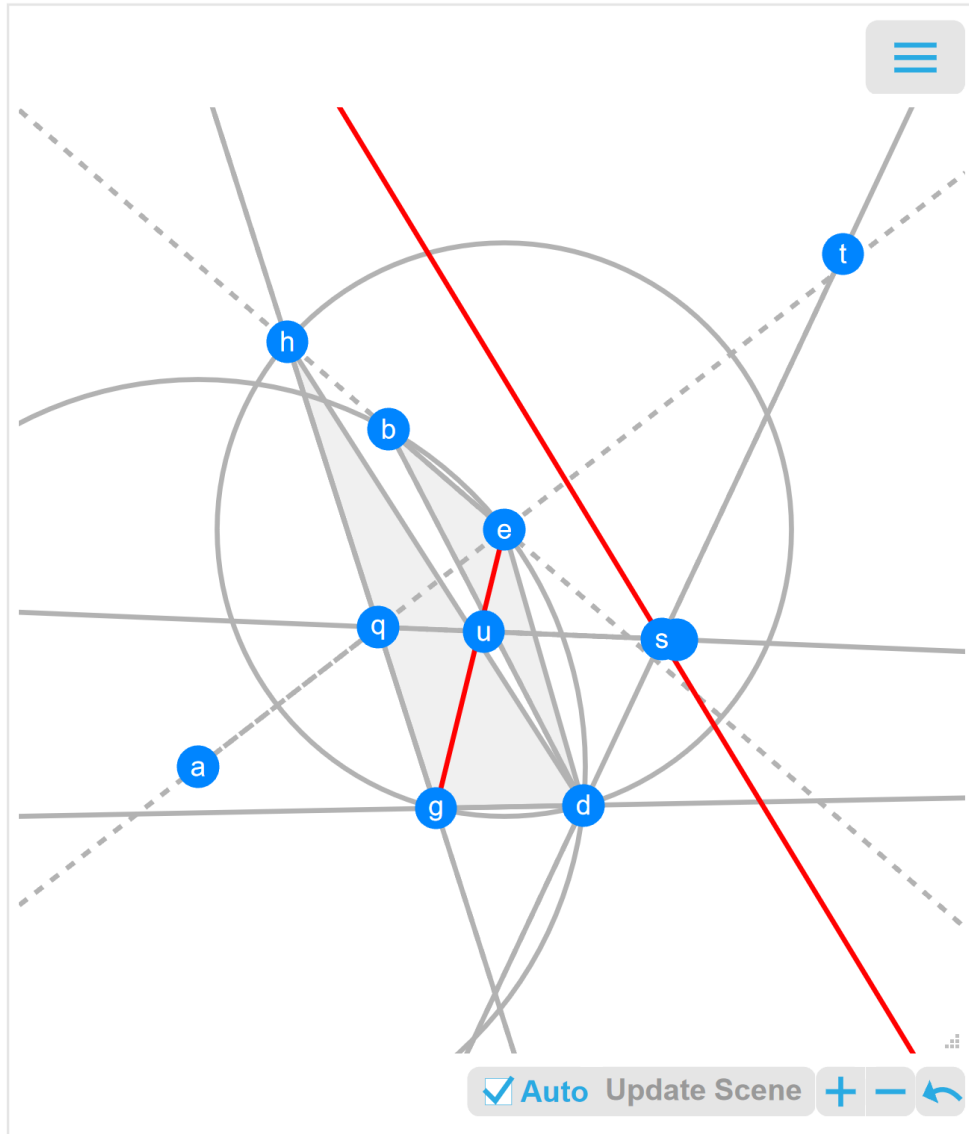




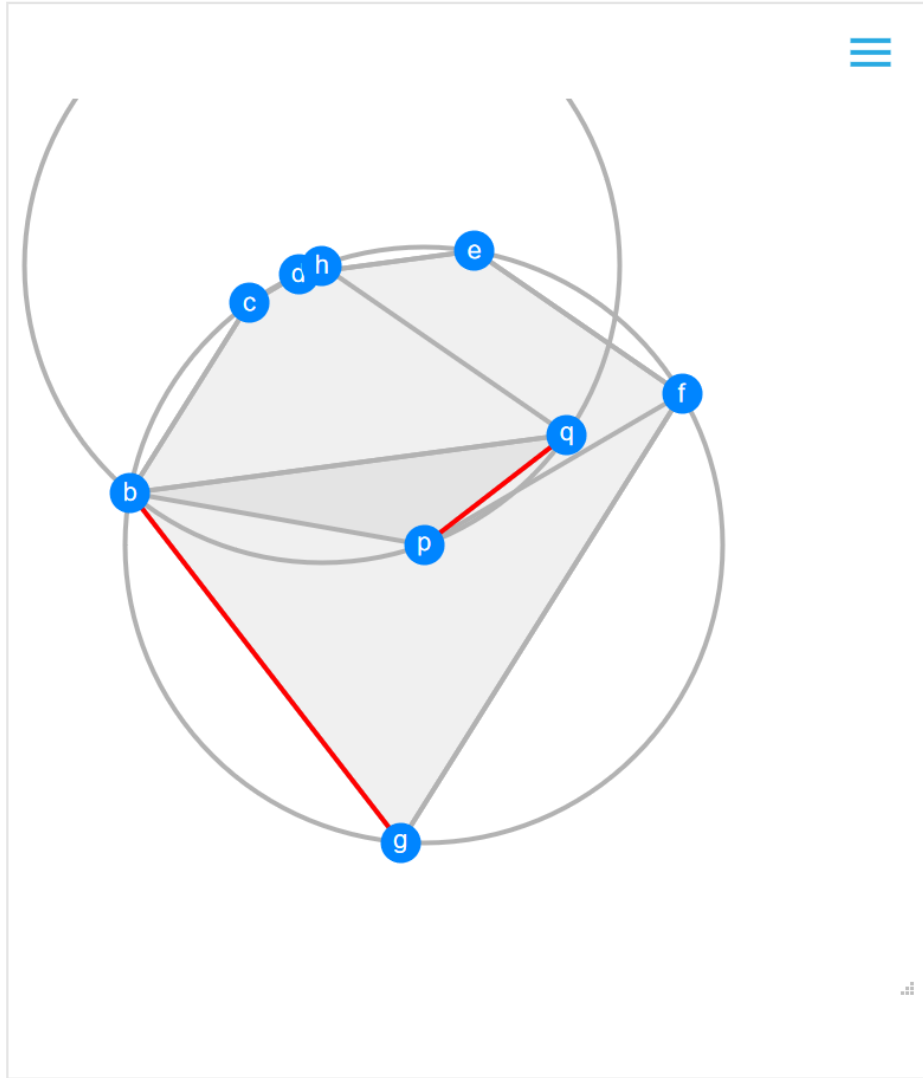
Let $gcdef$ be a cyclic pentagon with centre a . Let ag be parallel to de . Let cpq be a triangle with circumcentre g . Let dc be parallel to gq . Let $L1$ be the angle bisector of gf and ef . Let qp be parallel to $L1$. Determine the angle between ef and cp .



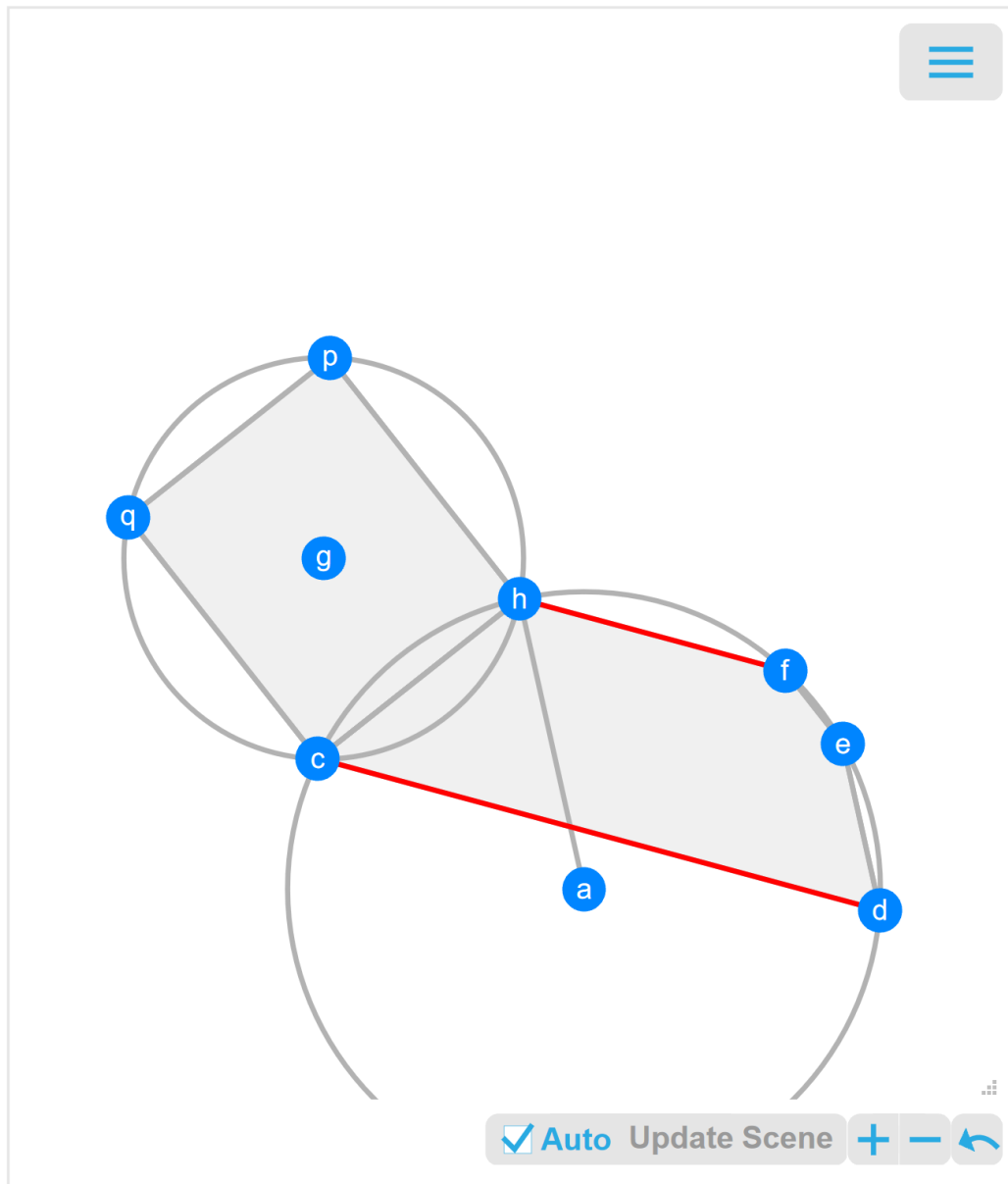
Let fcd be a triangle with circumcentre a . Let fgc be a triangle with circumcentre e . Let fd be parallel to ec . Let $L1$ be the angle bisector of dc and fc . Let fg be parallel to $L1$. Determine the angle between ad and eg .



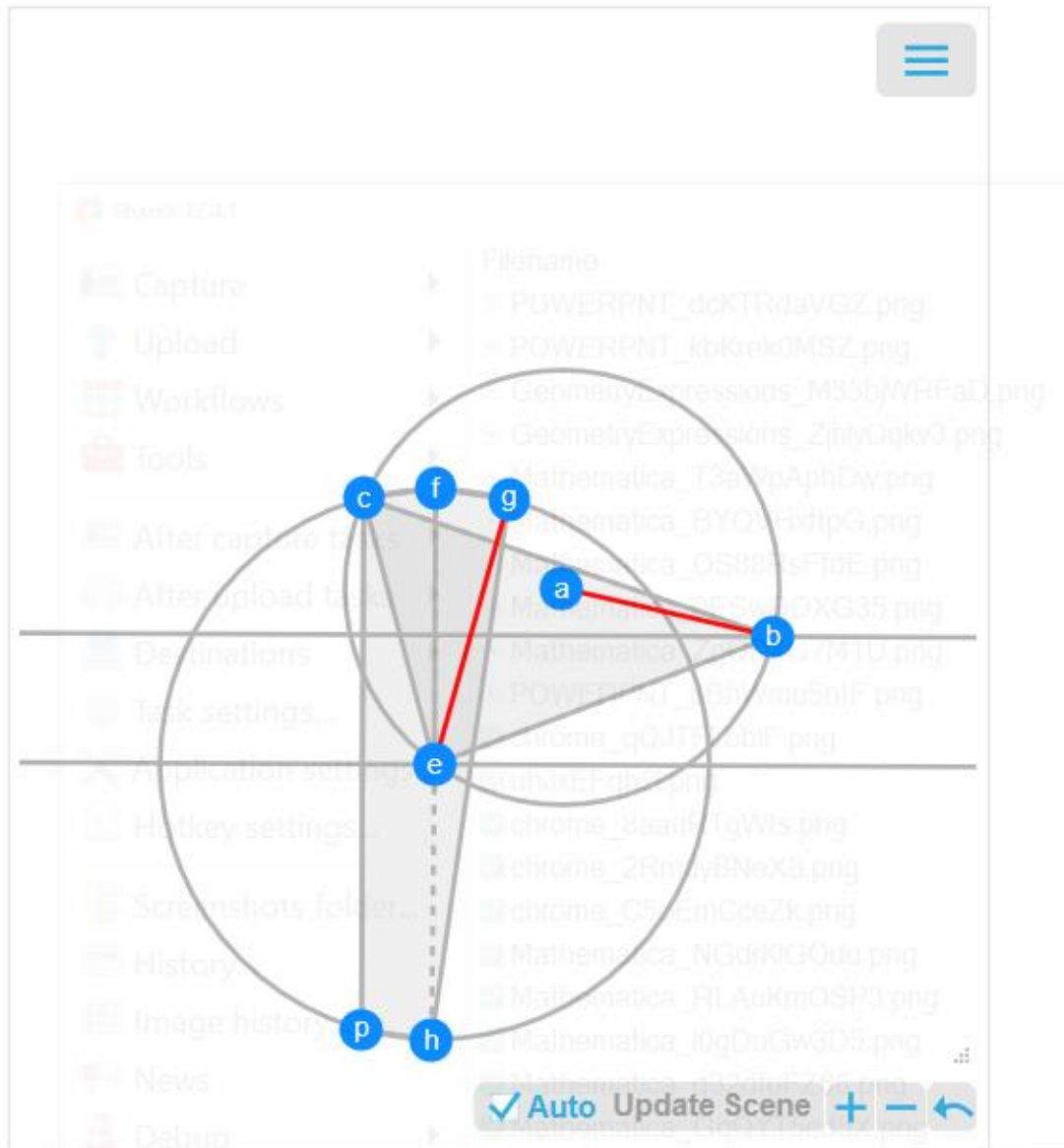
Let bed be a triangle with circumcentre a . Let dgh be a triangle with circumcentre e . Let ebh be collinear. Let L_1 be the reflection of bd over dg . Let L_2 be the reflection of ae over gh . Let L_3 be the angle bisector of L_1 and L_2 . Determine the angle between eg and L_3 .



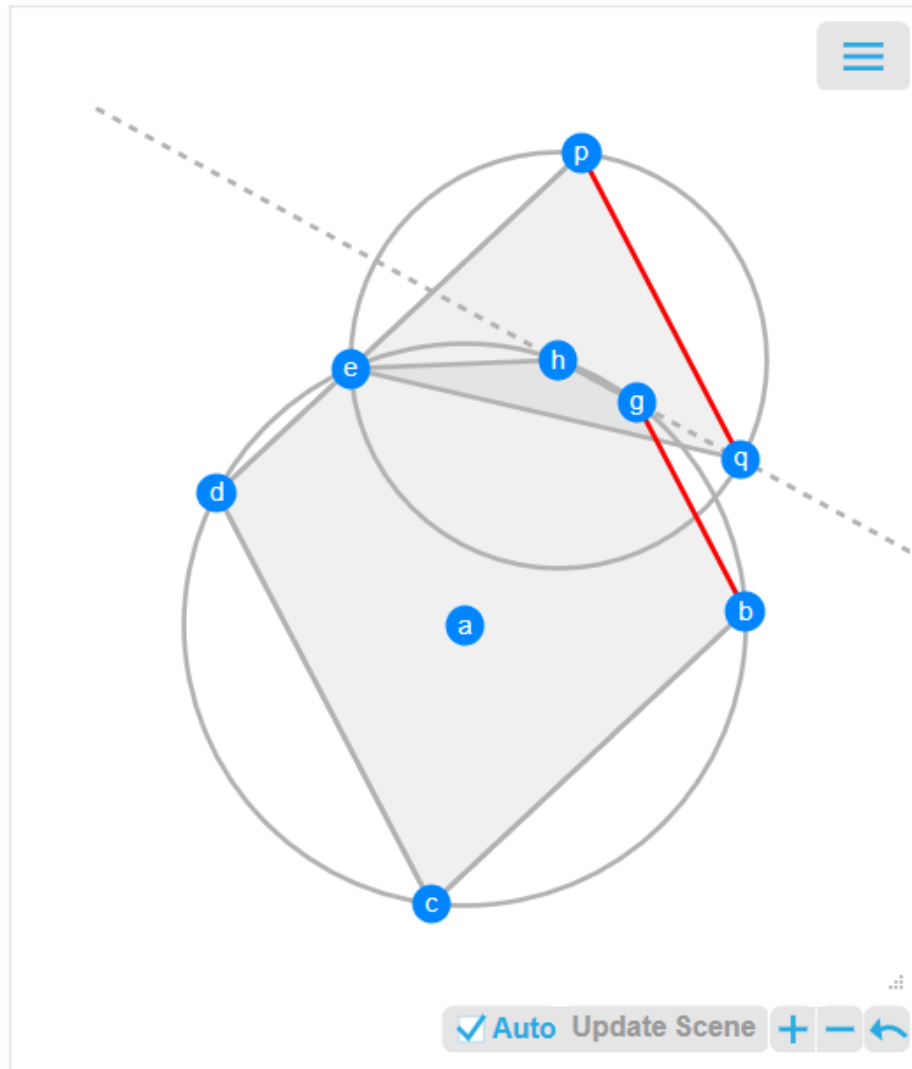
Let $bcdefg$ be a cyclic hexagon with centre p . Let pf be parallel to dc . Let bc be parallel to fg . Let pqb be a triangle with circumcentre h . Let ed be parallel to bq . Let ef be parallel to hq . Determine the angle between bg and pq .



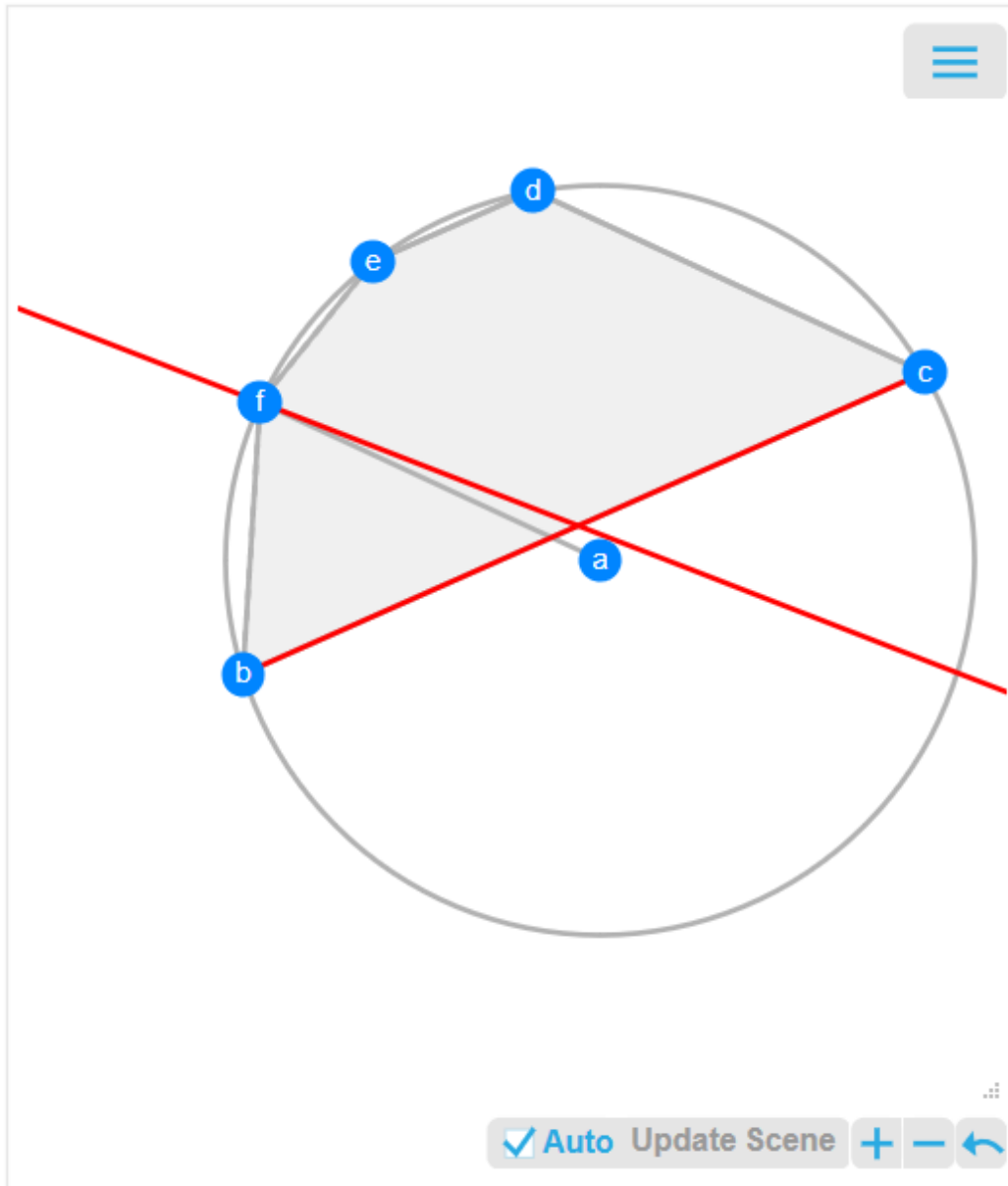
Let $hcdfe$ be a cyclic pentagon with centre a . Let ah be parallel to de . Let $hpqc$ be a cyclic quadrilateral with centre g . Let ef be parallel to hp . Let hc be parallel to qp . Let ef be parallel to cq . Determine the angle between hf and dc .



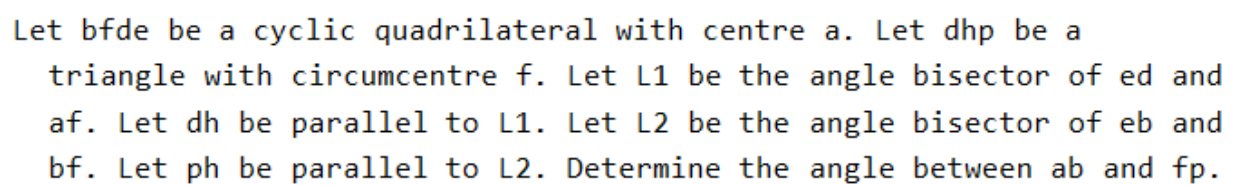
Let bce be a triangle with circumcentre a . Let $fghpc$ be a cyclic pentagon with centre e . Let fg be parallel to ph . Let ef be parallel to cp . Let $L1$ be the angle bisector of ef and eh . Let $L2$ be the angle bisector of bc and be . Let $L1$ be parallel to $L2$. Determine the angle between ab and eg .

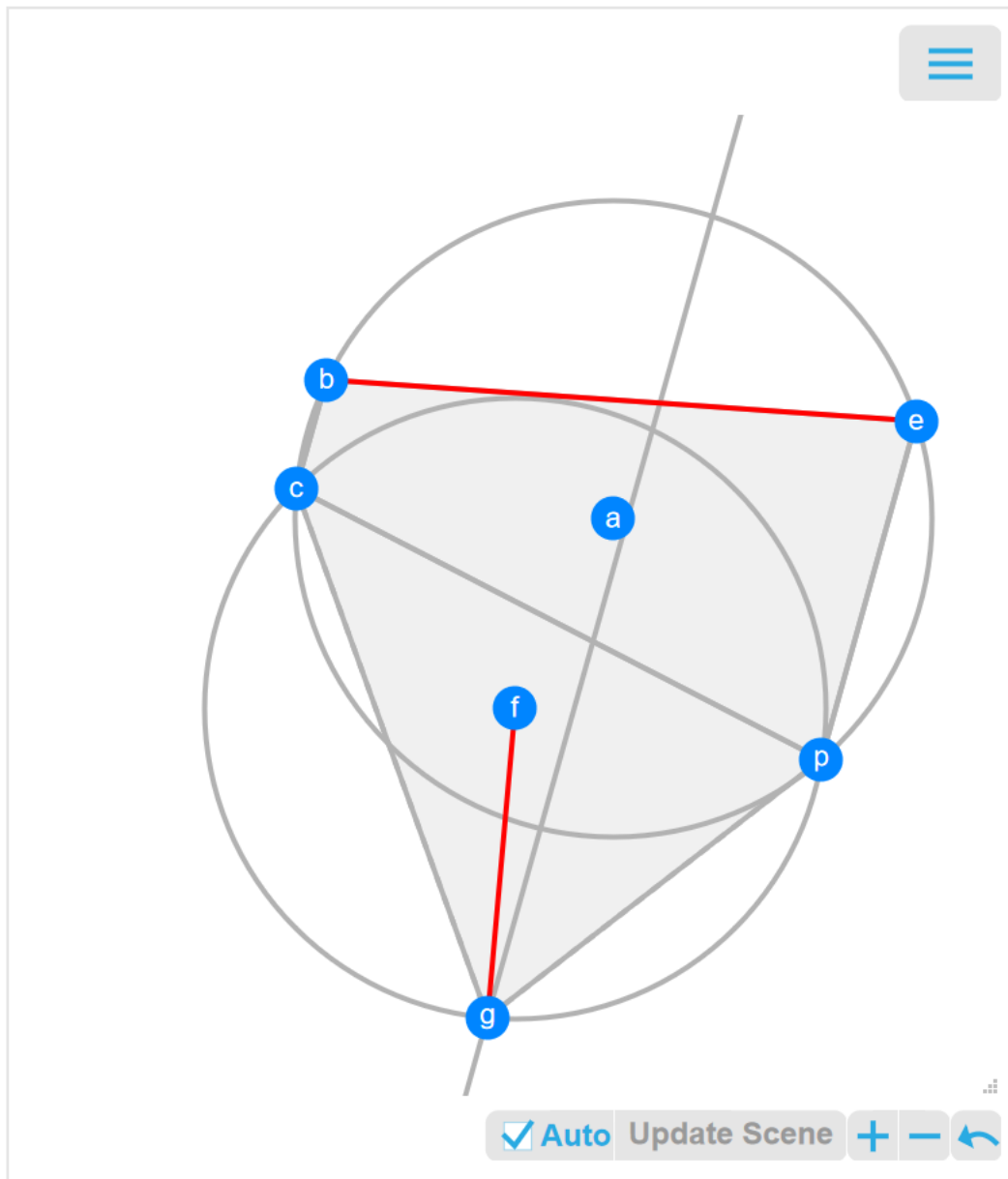


Let $bcdehg$ be a cyclic hexagon with centre a . Let bg be parallel to dc . Let bc be parallel to ed . Let pqr be a triangle with circumcentre h . Let bc be parallel to pe . Let hgq be collinear. Determine the angle between bg and pq .

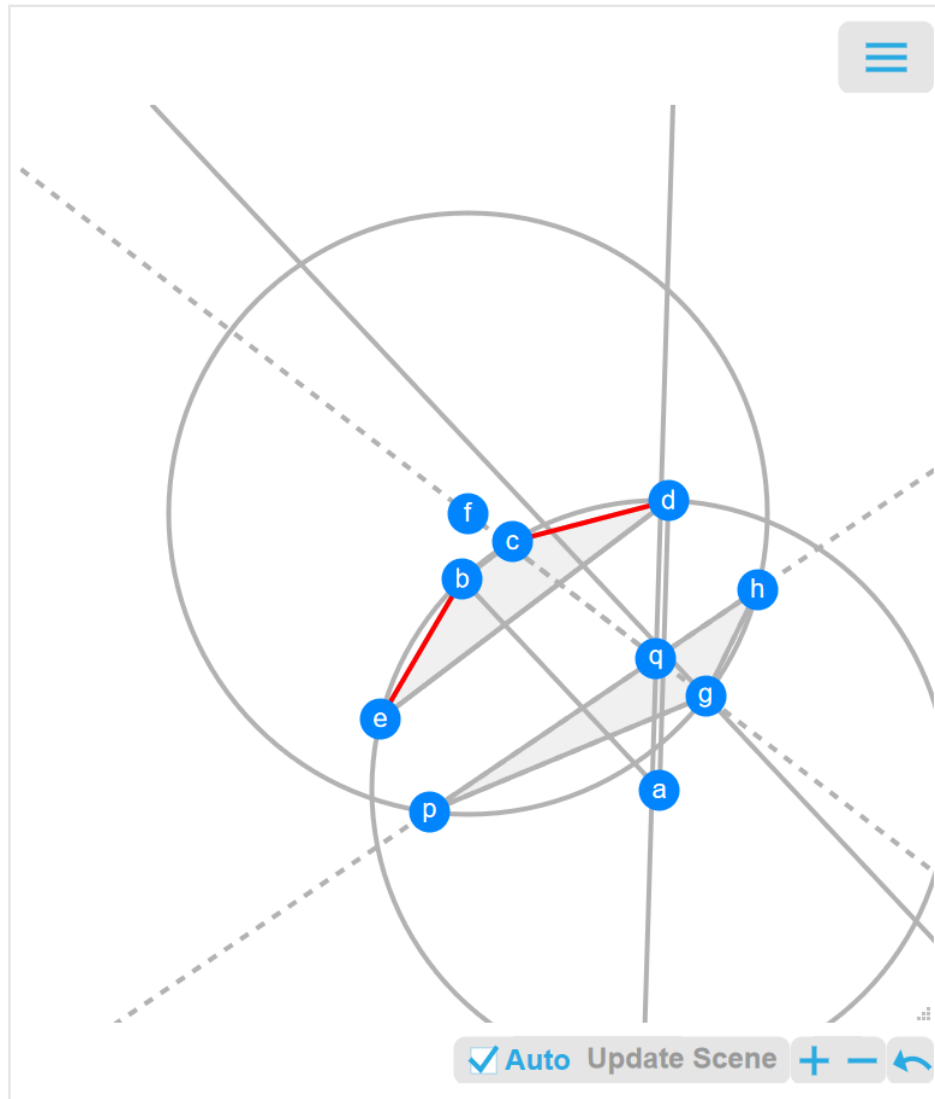


Let $bcdef$ be a cyclic pentagon with centre a . Let af be parallel to dc . Let bc be parallel to de . Let L_1 be the angle bisector of ef and bf . Determine the angle between bc and L_1 .

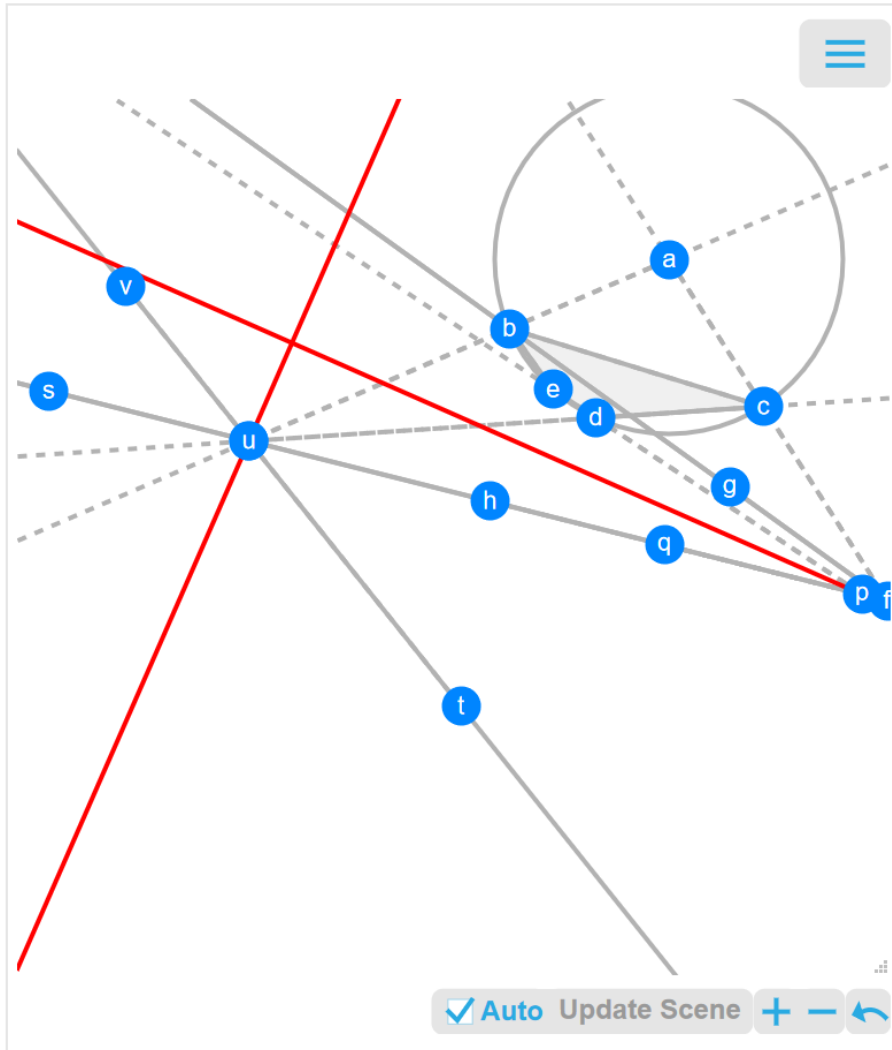




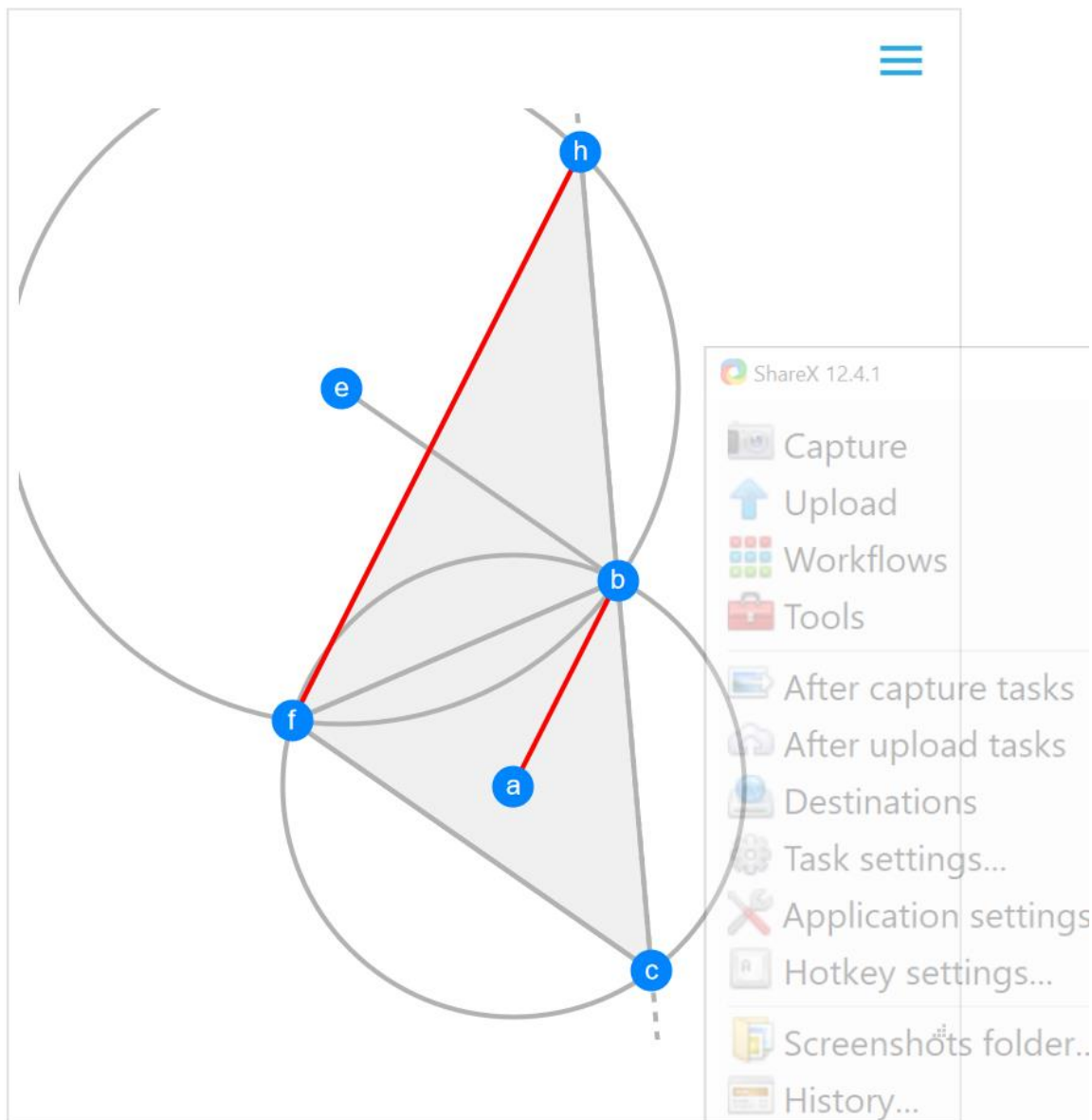
Let $bcpe$ be a cyclic quadrilateral with centre a . Let bc be parallel to pe . Let gcp be a triangle with circumcentre f . Let $L1$ be the angle bisector of gc and pg . Let bc be parallel to $L1$. Determine the angle between fg and be .



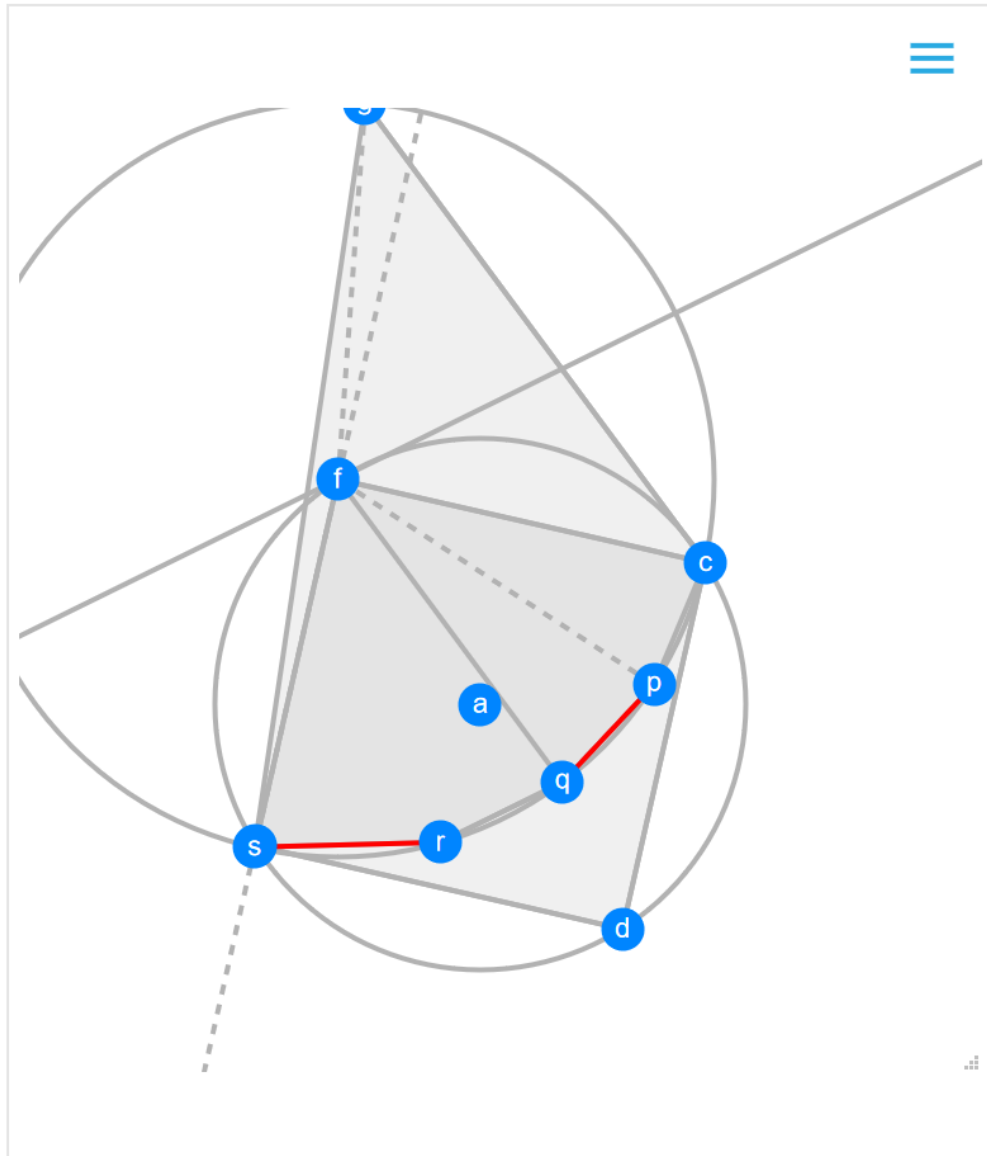
Let $bcde$ be a cyclic quadrilateral with centre a . Let bc be parallel to ed . Let ghp be a triangle with circumcentre f . Let L_1 be the angle bisector of hp and fg . Let ad be parallel to L_1 . Let L_2 be the angle bisector of gp and hg . Let ab be parallel to L_2 . Determine the angle between cd and eb .



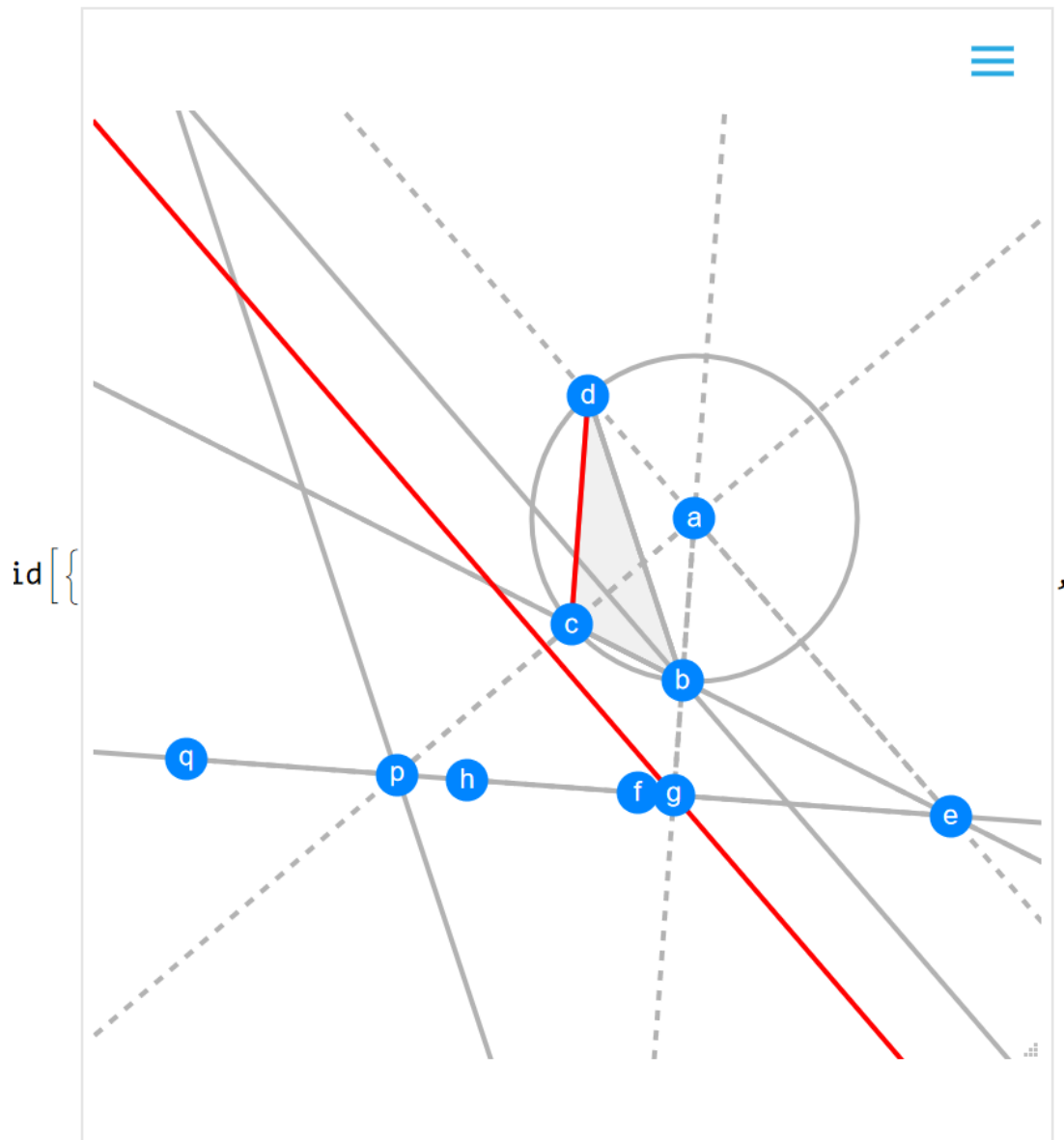
Let $bcde$ be a cyclic quadrilateral with centre a . Let L_1 be the angle bisector of bc and eb . Let L_2 be the reflection of ac over L_1 . Let L_3 be the angle bisector of L_2 and ed . Let L_4 be the reflection of ab over L_2 . Let L_5 be the angle bisector of L_4 and dc . Determine the angle between L_3 and L_5 .



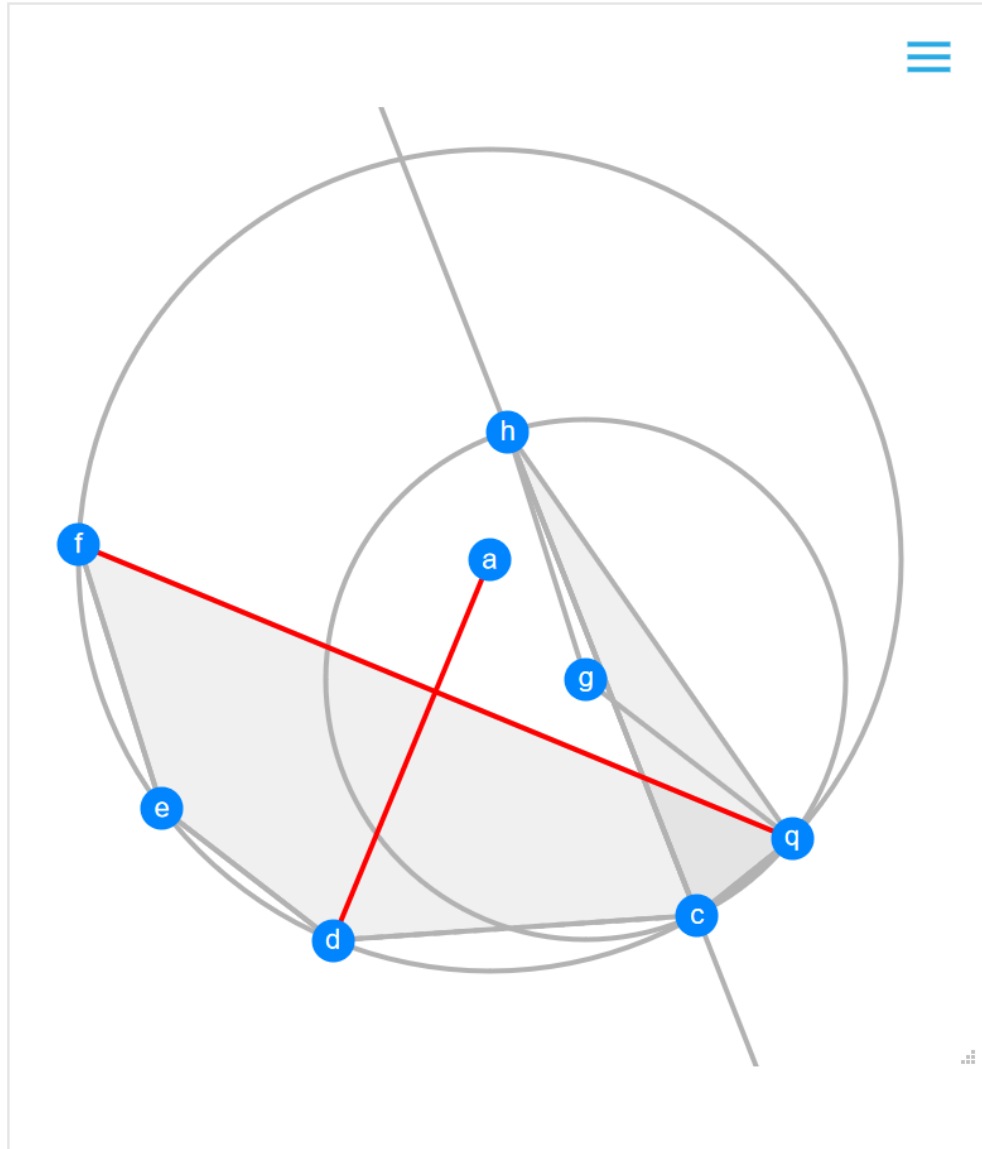
Let bcf be a triangle with circumcentre a . Let fch be a triangle with circumcentre e . Let bch be collinear. Let fc be parallel to eb . Determine the angle between ab and fh .



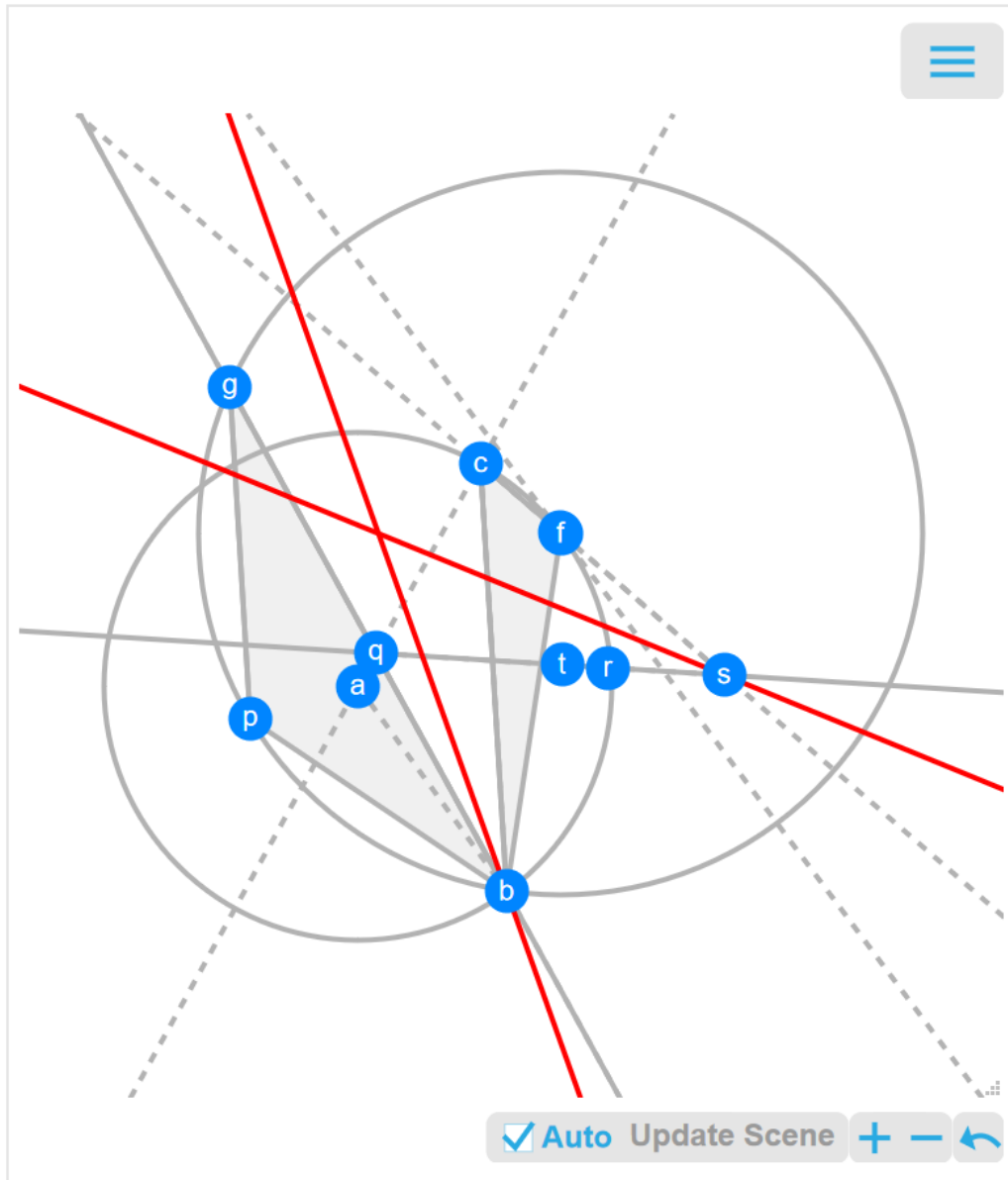
Let $fcde$ be a cyclic quadrilateral with centre a . Let fe be parallel to dc . Let fc be parallel to ed . Let $gcpqrs$ be a cyclic hexagon with centre f . Let fq be parallel to gc . Let fes be collinear. Let $L1$ be the angle bisector of fp and fg . Let rq be parallel to $L1$. Determine the angle between sr and qp .



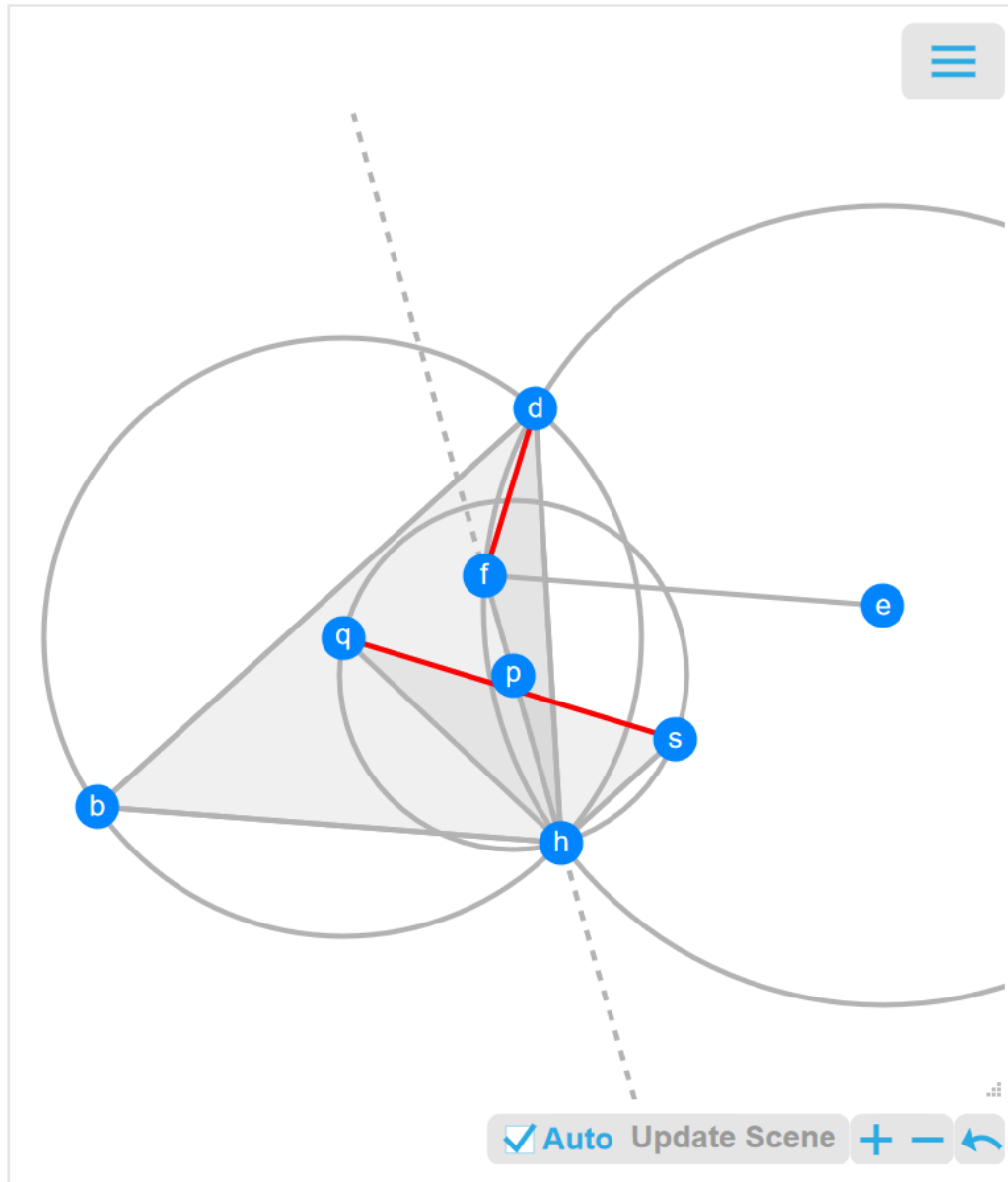
Let bcd be a triangle with circumcentre a . Let $L1$ be the reflection of ad over cb . Let $L2$ be the angle bisector of ab and $L1$. Let $L3$ be the angle bisector of $L1$ and ac . Let bd be parallel to $L3$. Let $L4$ be the angle bisector of bd and cb . Let $L2$ be parallel to $L4$. Determine the angle between $L2$ and dc . }]



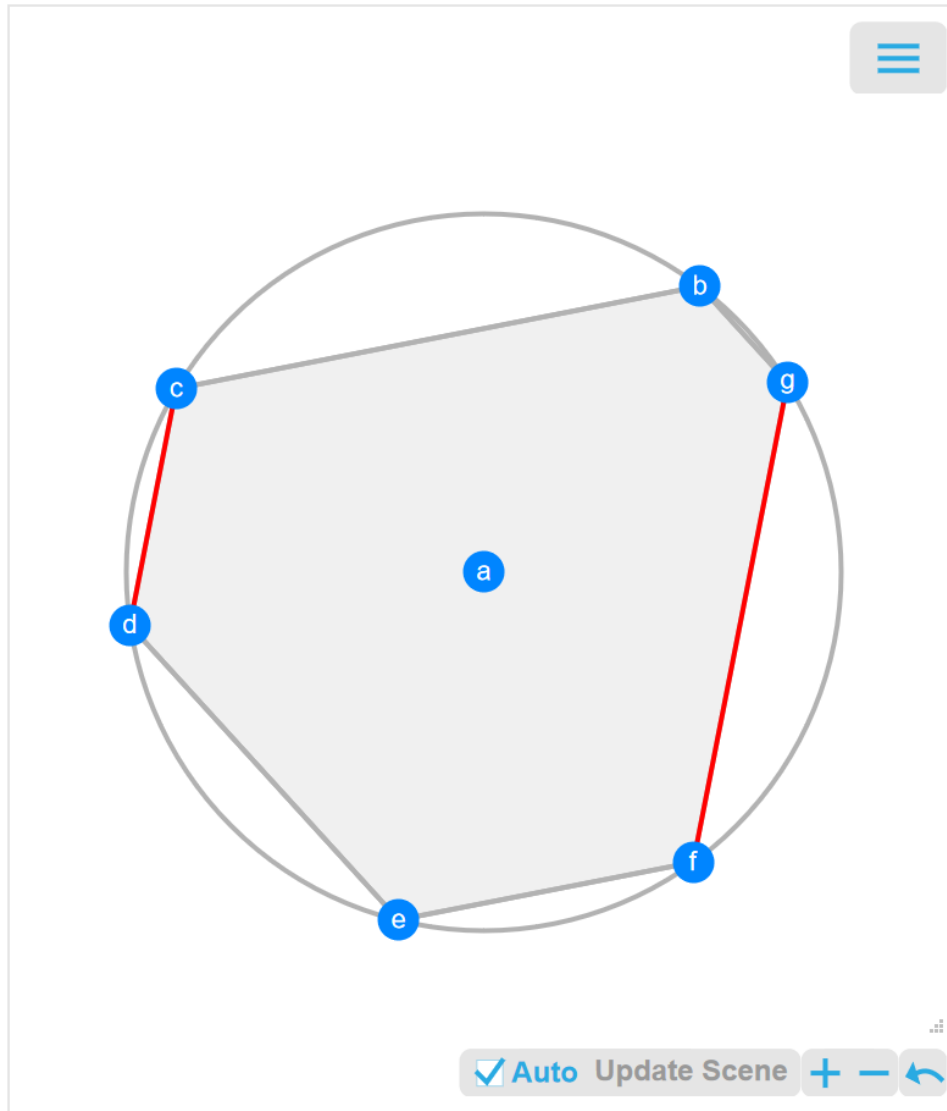
Let $qcdfe$ be a cyclic pentagon with centre a . Let hcg be a triangle with circumcentre g . Let fe be parallel to gh . Let de be parallel to gq . Let L_1 be the angle bisector of dc and qc . Let hc be parallel to L_1 . Determine the angle between ad and qf .



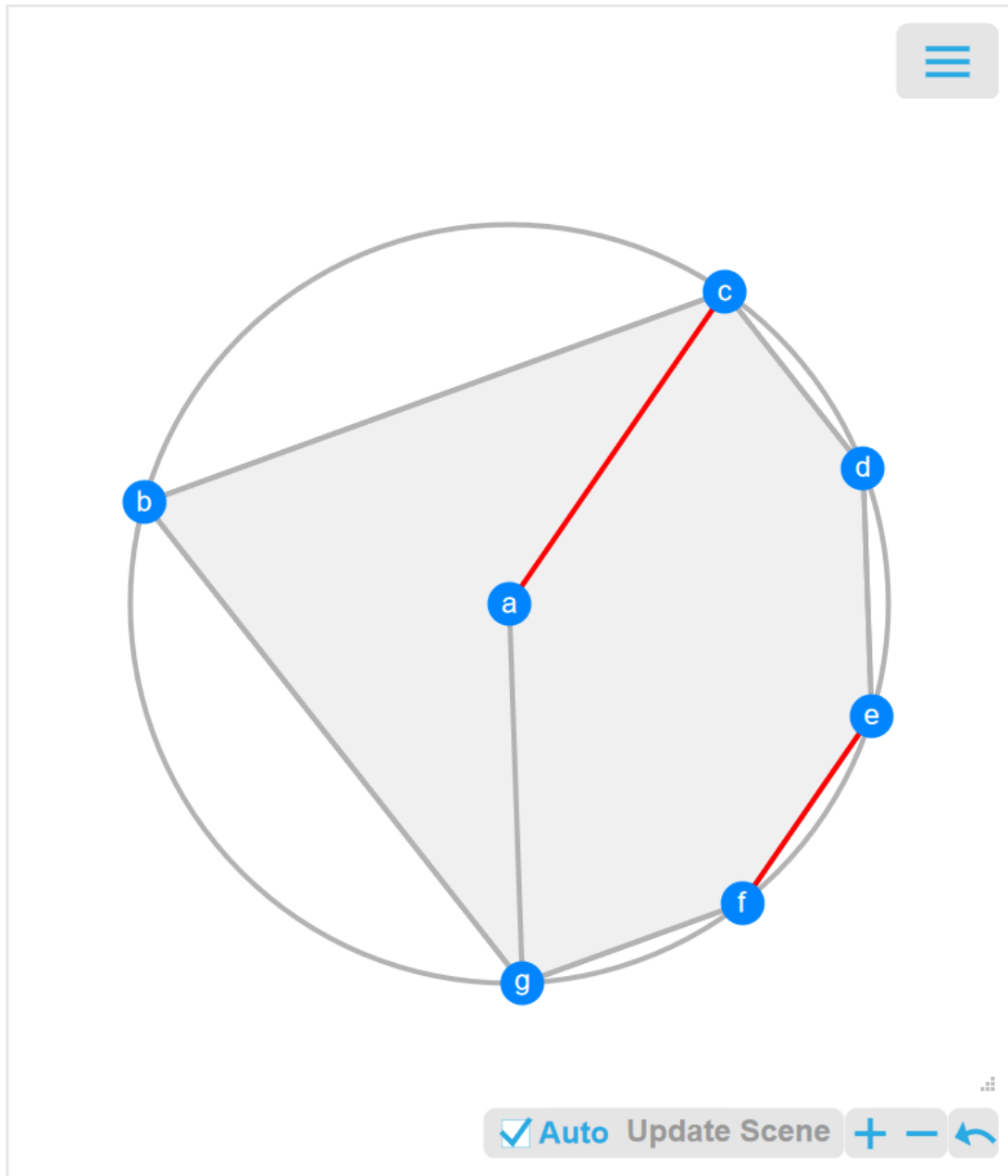
Let $bcdf$ be a cyclic quadrilateral with centre a . Let gbp be a triangle with circumcentre f . Let cb be parallel to gp . Let fdp be collinear. Let $L1$ be the angle bisector of ab and cb . Let $L2$ be the reflection of ac over gb . Let $L3$ be the angle bisector of $L2$ and cd . Determine the angle between $L1$ and $L3$.



Let bhd be a triangle with circumcentre q . Let fdh be a triangle with circumcentre e . Let bh be parallel to ef . Let qhs be a triangle with circumcentre p . Let bd be parallel to hs . Let hfp be collinear. Determine the angle between qs and fd .



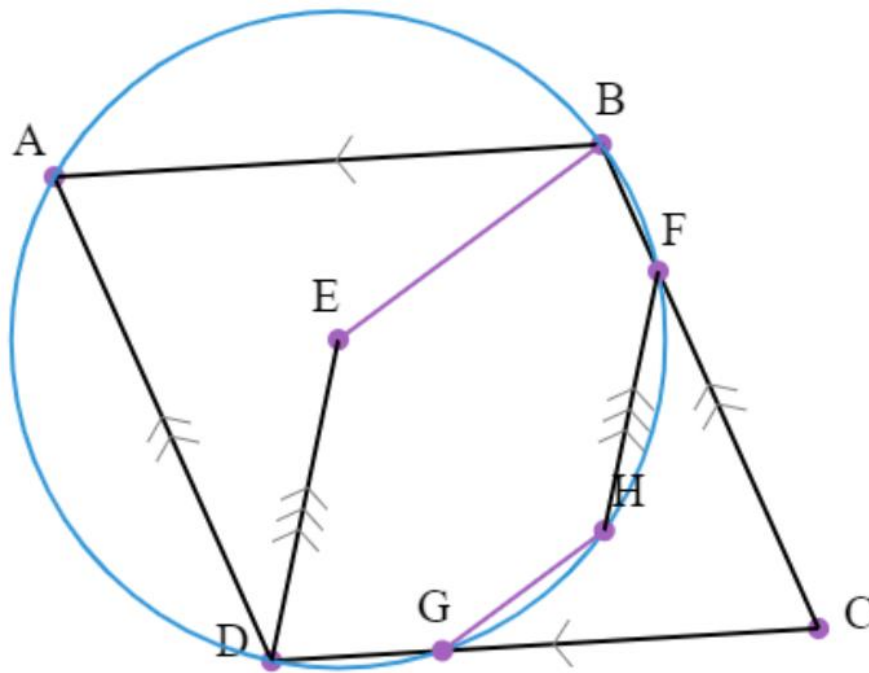
Let $bcdefg$ be a cyclic hexagon with centre a . Let bg be parallel to de . Let bc be parallel to ef . Determine the angle between gf and dc .



Let $bcdefg$ be a cyclic hexagon with centre a . Let bg be parallel to dc . Let ag be parallel to de . Let bc be parallel to fg . Determine the angle between ac and fe .



AA

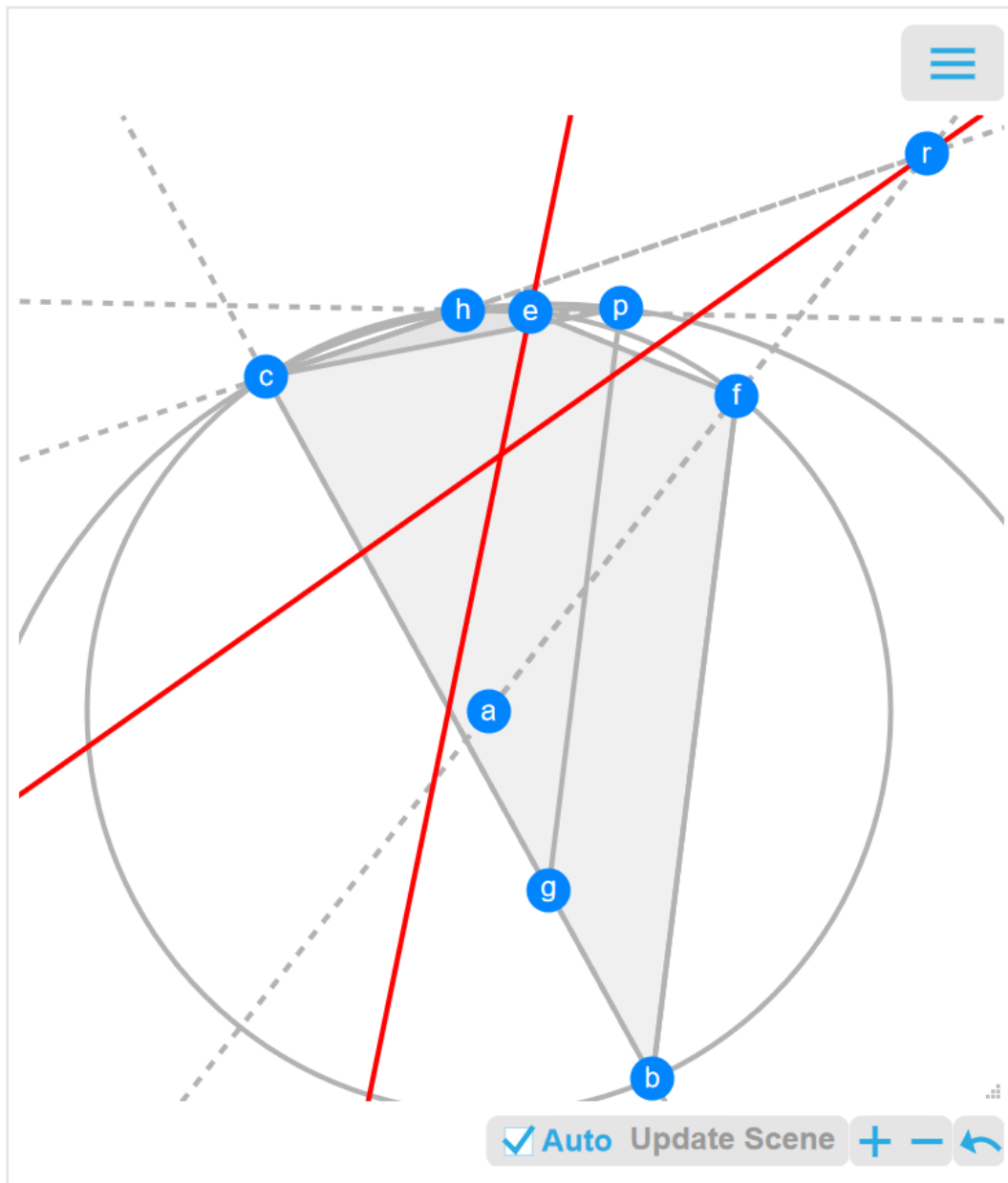


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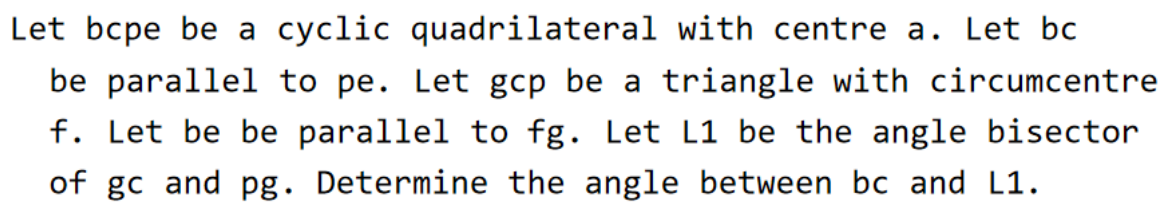


angle(BE, GH)

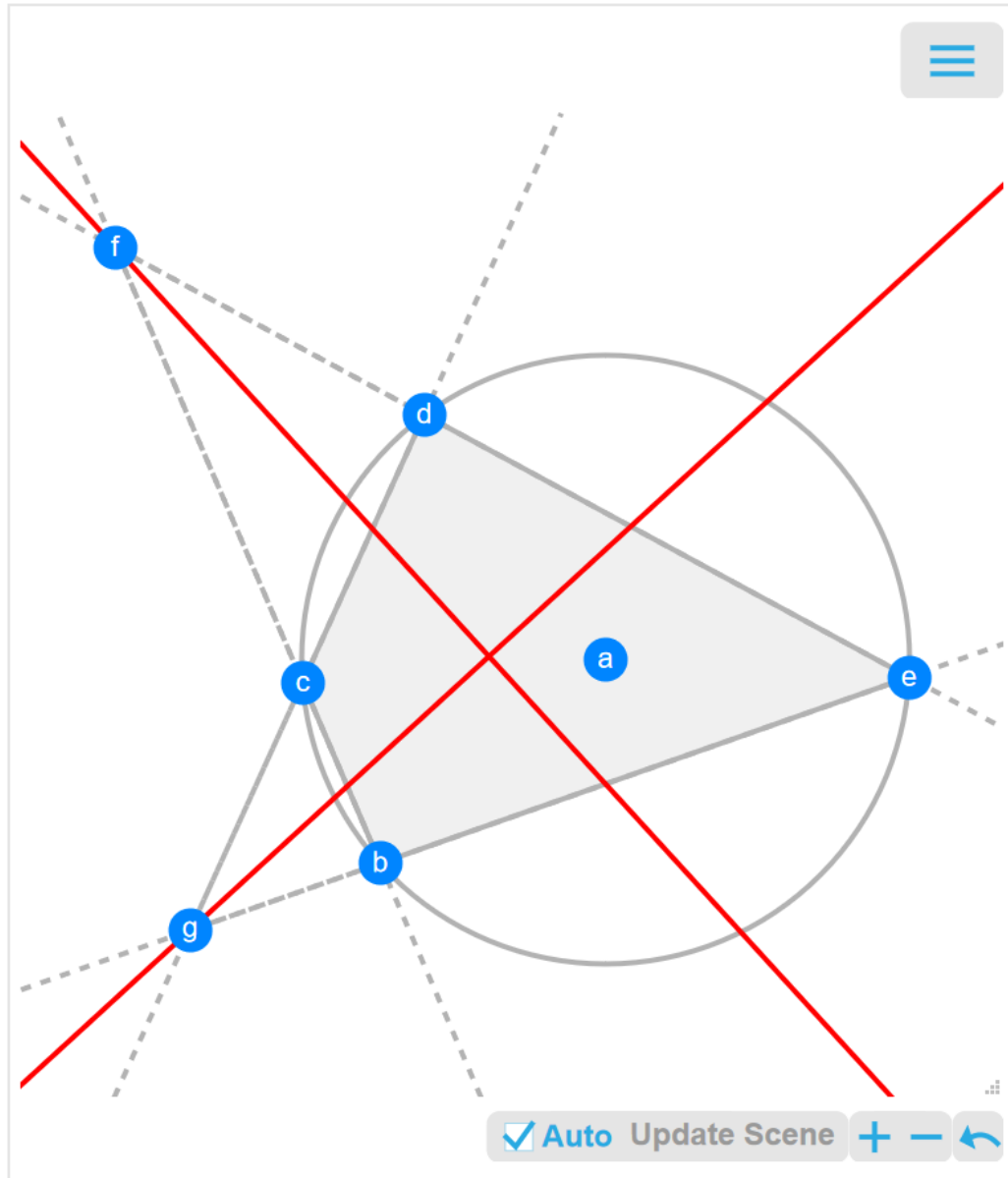
180



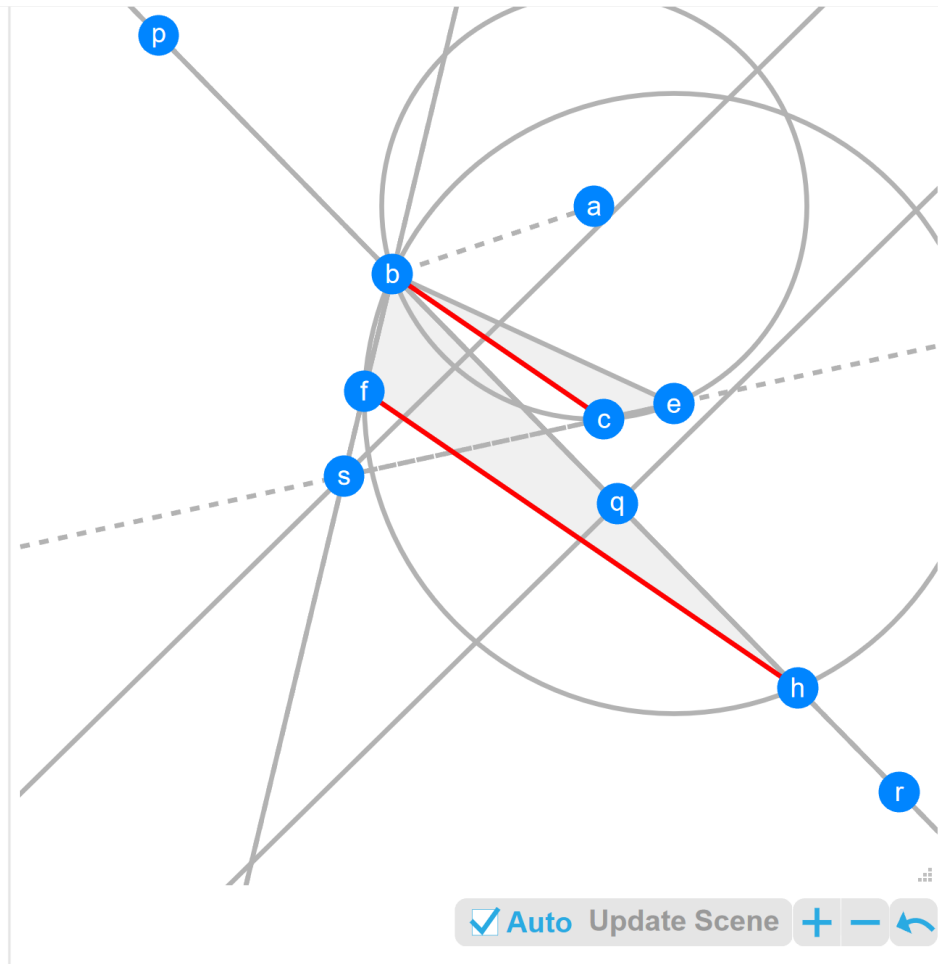
Let $bchef$ be a cyclic pentagon with centre a . Let hpc be a triangle with circumcentre g . Let hep be collinear. Let bf be parallel to gp . Let cbg be collinear. Let $L1$ be the angle bisector of af and hc . Let $L2$ be the angle bisector of ef and he . Determine the angle between $L1$ and $L2$.



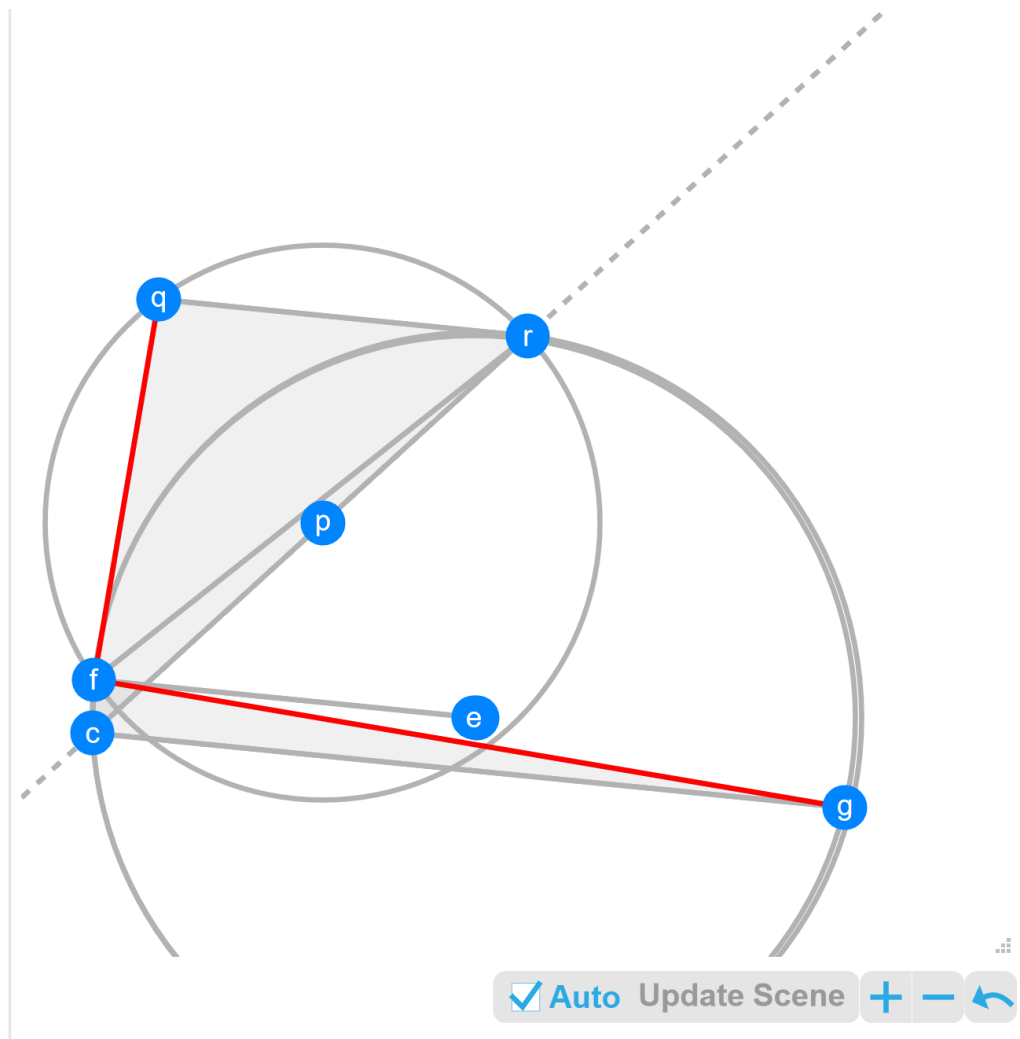
Let $bcpe$ be a cyclic quadrilateral with centre a . Let bc be parallel to pe . Let gcp be a triangle with circumcentre f . Let be be parallel to fg . Let L_1 be the angle bisector of gc and pg . Determine the angle between bc and L_1 .



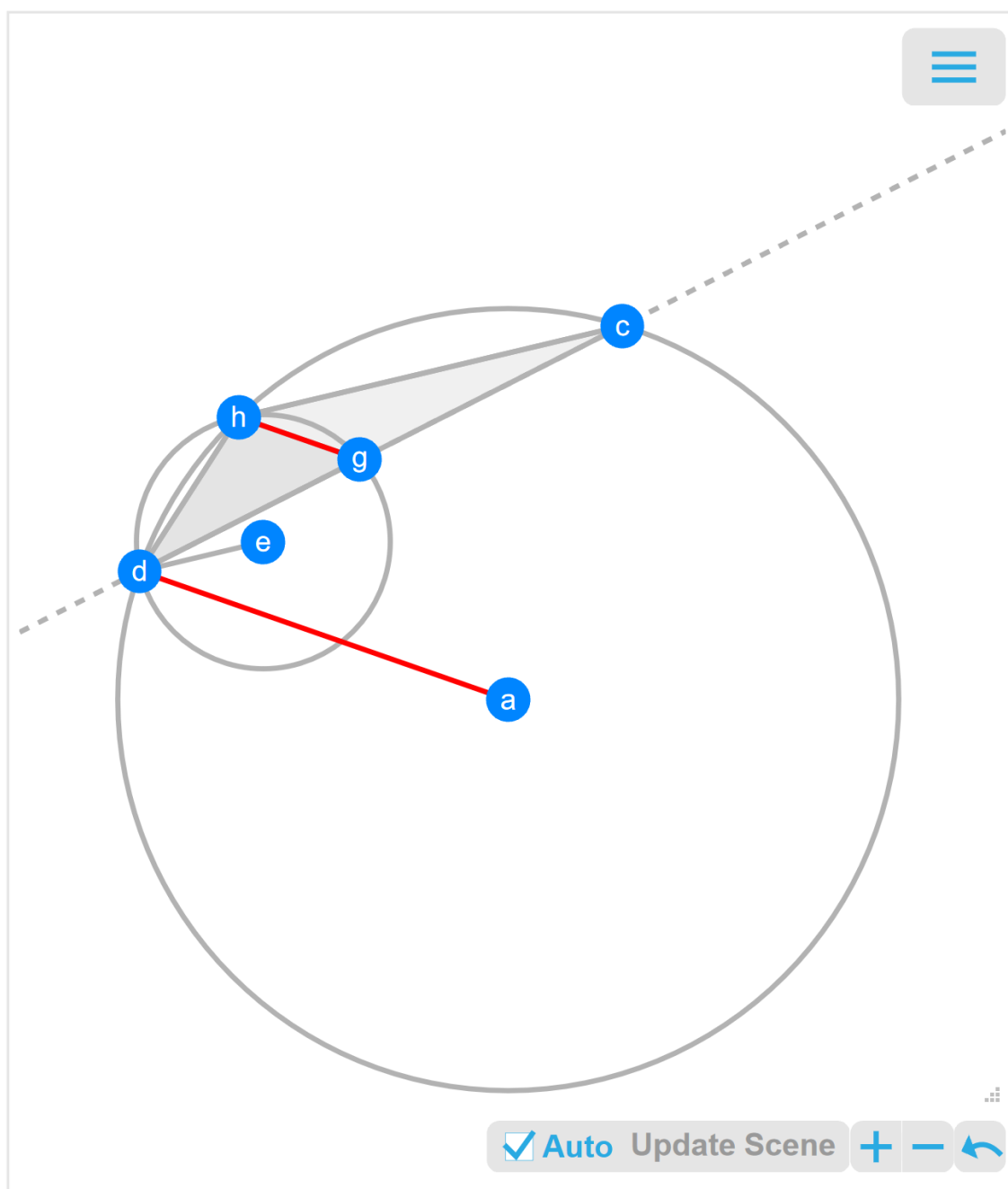
Let $bcde$ be a cyclic quadrilateral with centre a . Let L_1 be the angle bisector of bc and ed . Let L_2 be the angle bisector of dc and be . Determine the angle between L_1 and L_2 .



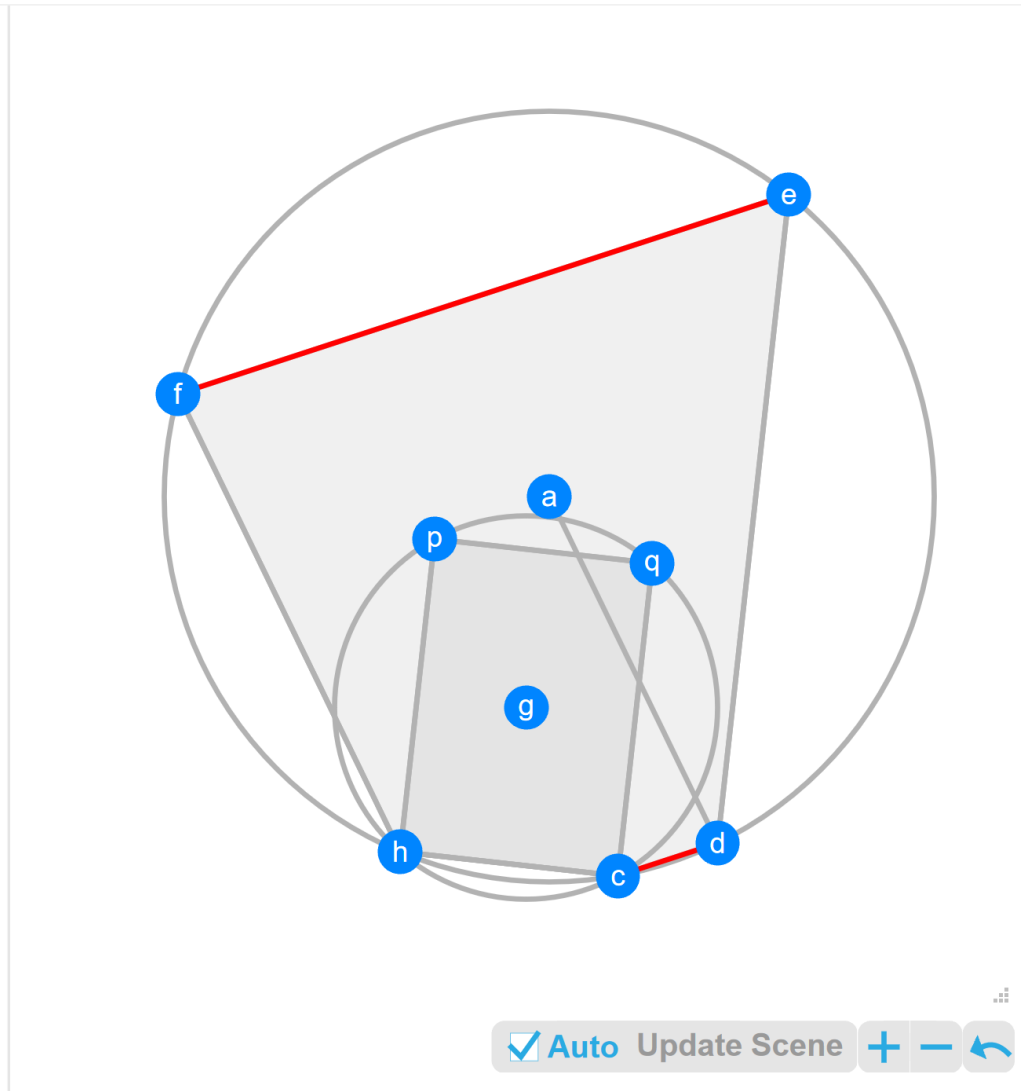
Let bce be a triangle with circumcentre a . Let fbh be a triangle with circumcentre e . Let $L1$ be the reflection of ab in fb . Let $L2$ be the angle bisector of $L1$ and bh . Let $L3$ be the angle bisector of ec and fb . Let $L2$ be parallel to $L3$. Determine the angle between fh and bc .



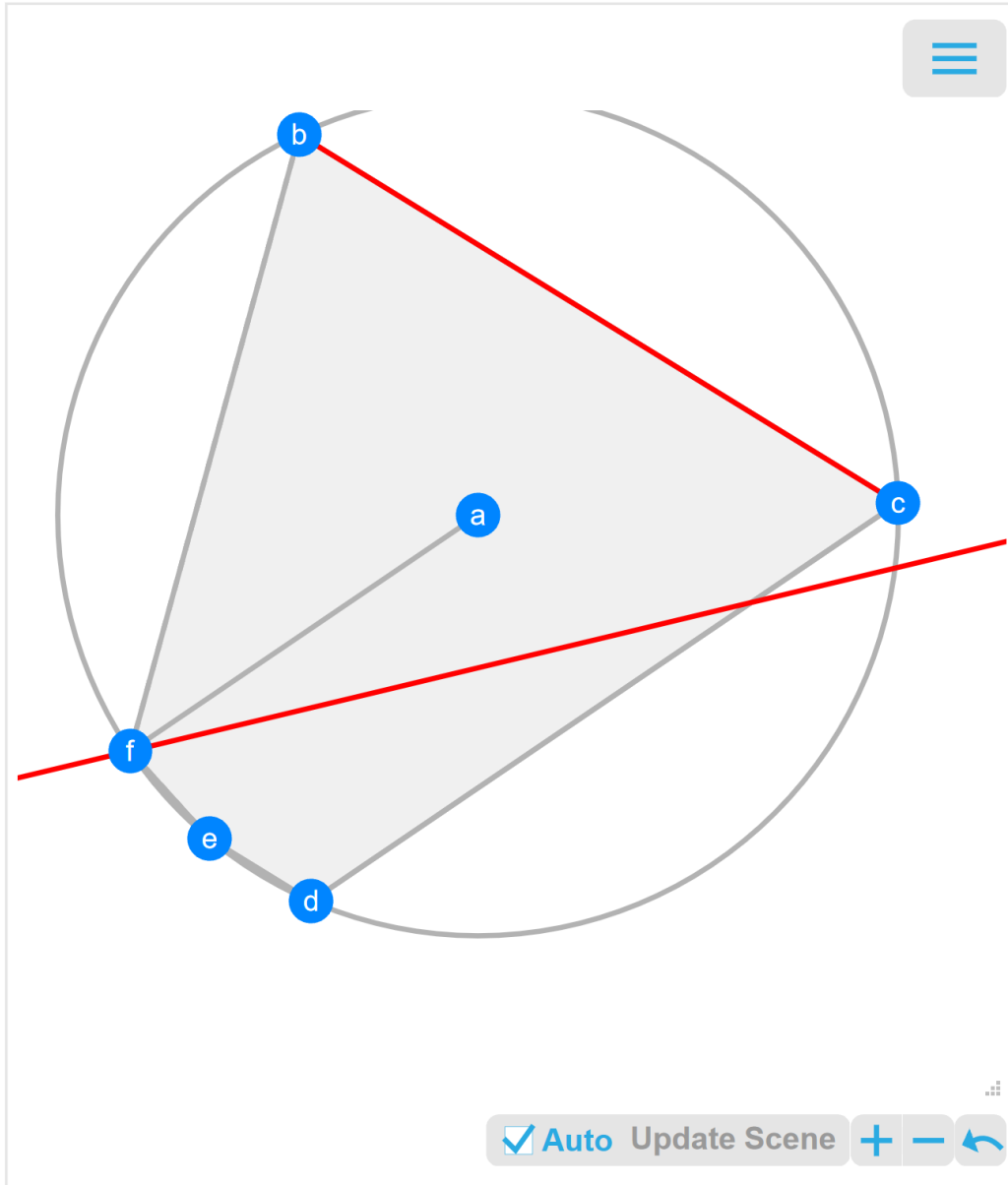
Let fcr be a triangle with circumcentre a . Let fgc be a triangle with circumcentre e . Let af be parallel to cg . Let qrf be a triangle with circumcentre p . Let ef be parallel to rq . Let rcp be collinear. Determine the angle between qf and fg .



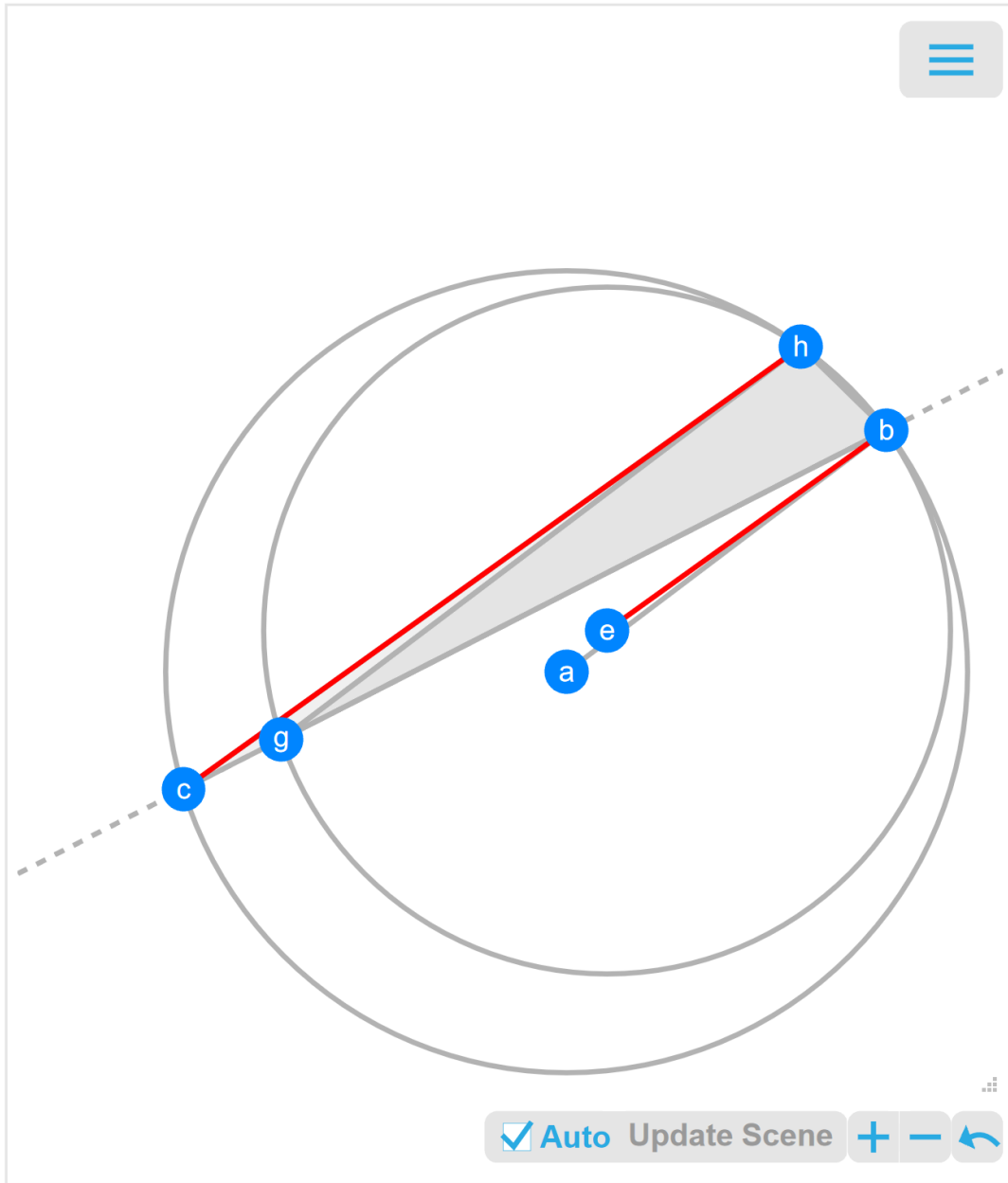
Let hcd be a triangle with circumcentre a . Let dgh be a triangle with circumcentre e . Let dgc be collinear. Let hc be parallel to ed . Determine the angle between ad and hg .



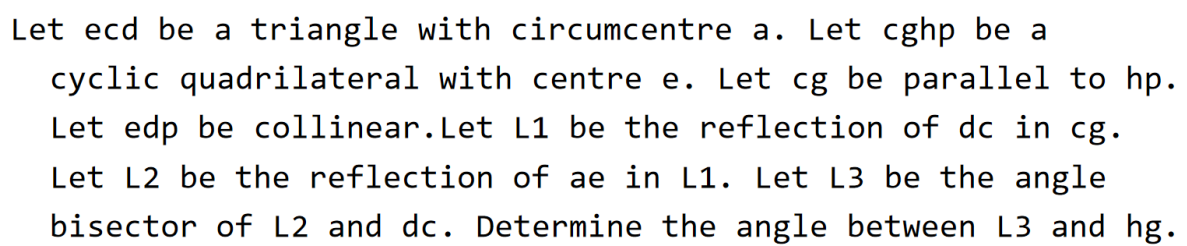
Let $hcdfe$ be a cyclic pentagon with centre a . Let ad be parallel to hf . Let $hpqc$ be a cyclic quadrilateral with centre g . Let de be parallel to hp . Let hc be parallel to qp . Let de be parallel to cq . Determine the angle between fe and dc .

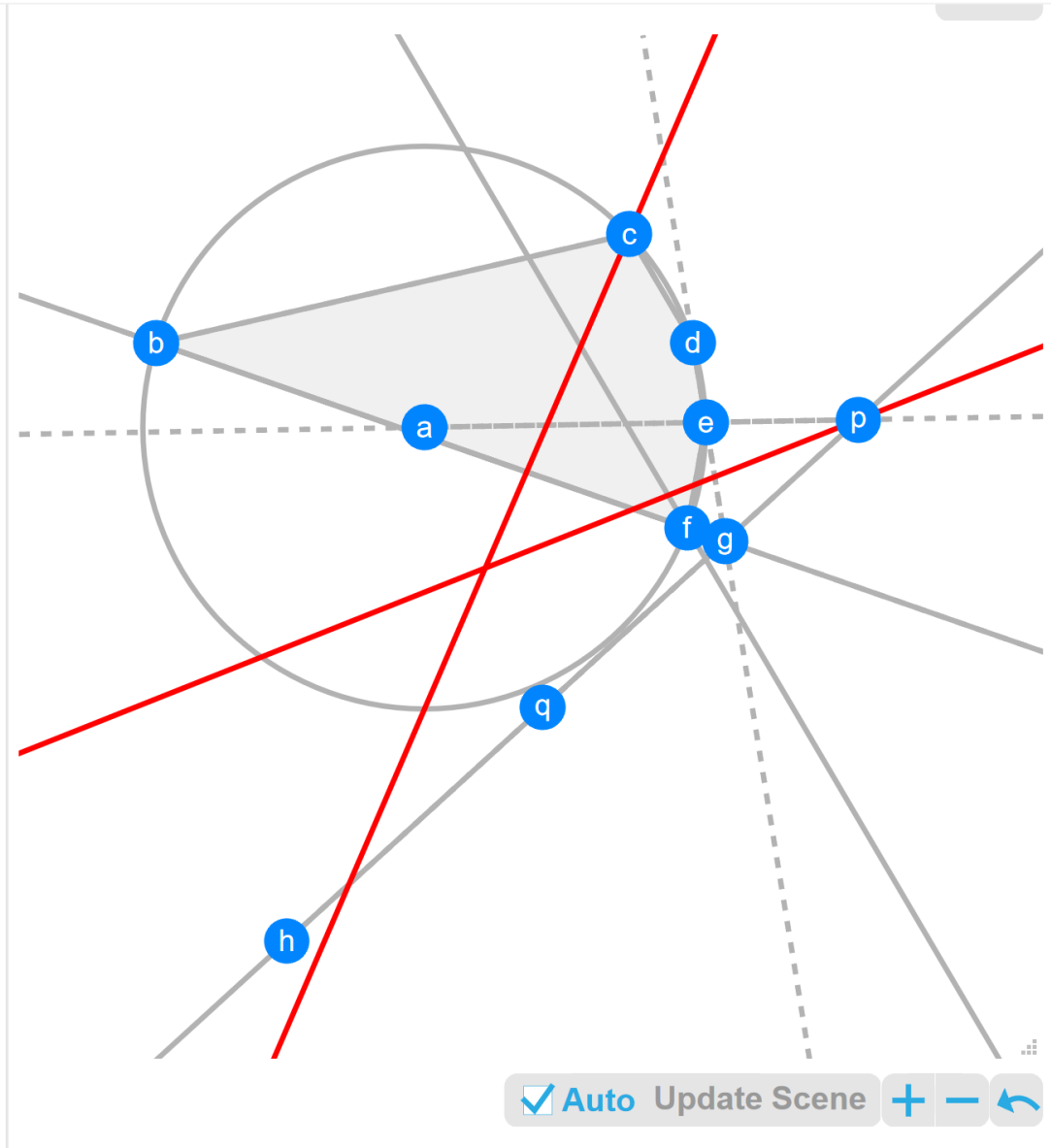


Let $bcdef$ be a cyclic pentagon with centre a . Let af be parallel to dc . Let bc be parallel to de . Let $L1$ be the angle bisector of ef and bf . Determine the angle between bc and $L1$.

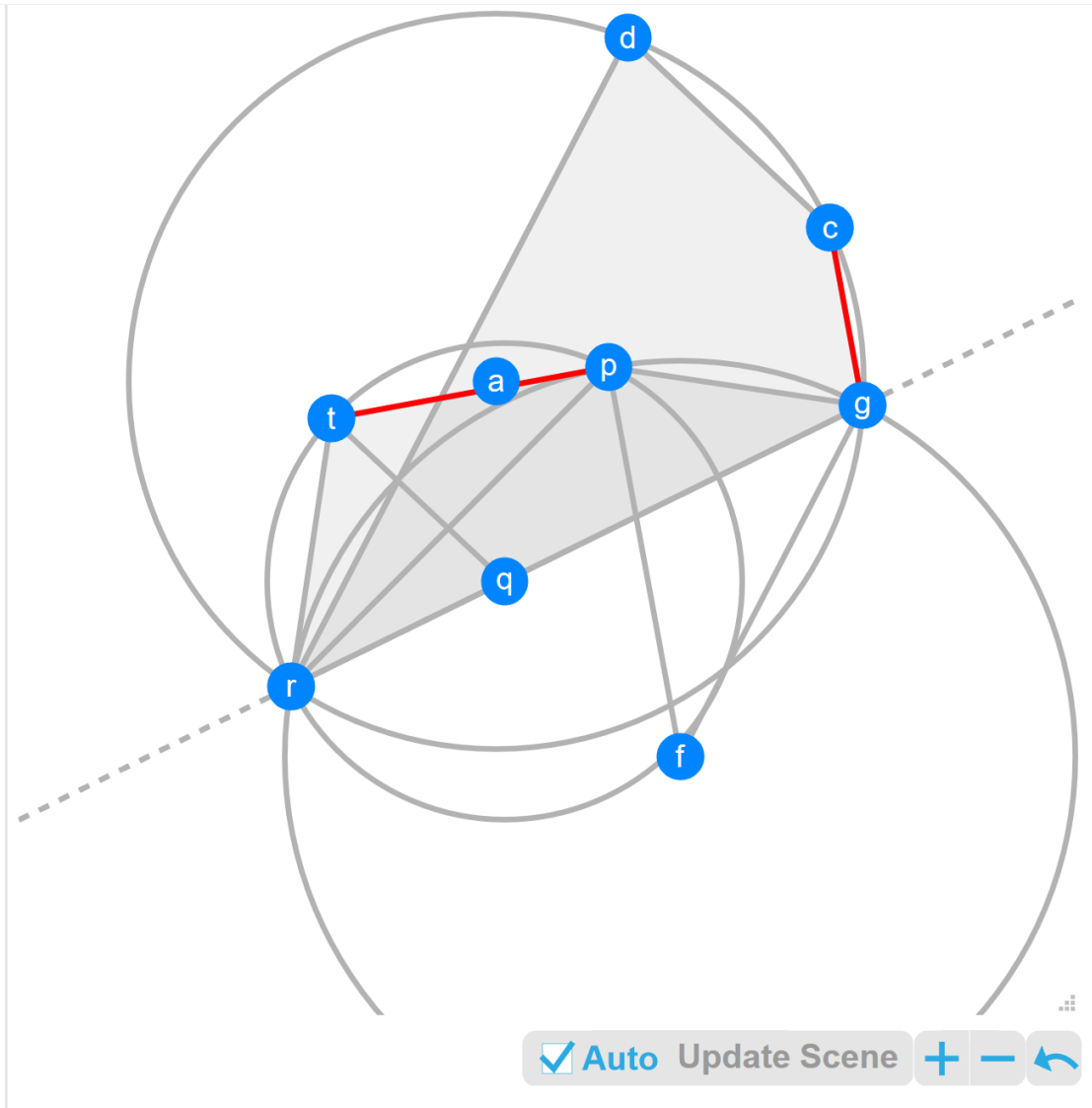


Let bch be a triangle with circumcentre a . Let bgh be a triangle with circumcentre e . Let bcg be collinear. Let ab be parallel to hg . Determine the angle between eb and hc .

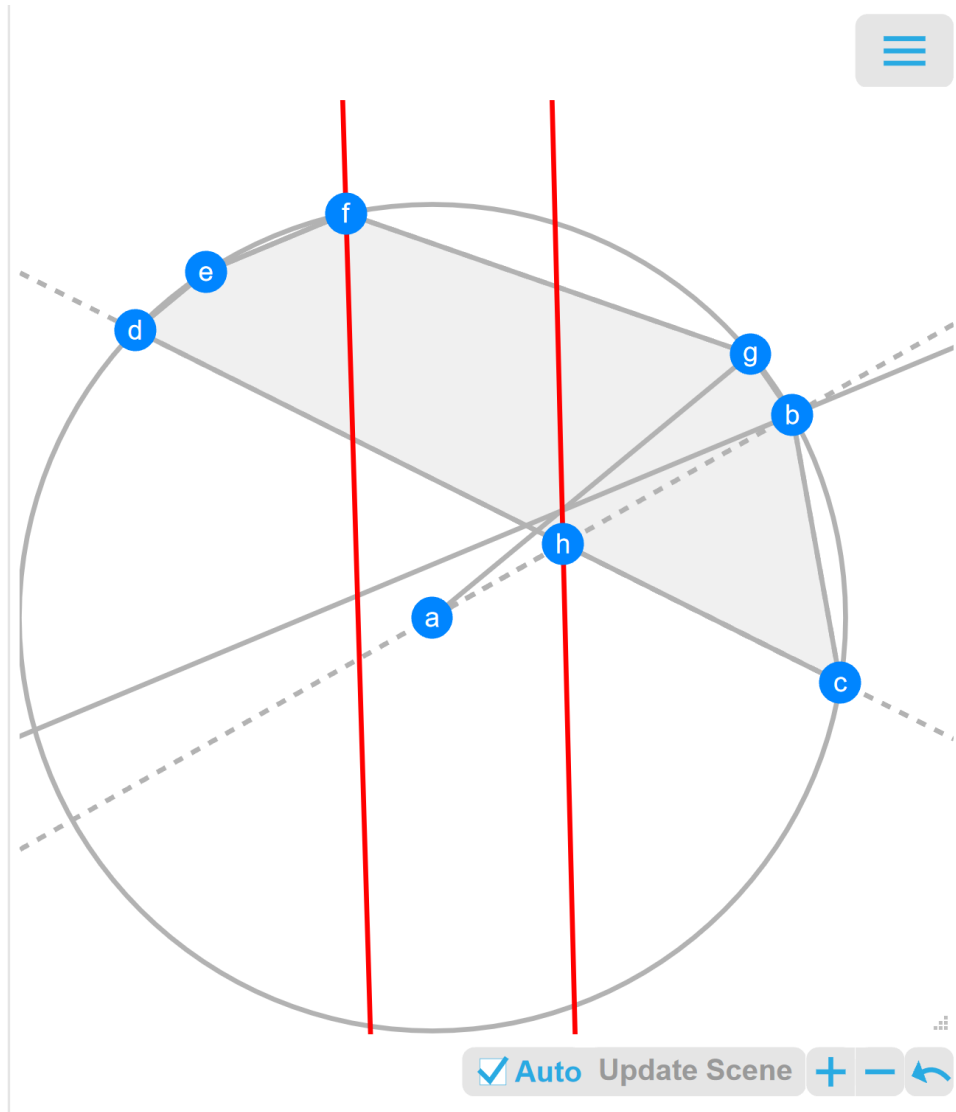




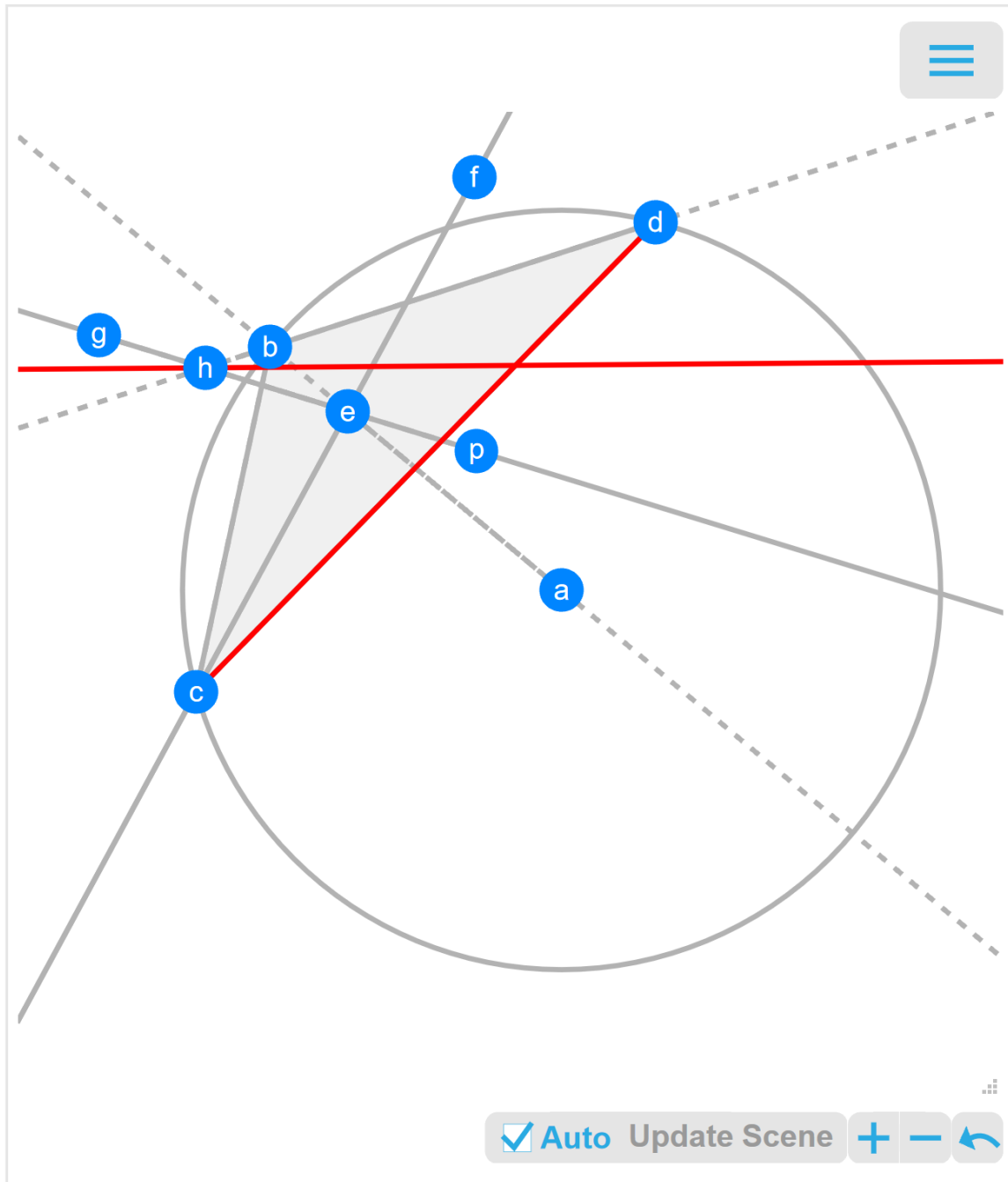
Let $bcdef$ be a cyclic pentagon with centre a . Let $L1$ be the angle bisector of bc and dc . Let $L2$ be the angle bisector of bf and fe . Let dc be parallel to $L2$. Let $L3$ be the reflection of ed in bf . Let $L4$ be the angle bisector of $L3$ and ae . Determine the angle between $L1$ and $L4$.



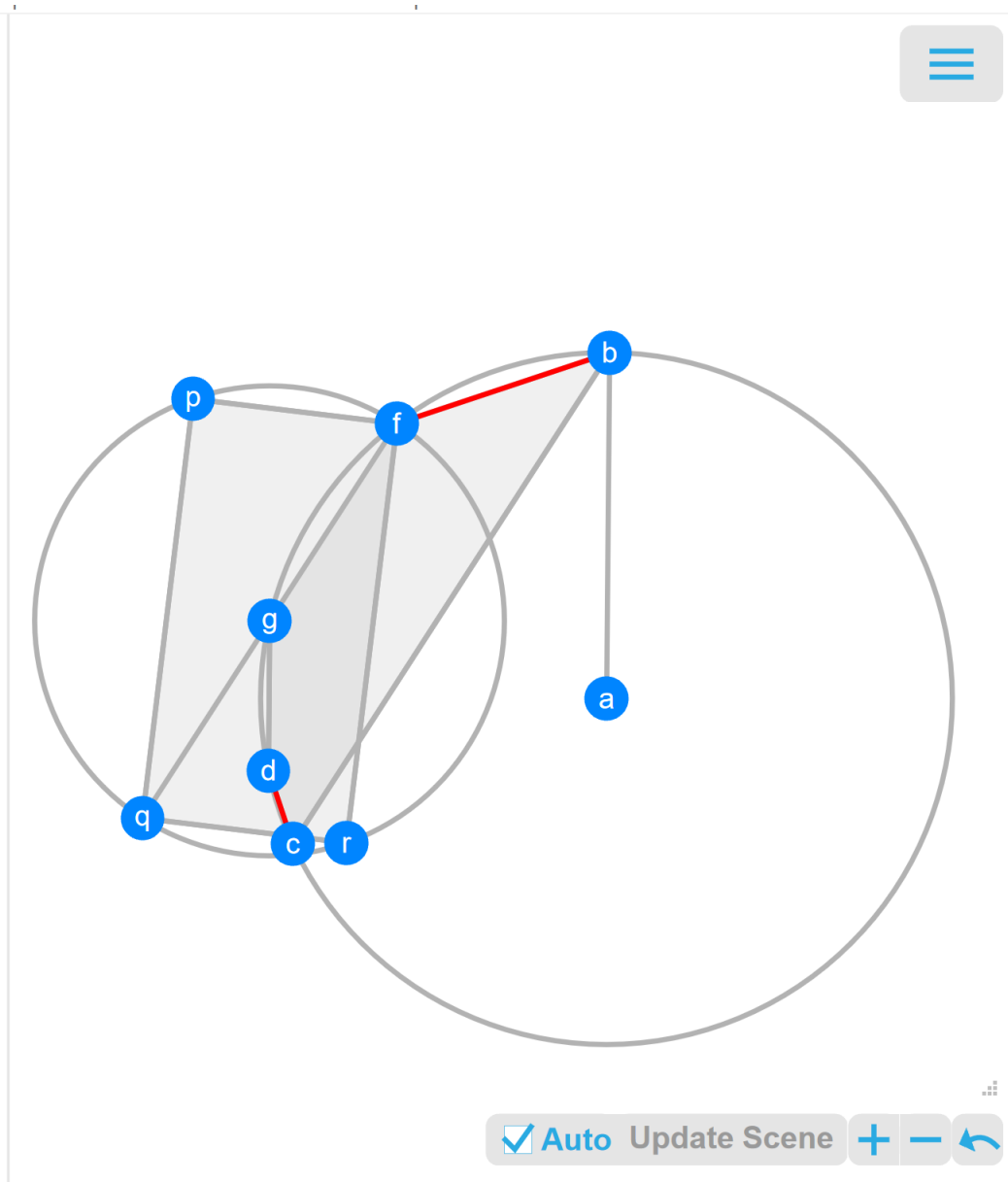
Let $gcdr$ be a cyclic quadrilateral with centre a . Let grp be a triangle with circumcentre f . Let dr be parallel to fg . Let gc be parallel to fp . Let rpt be a triangle with circumcentre q . Let rgq be collinear. Let dc be parallel to qt . Determine the angle between gc and pt .



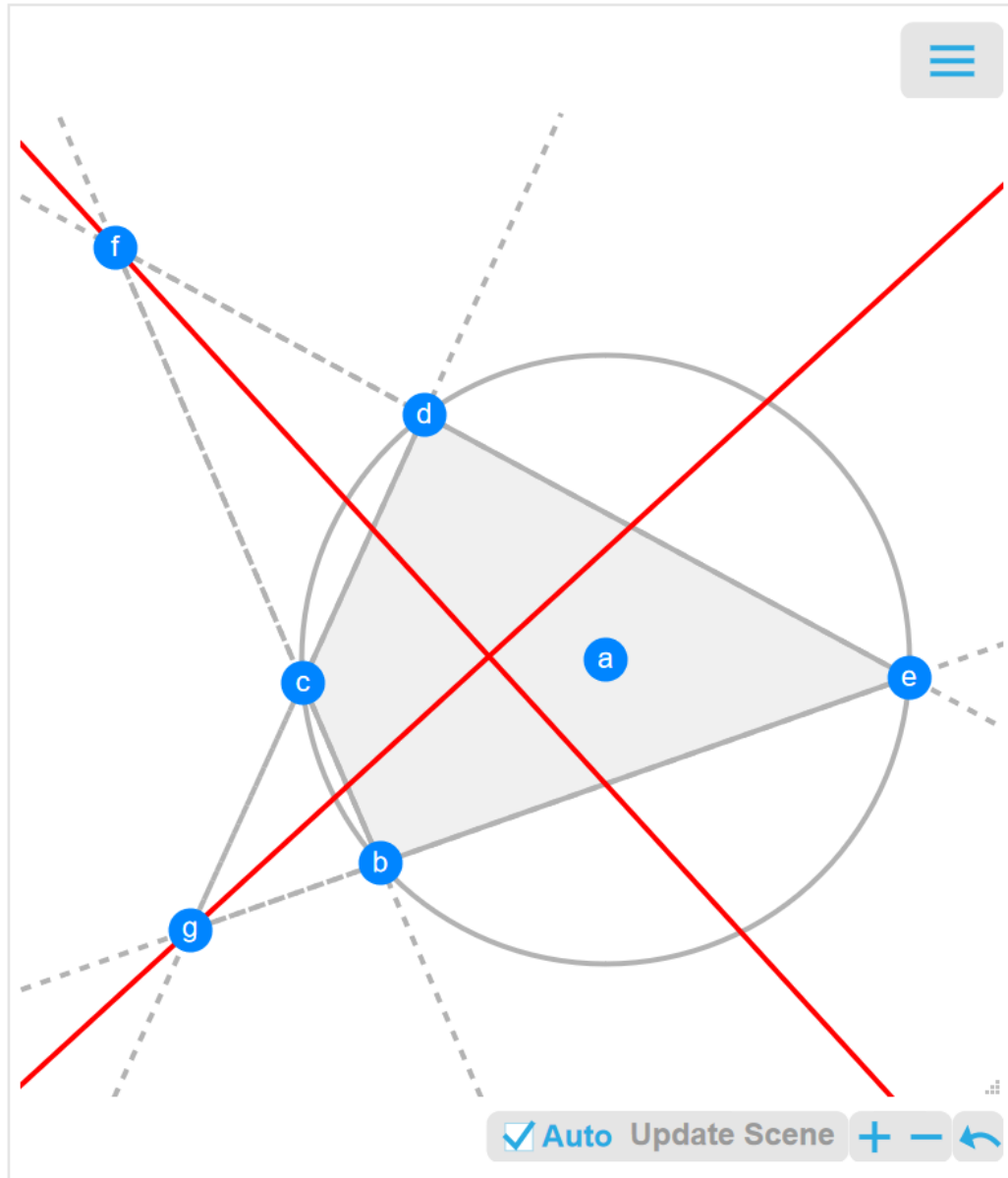
Let $bcdefg$ be a cyclic hexagon with centre a . Let ag be parallel to de . Let $L1$ be the angle bisector of ab and cd . Let $L2$ be the angle bisector of gb and bc . Let fe be parallel to $L2$. Let $L3$ be the angle bisector of fg and fe . Determine the angle between $L1$ and $L3$.



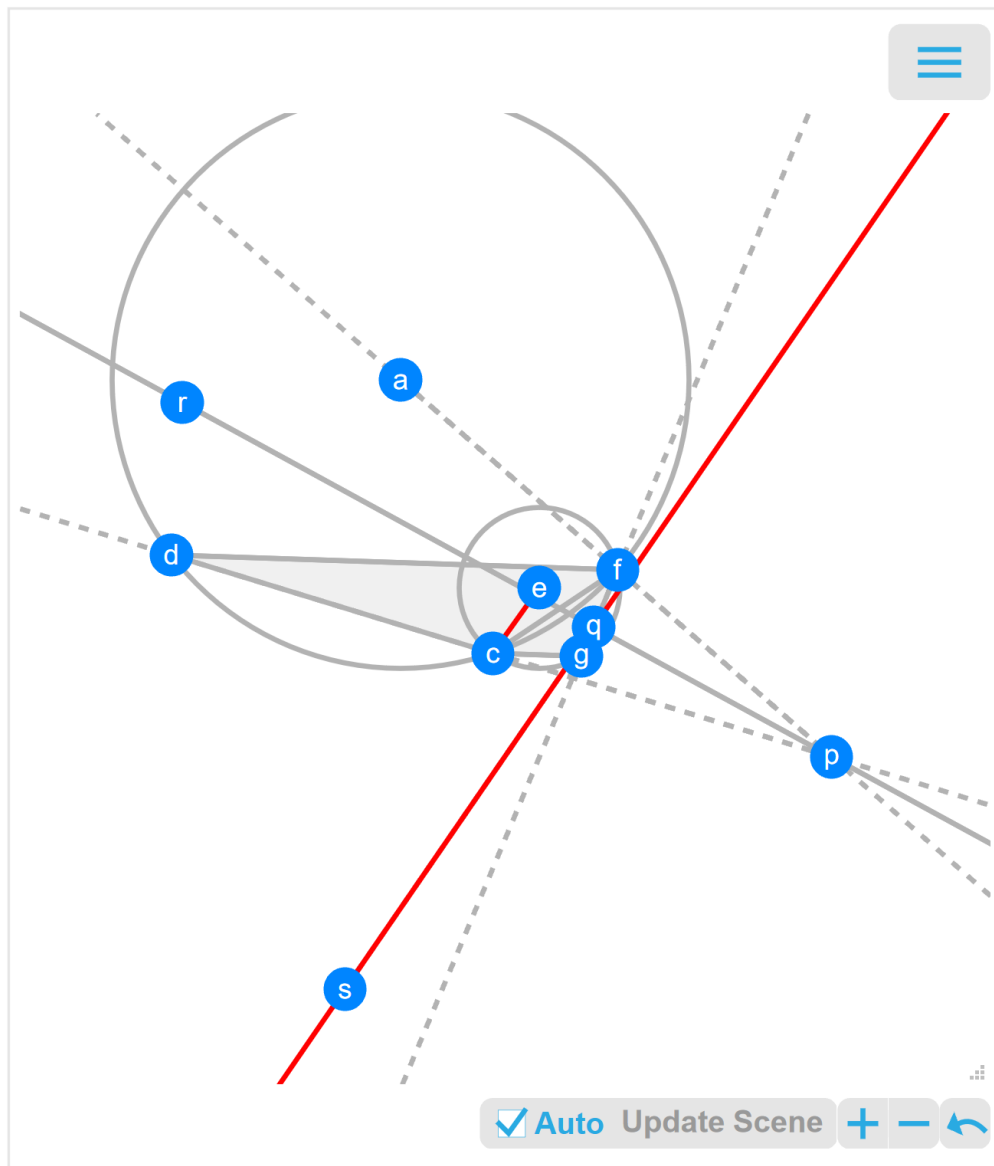
Let bcd be a triangle with circumcentre a . Let L_1 be the angle bisector of cd and bc . Let L_2 be the reflection of ab in L_1 . Let L_3 be the angle bisector of db and L_2 . Determine the angle between cd and L_3 .



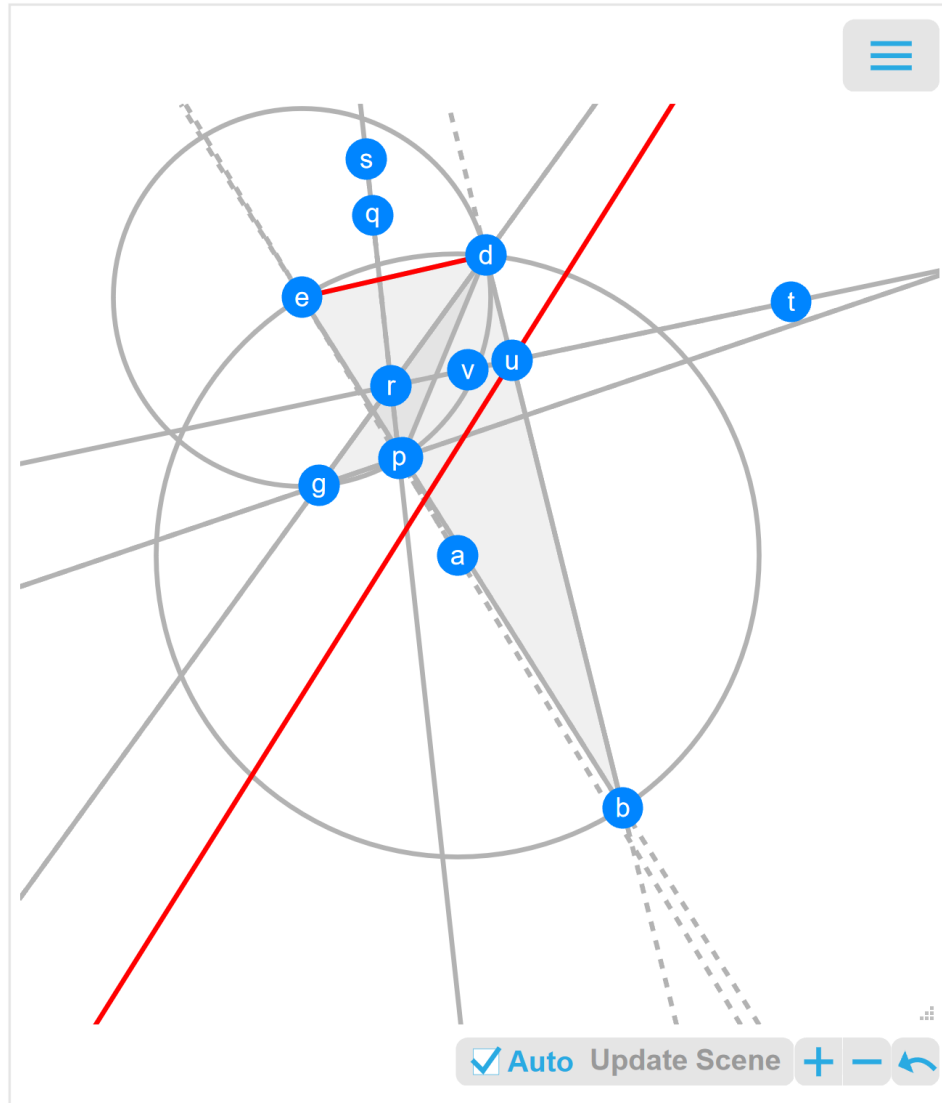
Let $bcdgf$ be a cyclic pentagon with centre a . Let ab be parallel to dg . Let $fpqr$ be a cyclic quadrilateral with centre g . Let rf be parallel to pq . Let fp be parallel to rq . Let bc be parallel to gq . Determine the angle between bf and dc .



Let $bcde$ be a cyclic quadrilateral with centre a . Let L_1 be the angle bisector of bc and ed . Let L_2 be the angle bisector of dc and be . Determine the angle between L_1 and L_2 .



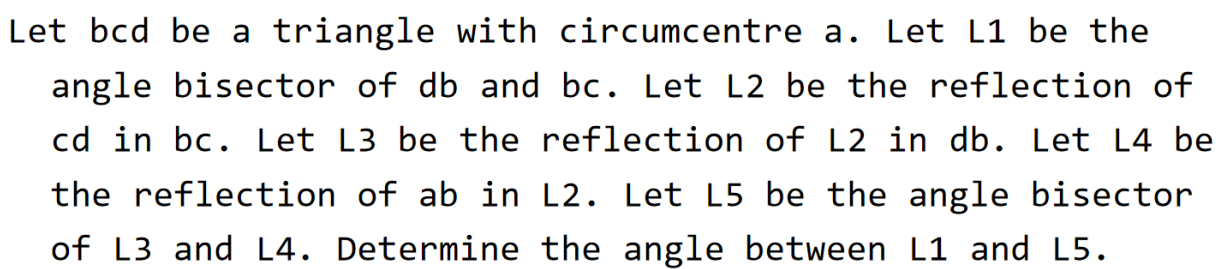
Let fcd be a triangle with circumcentre a . Let fgc be a triangle with circumcentre e . Let df be parallel to cg . Let $L1$ be the angle bisector of af and dc . Let $L2$ be the reflection of fg in $L1$. Determine the angle between ec and $L2$.

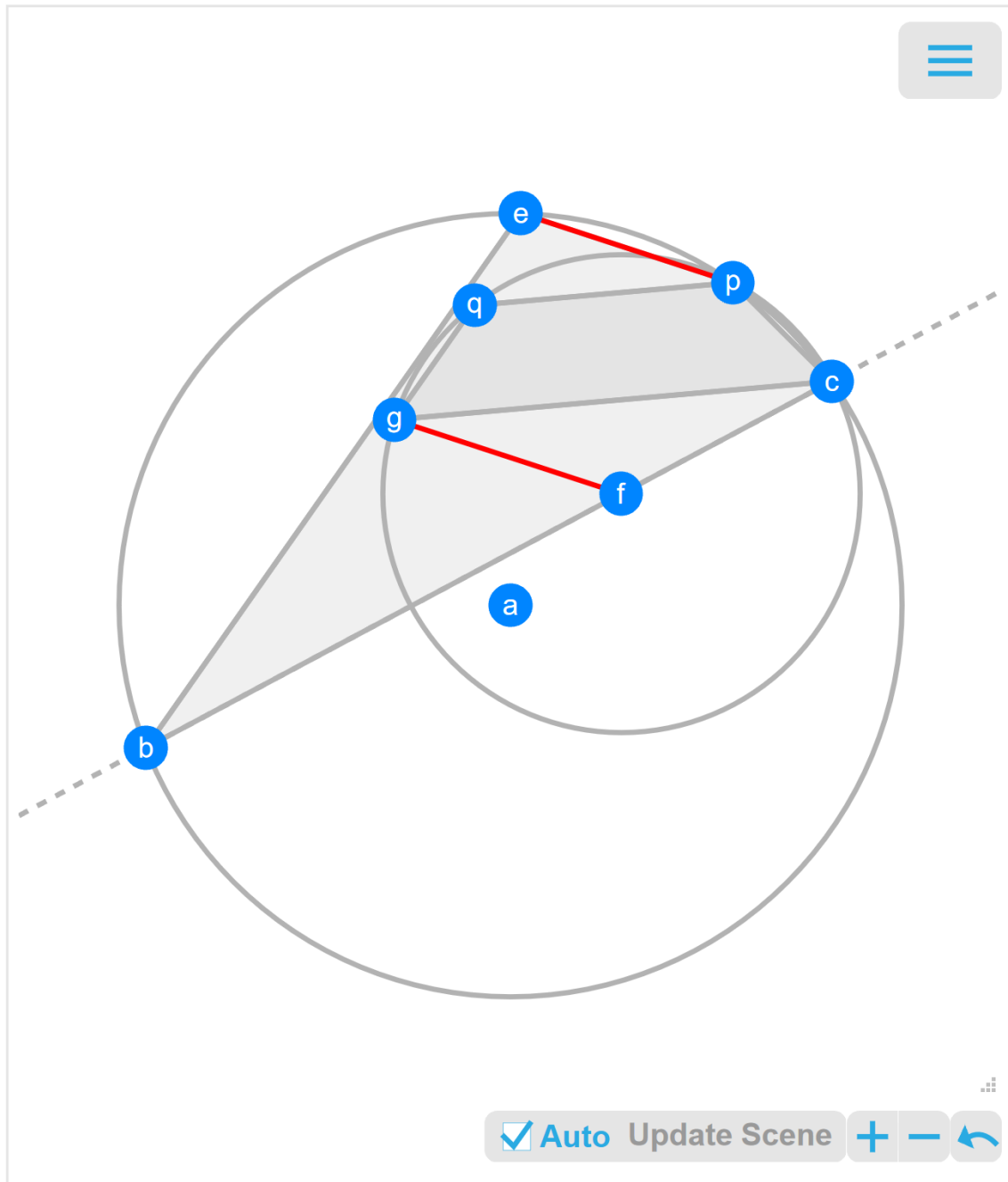


Let bed be a triangle with circumcentre a . Let dgh be a triangle with circumcentre e . Let ebh be collinear. Let L_1 be the reflection of ae in gh . Let L_2 be the reflection of L_1 in dg . Let L_3 be the angle bisector of bd and L_2 . Determine the angle between ed and L_3 .

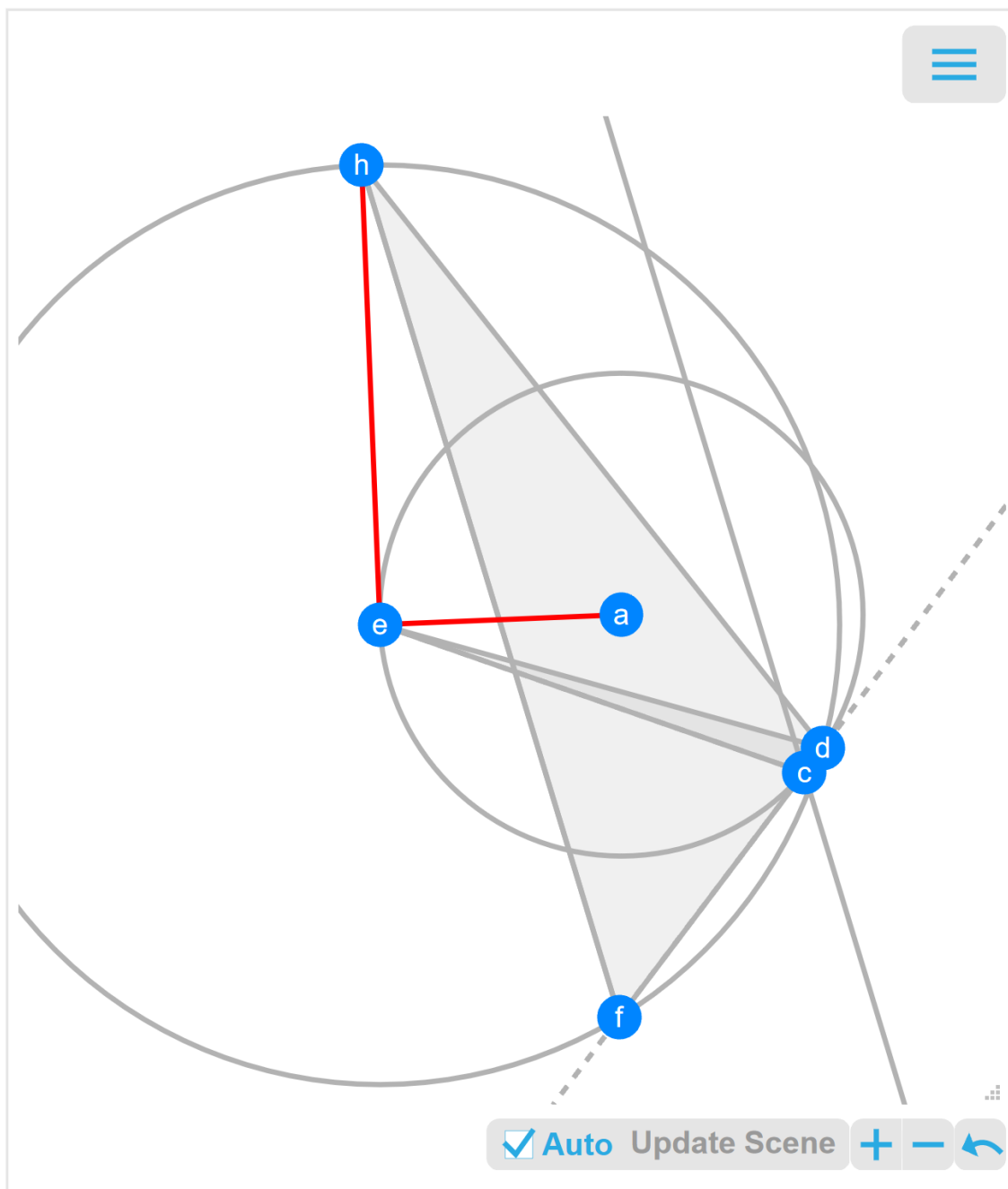


Let $gcde$ be a cyclic quadrilateral with centre a . Let ge be parallel to dc . Let $ghpc$ be a cyclic quadrilateral with centre f . Let gc be parallel to ph . Let gh be parallel to cp . Let L_1 be the reflection of gh in ge . Determine the angle between L_1 and ed .

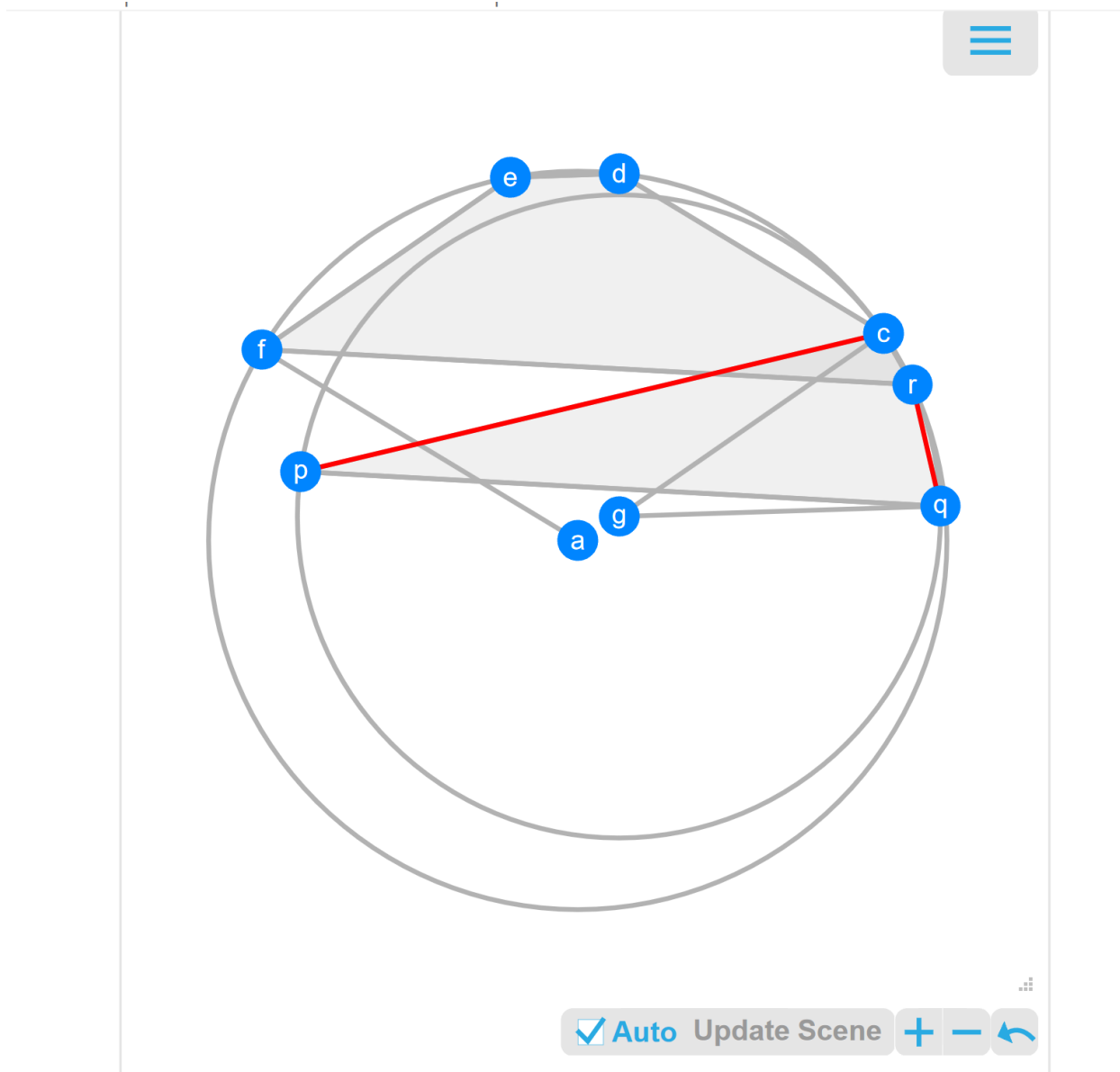




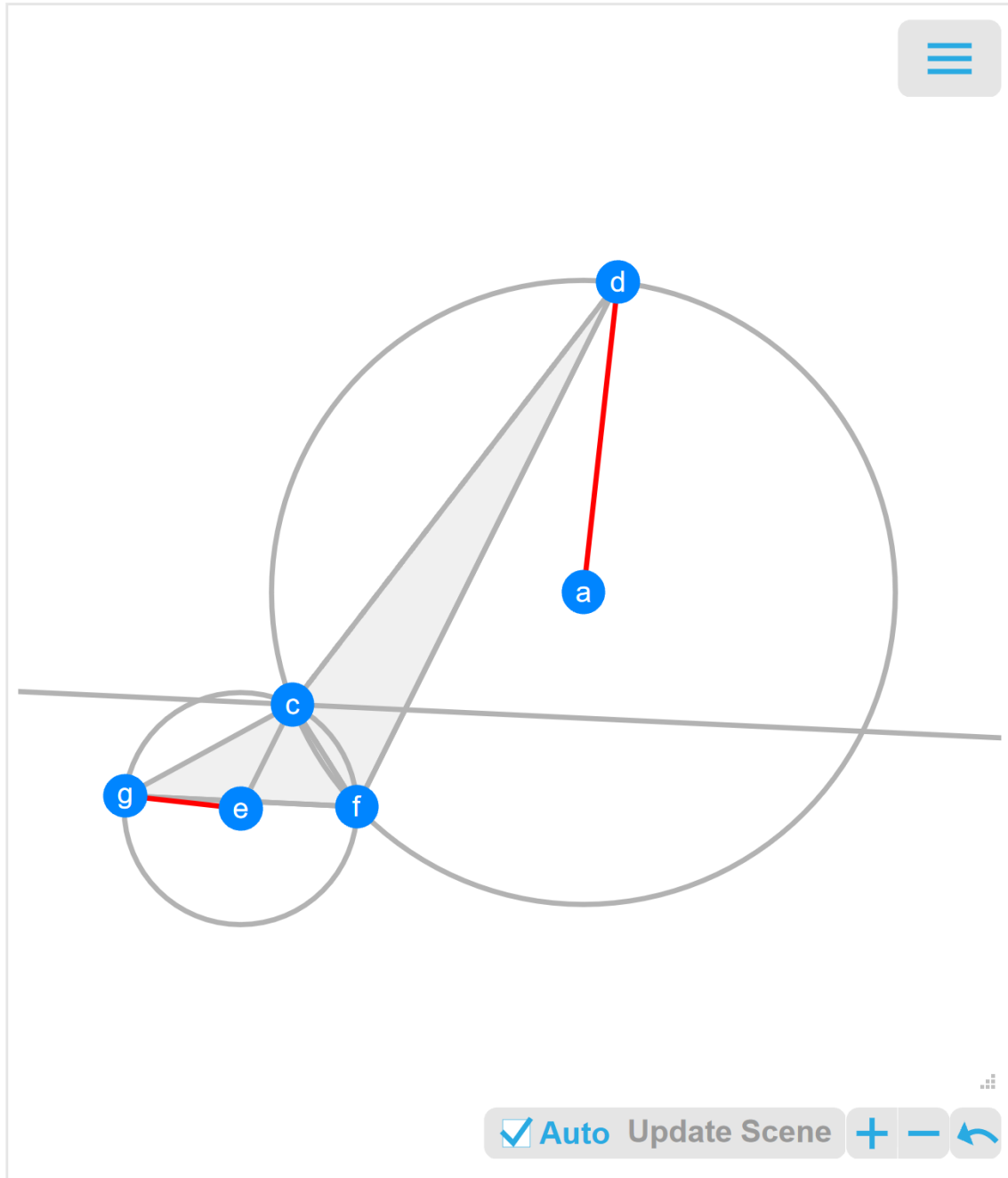
Let $bcpe$ be a cyclic quadrilateral with centre a . Let $gcpq$ be a cyclic quadrilateral with centre f . Let be be parallel to qg . Let gc be parallel to qp . Let cbf be collinear. Determine the angle between fg and pe .



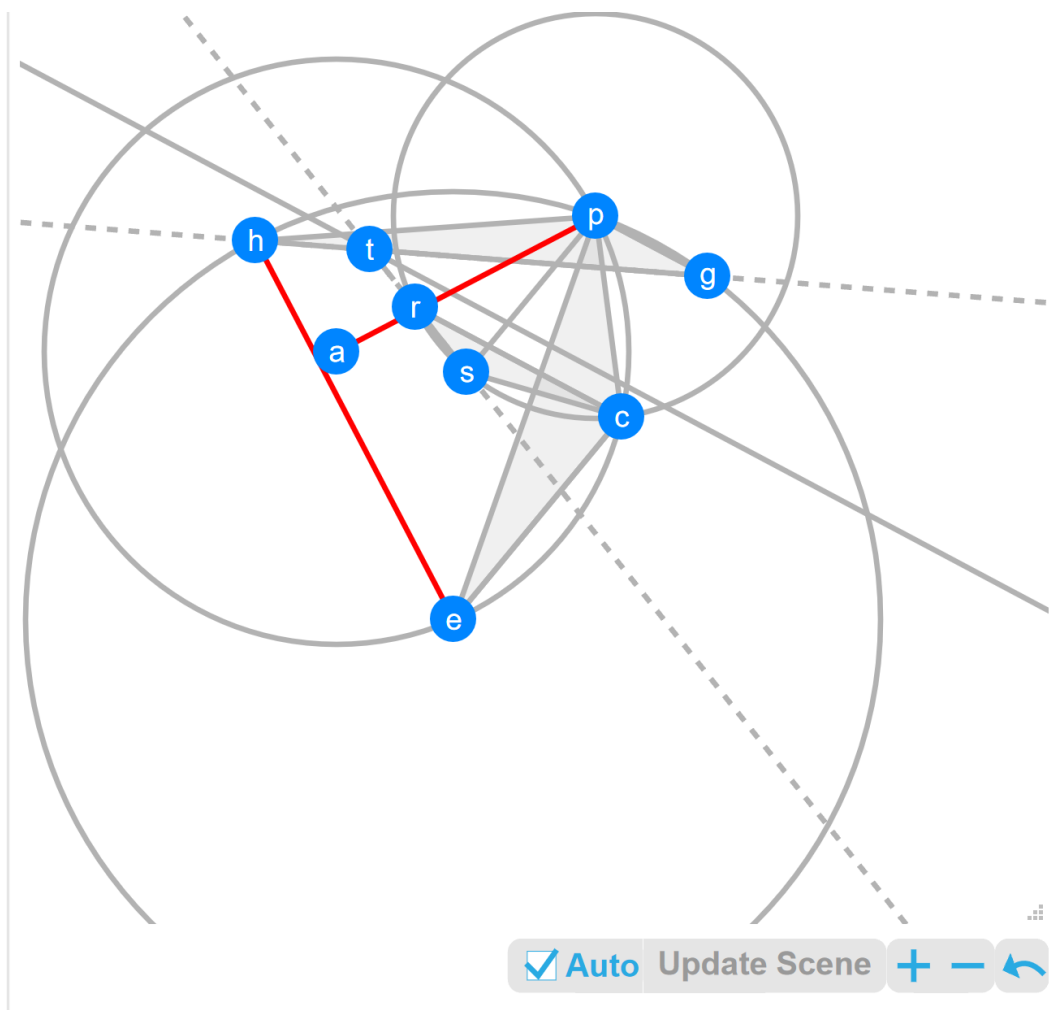
Let ecd be a triangle with circumcentre a . Let fdh be a triangle with circumcentre e . Let dcf be collinear. Let L_1 be the angle bisector of ec and dc . Let fh be parallel to L_1 . Determine the angle between ae and eh .



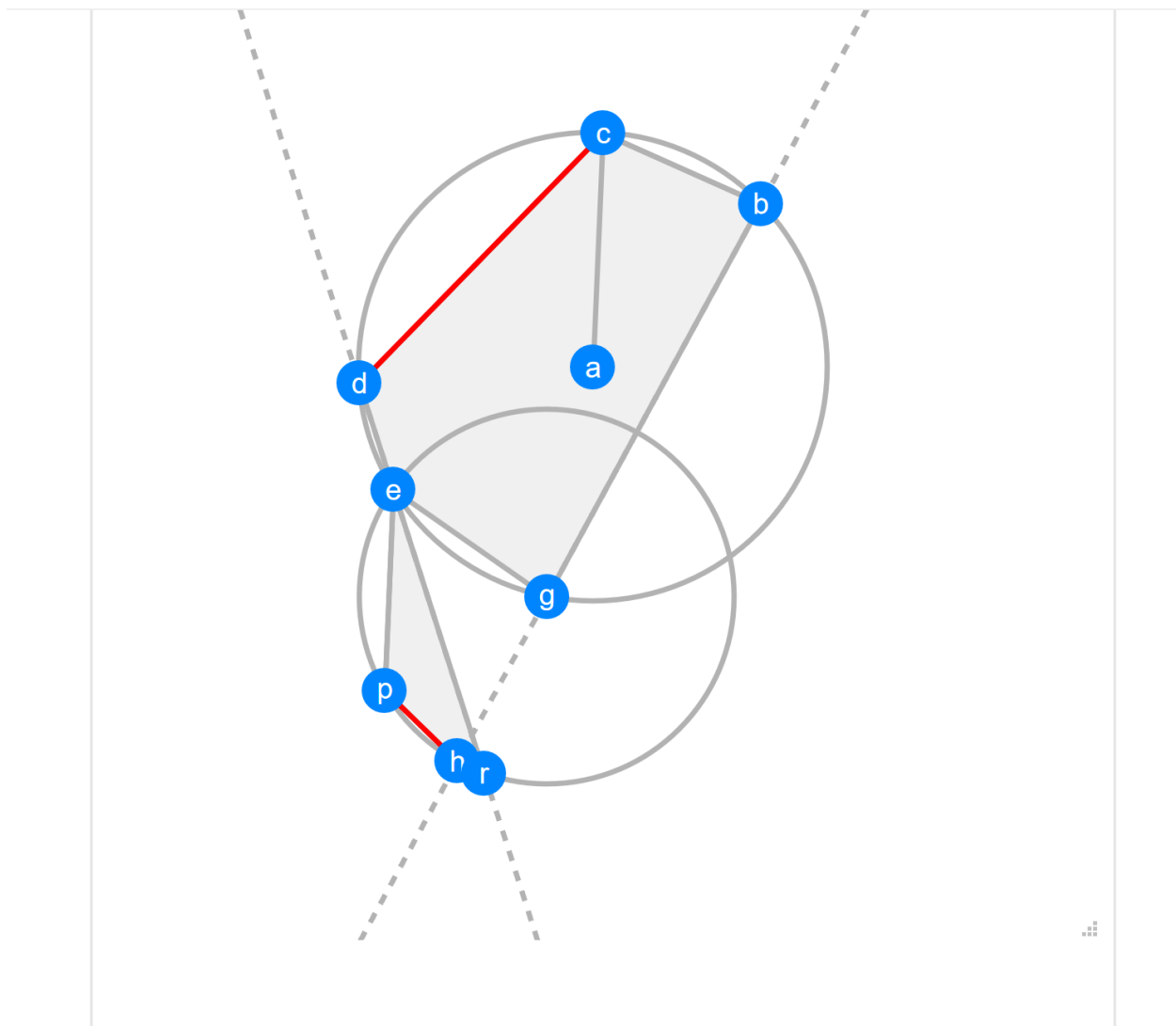
Let $rcdef$ be a cyclic pentagon with centre a . Let af be parallel to dc . Let $cpqr$ be a cyclic quadrilateral with centre g . Let rf be parallel to qp . Let fe be parallel to gc . Let de be parallel to gq . Determine the angle between cp and rq .



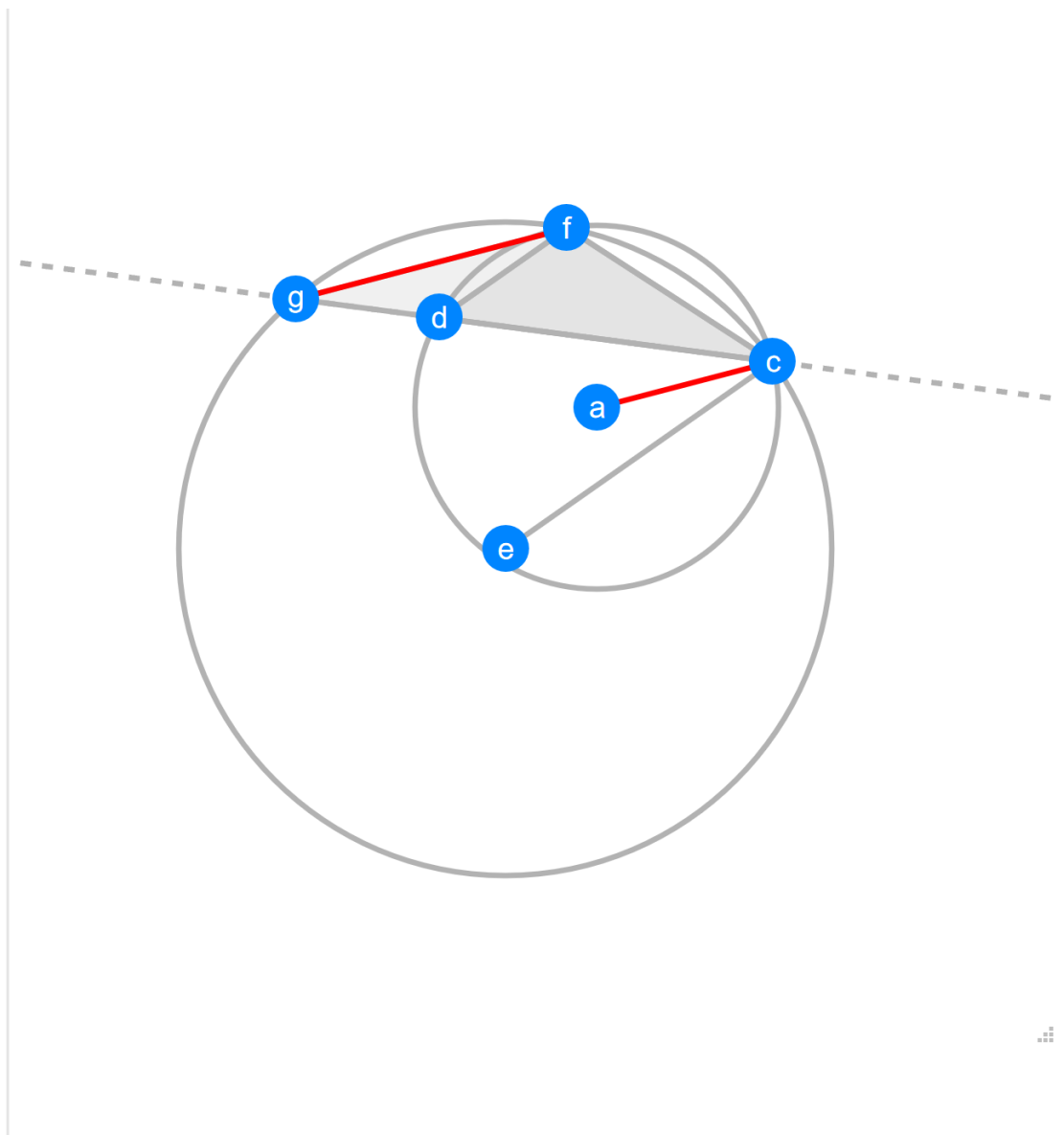
Let $\triangle fcd$ be a triangle with circumcentre a . Let $\triangle fgc$ be a triangle with circumcentre e . Let fd be parallel to ec . Let $L1$ be the angle bisector of $\angle dc$ and $\angle fc$. Let fg be parallel to $L1$. Determine the angle between ad and eg .



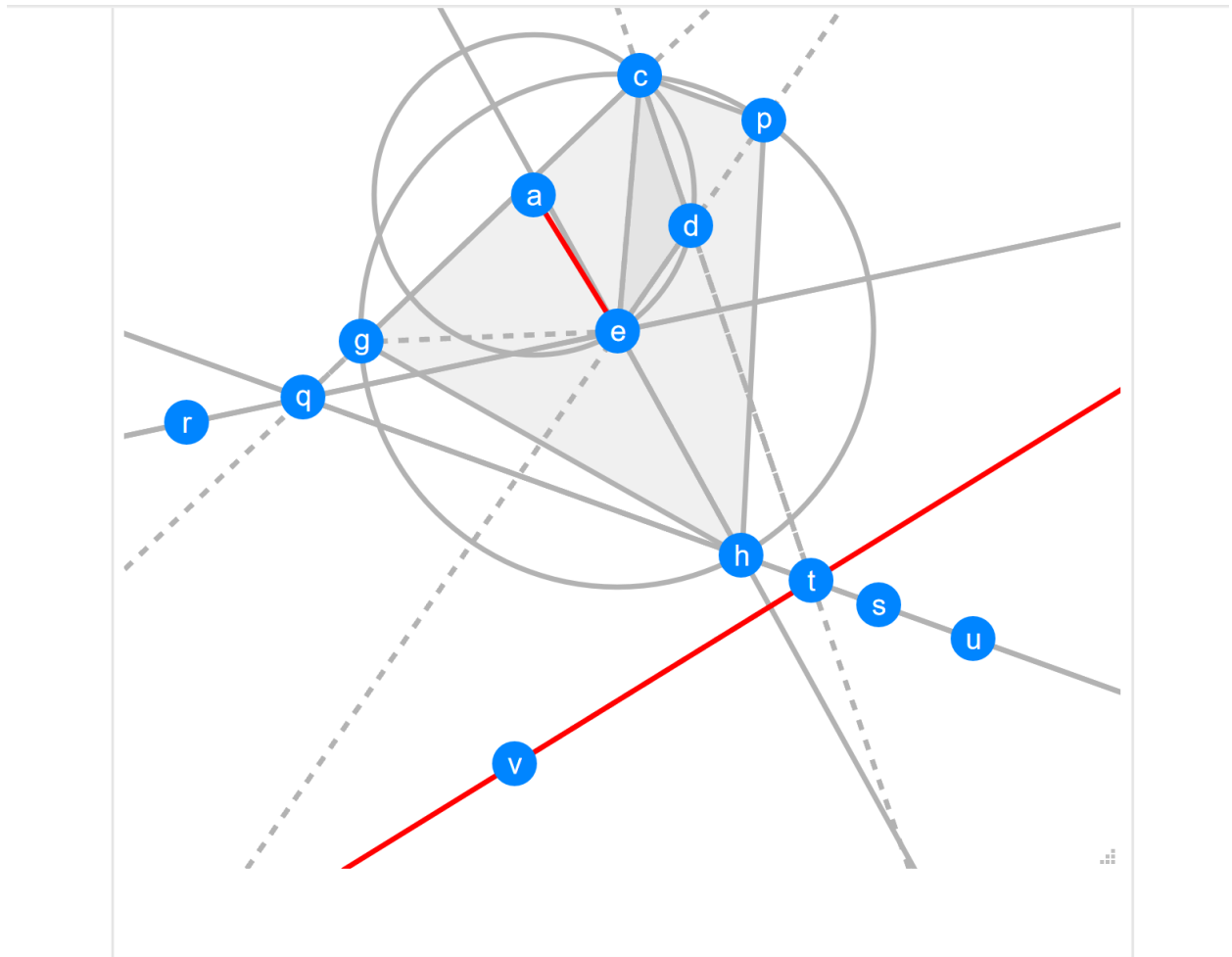
Let pce be a triangle with circumcentre a . Let pgh be a triangle with circumcentre e . Let crs be a triangle with circumcentre p . Let pg be parallel to cr . Let ec be parallel to ps . Let $L1$ be the angle bisector of hg and sr . Let pg be parallel to $L1$. Determine the angle between ap and eh .



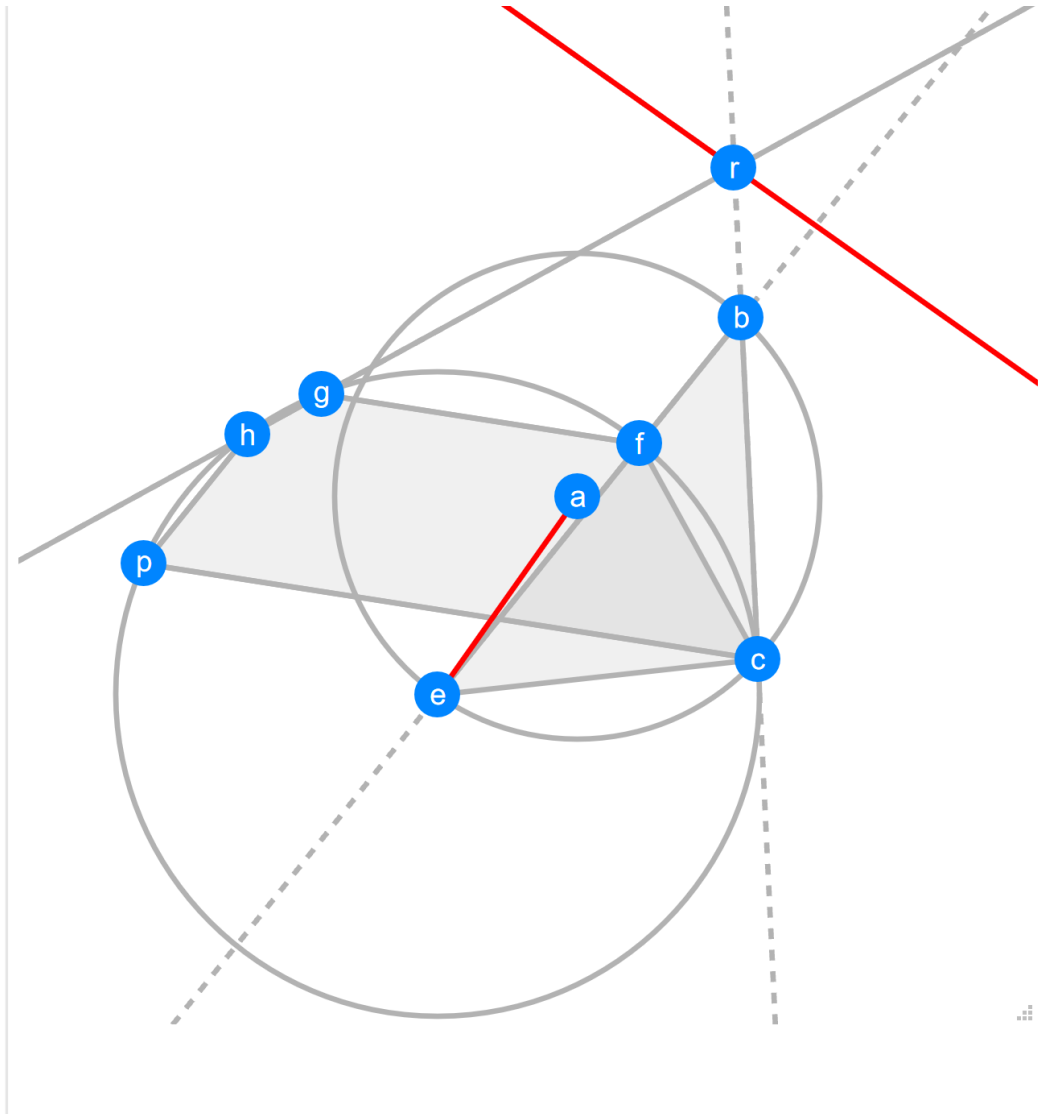
Let $bcdeg$ be a cyclic pentagon with centre a . Let $hper$ be a cyclic quadrilateral with centre g . Let cb be parallel to hr . Let ac be parallel to ep . Let edr be collinear. Let gbh be collinear. Determine the angle between dc and hp .



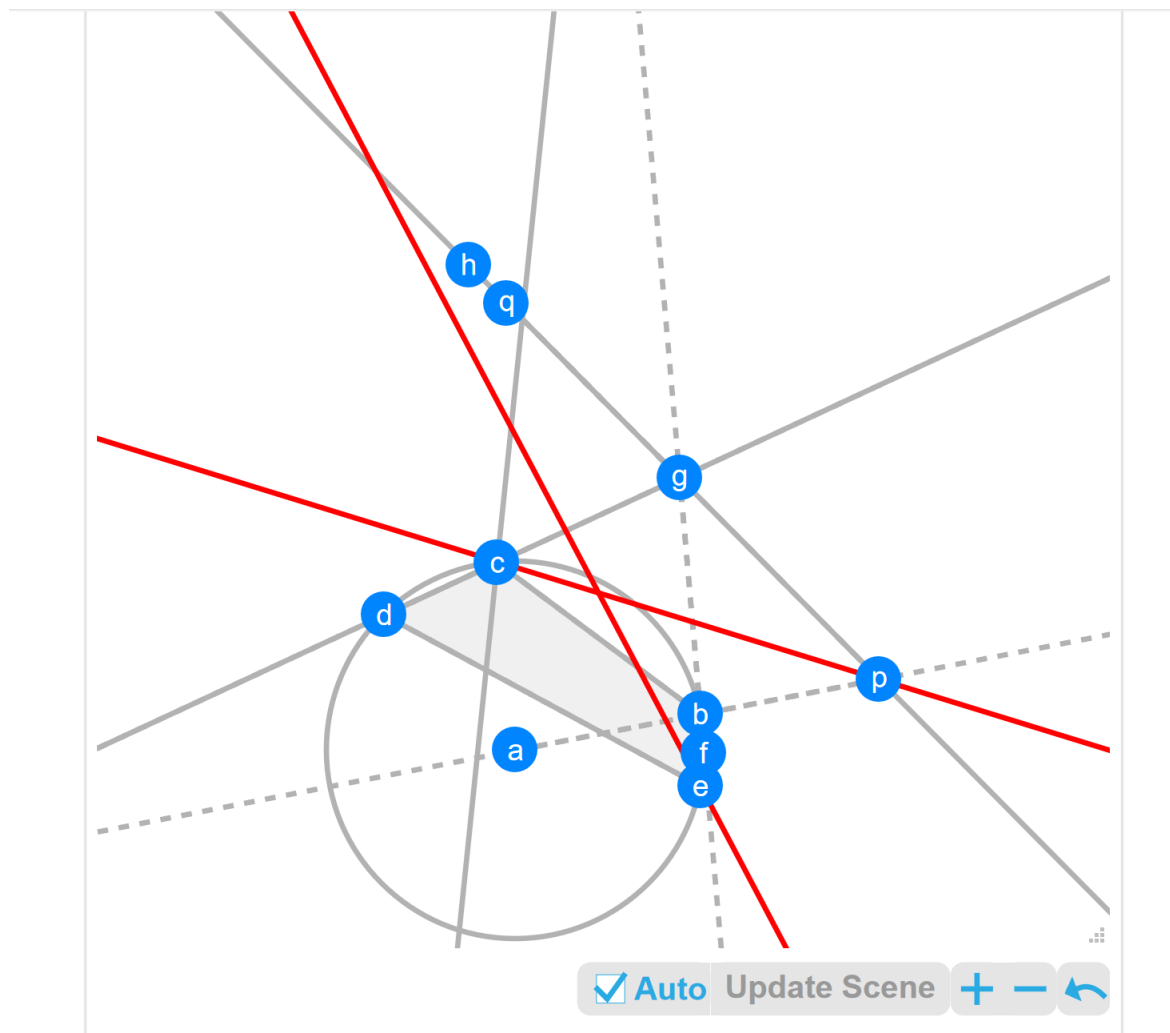
Let fcd be a triangle with circumcentre a . Let fgc be a triangle with circumcentre e . Let cdg be collinear. Let fd be parallel to ec . Determine the angle between ac and fg .



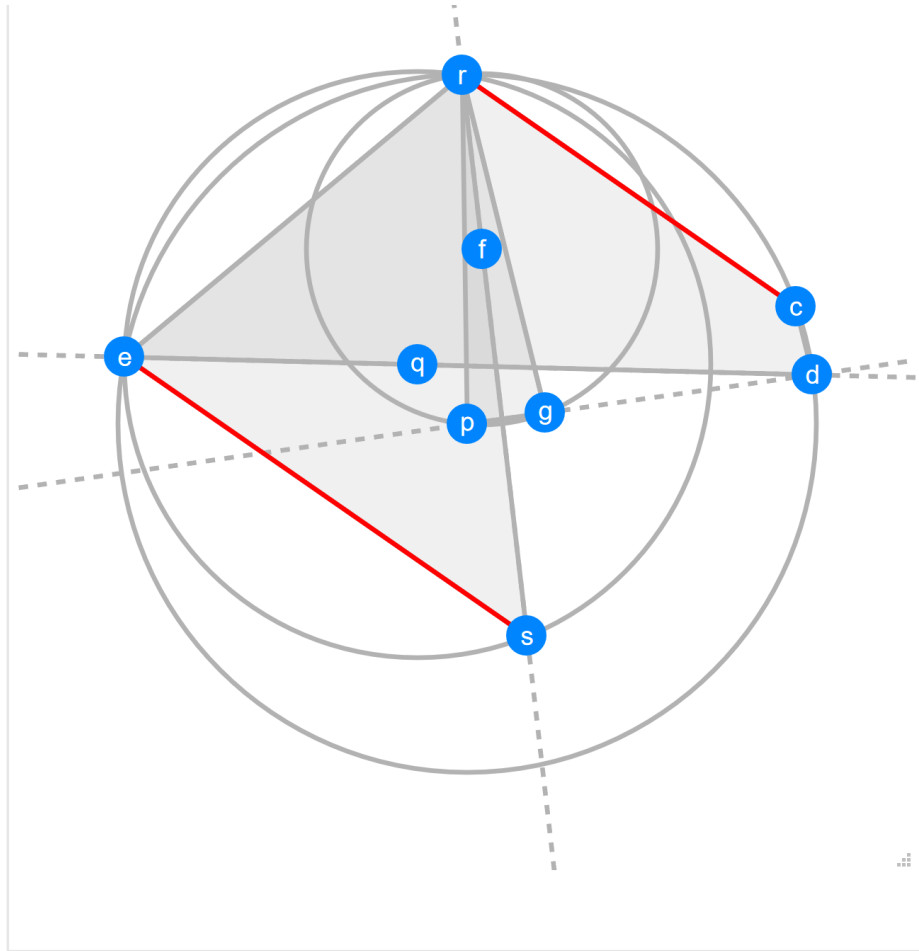
Let ecd be a triangle with circumcentre a . Let $cghp$ be a cyclic quadrilateral with centre e . Let edp be collinear. Let L_1 be the angle bisector of de and eg . Let eh be parallel to L_1 . Let L_2 be the angle bisector of eh and ec . Let L_3 be the reflection of cg in L_2 . Let L_4 be the reflection of dc in L_3 . Determine the angle between ae and L_4 .



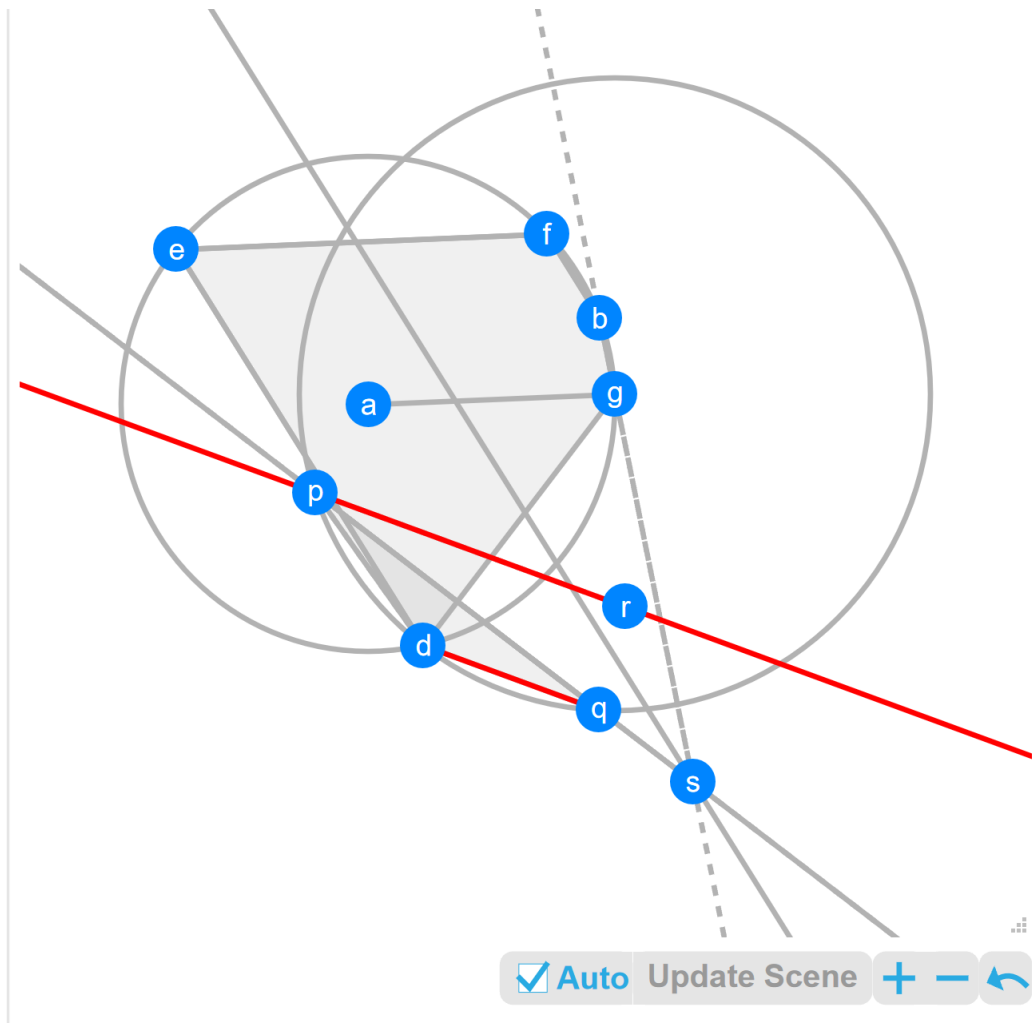
Let bce be a triangle with circumcentre a . Let $fghpc$ be a cyclic pentagon with centre e . Let ae be parallel to ph . Let fg be parallel to cp . Let ebf be collinear. Let $L1$ be the reflection of bc in gh . Determine the angle between ae and $L1$.



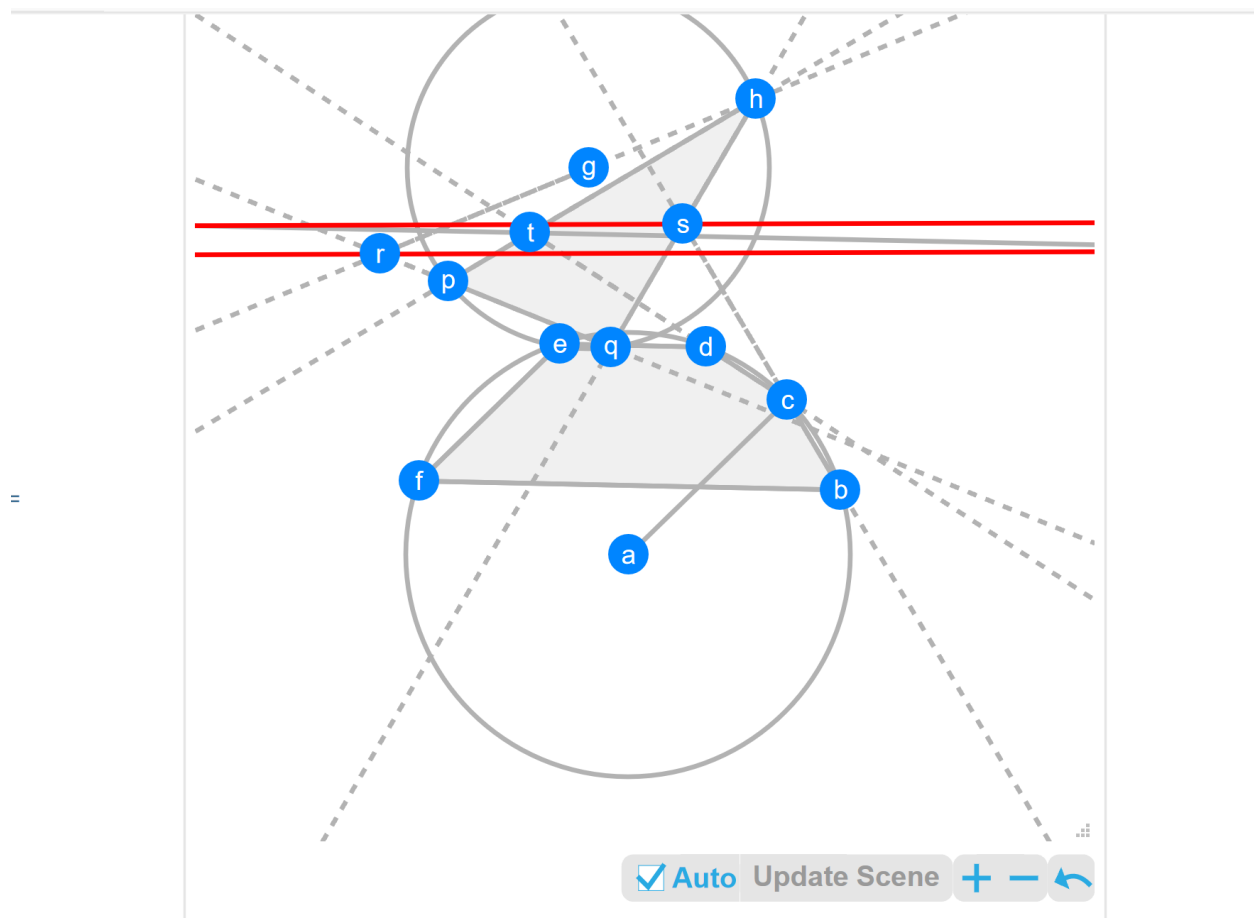
Let $bcdef$ be a cyclic pentagon with centre a . Let L_1 be the angle bisector of bc and dc . Let fe be parallel to L_1 . Let L_2 be the reflection of bf in dc . Let L_3 be the angle bisector of L_2 and ab . Let L_4 be the angle bisector of fe and ed . Determine the angle between L_3 and L_4 .



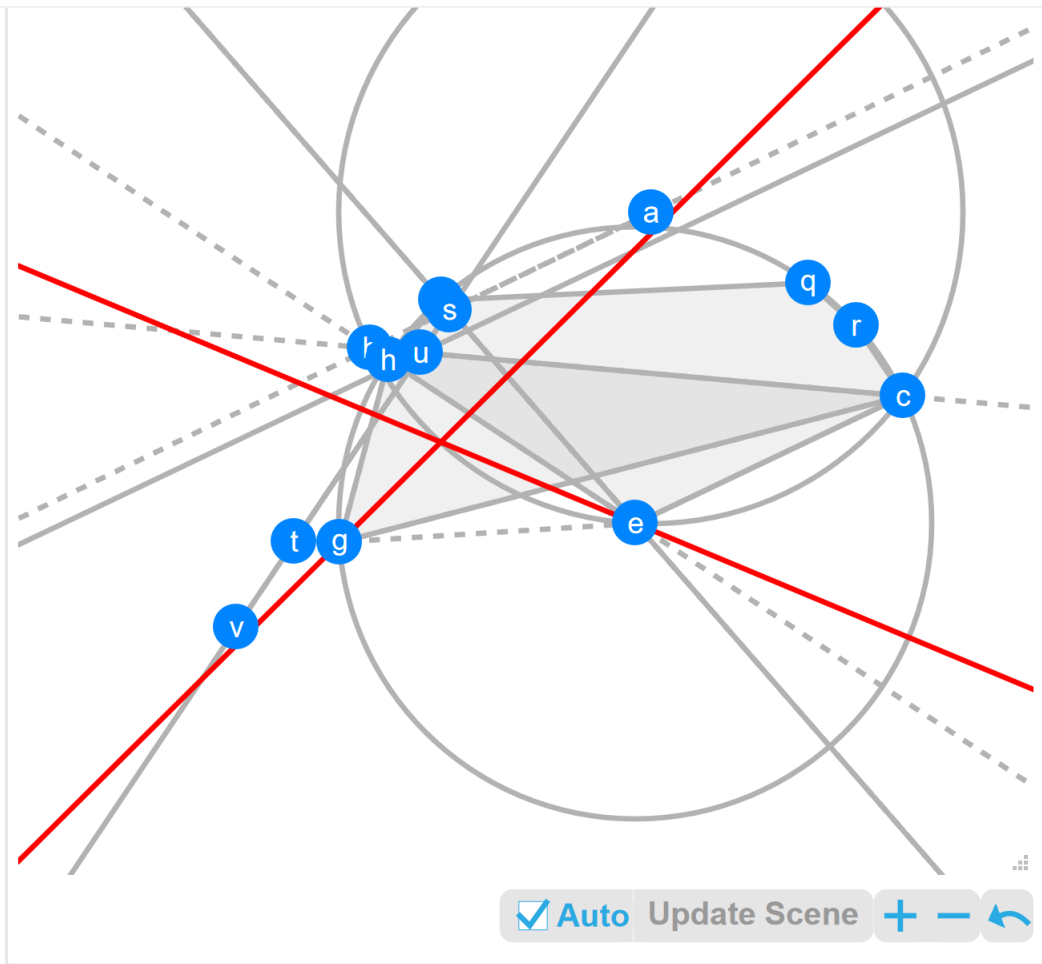
Let $rcde$ be a cyclic quadrilateral with centre p . Let grp be a triangle with circumcentre f . Let pdg be collinear. Let dc be parallel to gr . Let rse be a triangle with circumcentre q . Let rfs be collinear. Let edq be collinear. Determine the angle between es and rc .



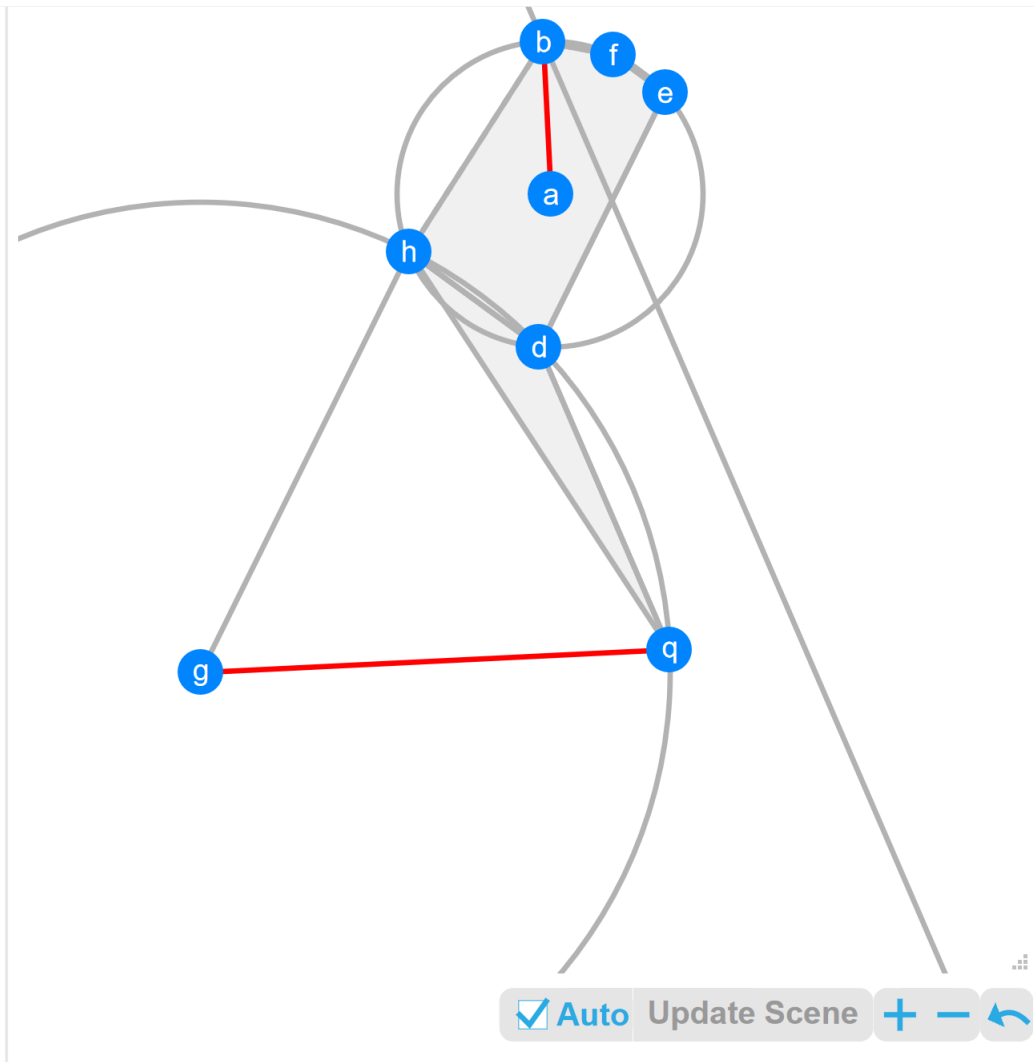
Let $bgdef$ be a cyclic pentagon with centre a . Let bf be parallel to ed . Let ag be parallel to ef . Let dpq be a triangle with circumcentre g . Let $L1$ be the reflection of dp in pq . Let $L2$ be the angle bisector of pq and bg . Let bf be parallel to $L2$. Determine the angle between $L1$ and qd .



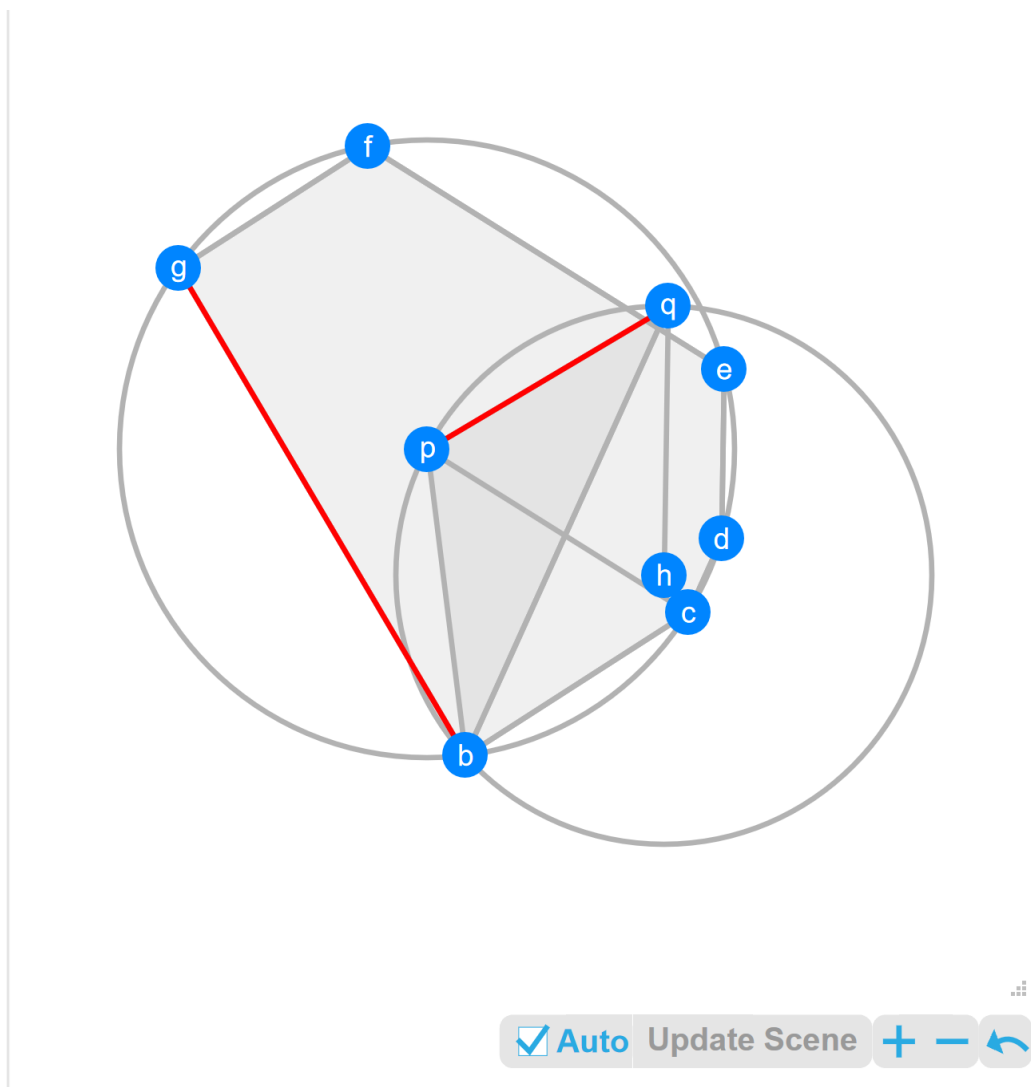
Let $bcdef$ be a cyclic pentagon with centre a . Let bf be parallel to de .
 Let ac be parallel to fe . Let hpq be a triangle with circumcentre g . Let $L1$ be the angle bisector of qp and gh . Let $L2$ be the angle bisector of bc and hq . Let $L3$ be the angle bisector of hp and cd .
 Let bf be parallel to $L3$. Determine the angle between $L1$ and $L2$.



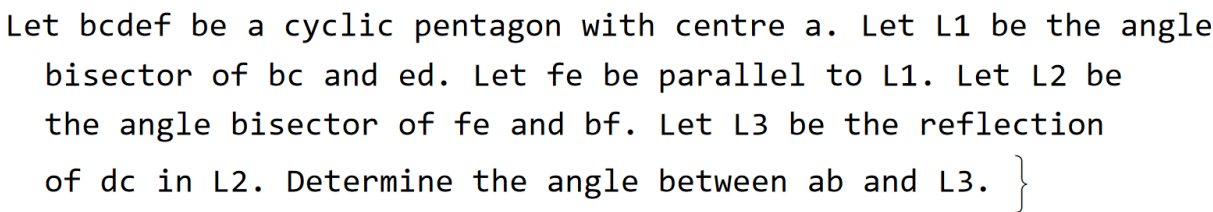
Let bce be a triangle with circumcentre a . Let $cghpqr$ be a cyclic hexagon with centre e . Let ebh be collinear. Let $L1$ be the angle bisector of gh and cg . Let $L2$ be the angle bisector of ep and eg . Let $L3$ be the reflection of ab in ep . Let $L4$ be the angle bisector of $L3$ and bc . Let ec be parallel to $L4$. Determine the angle between $L1$ and $L2$.

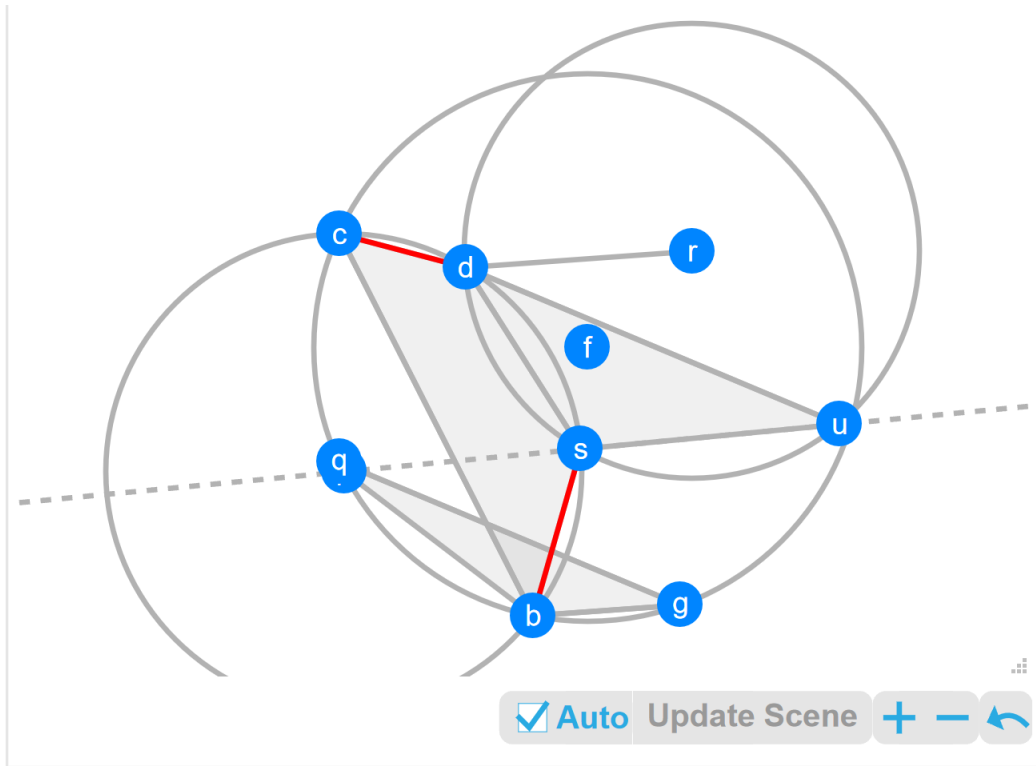


Let $bhdef$ be a cyclic pentagon with centre a . Let hd be parallel to fe . Let hdq be a triangle with circumcentre g . Let de be parallel to gh . Let $L1$ be the angle bisector of fb and bh . Let qd be parallel to $L1$. Determine the angle between ab and gq .

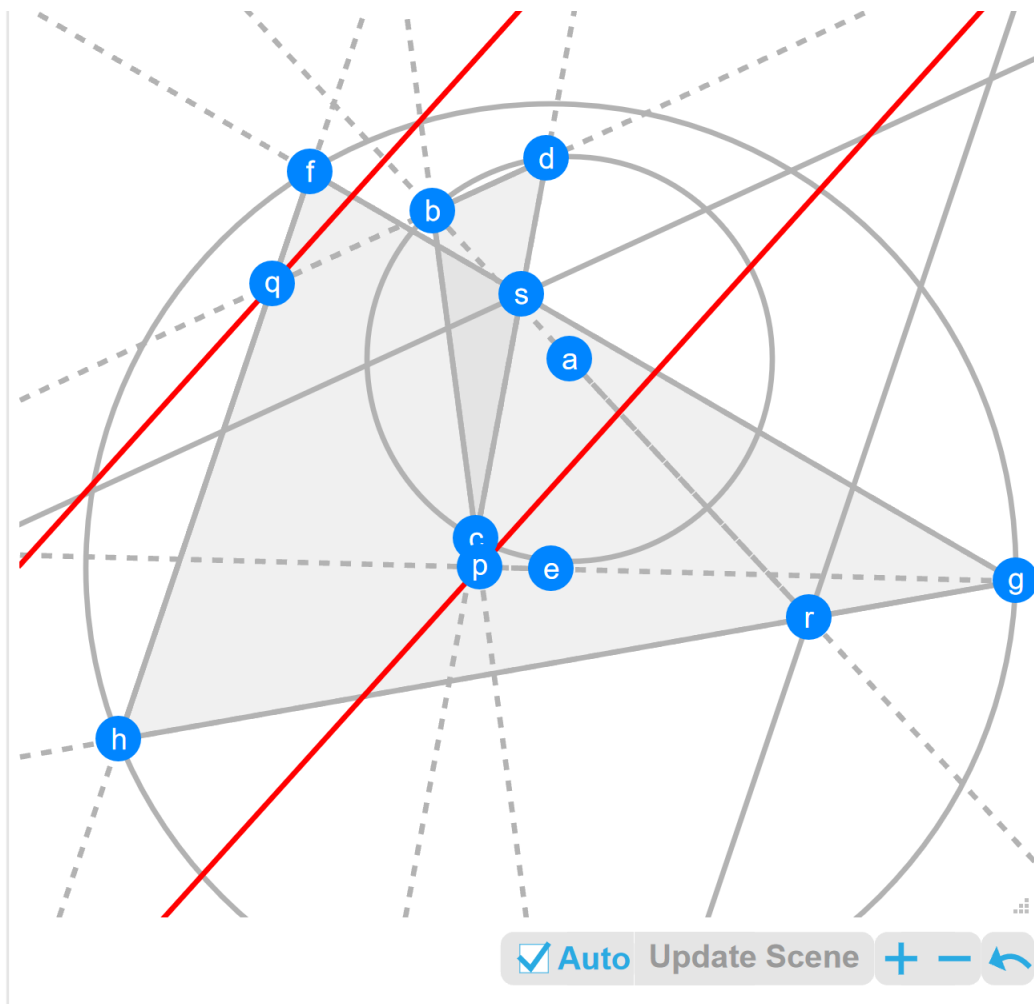


Let $bcdefg$ be a cyclic hexagon with centre p . Let pc be parallel to fe . Let bc be parallel to fg . Let pqb be a triangle with circumcentre h . Let dc be parallel to bq . Let de be parallel to hq . Determine the angle between bg and pq .

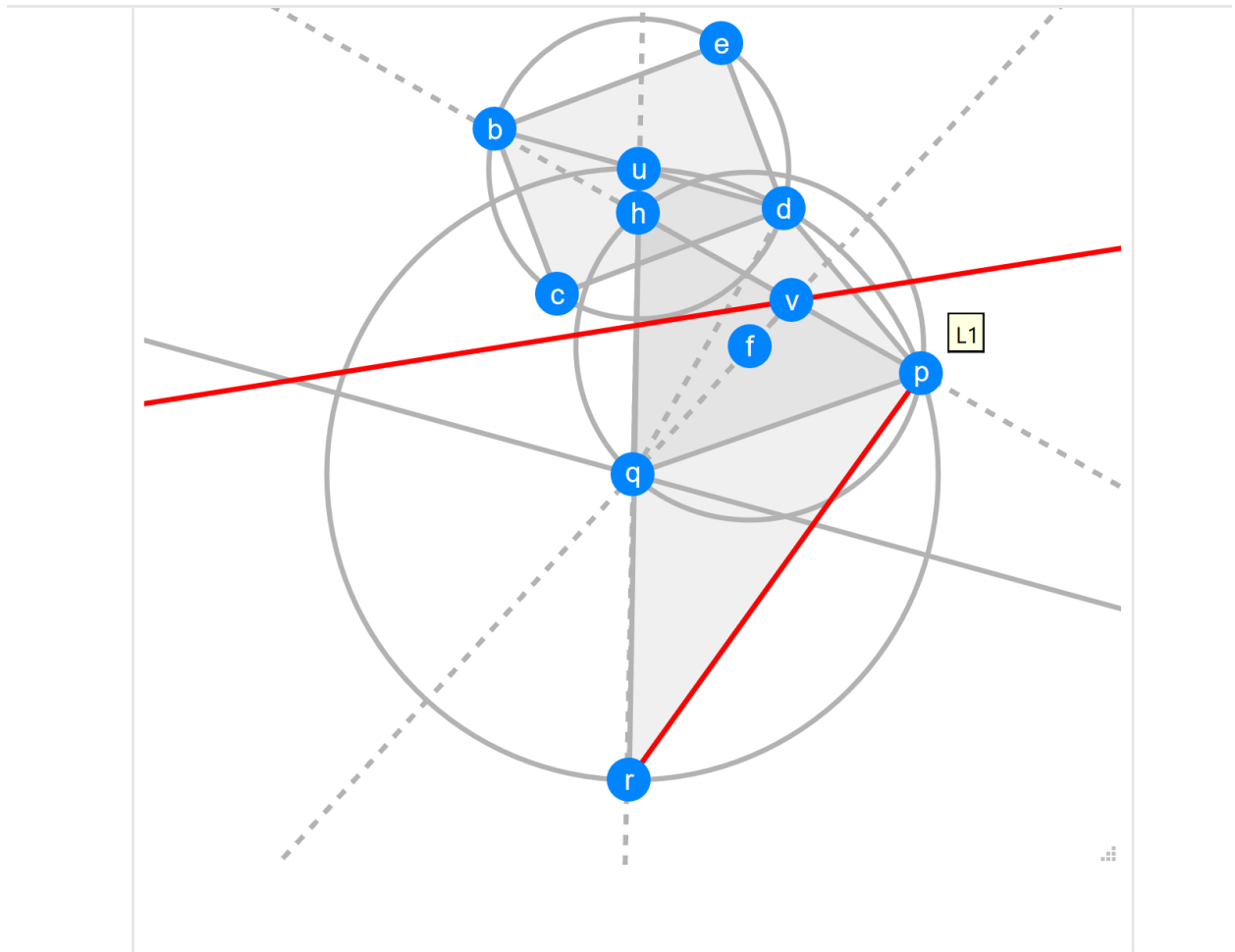




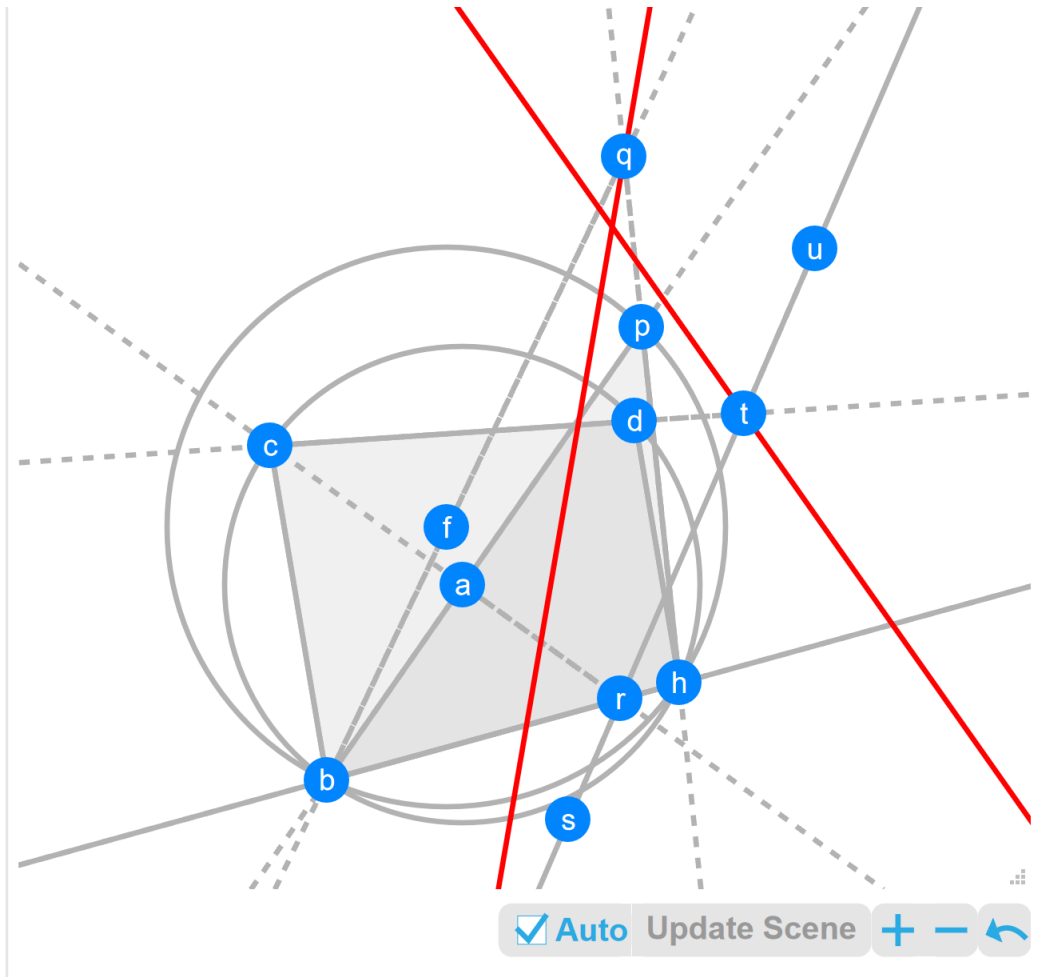
Let $bcds$ be a cyclic quadrilateral with centre p . Let $gbpq$ be a cyclic quadrilateral with centre f . Let bc be parallel to qp . Let sdu be a triangle with circumcentre r . Let spu be collinear. Let gq be parallel to ud . Let gb be parallel to rd . Determine the angle between cd and sb .



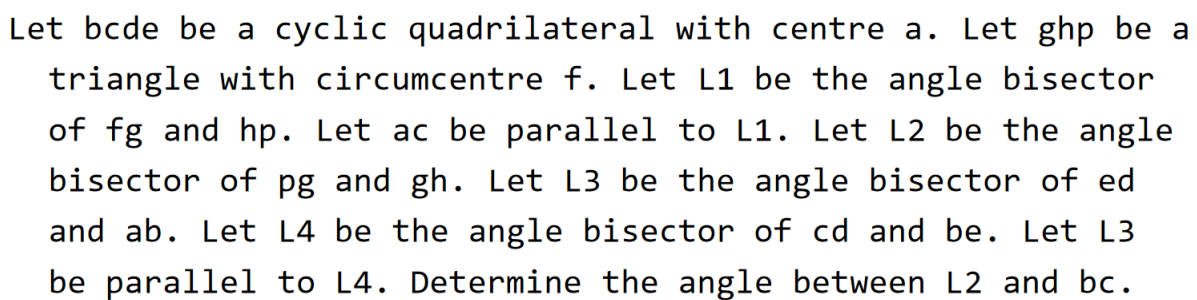
Let bcd be a triangle with circumcentre a . Let fgh be a triangle with circumcentre e . Let $L1$ be the angle bisector of eg and bc . Let $L2$ be the angle bisector of fh and db . Let $L3$ be the angle bisector of ab and hg . Let fh be parallel to $L3$. Let $L4$ be the angle bisector of fg and cd . Let db be parallel to $L4$. Determine the angle between $L1$ and $L2$.

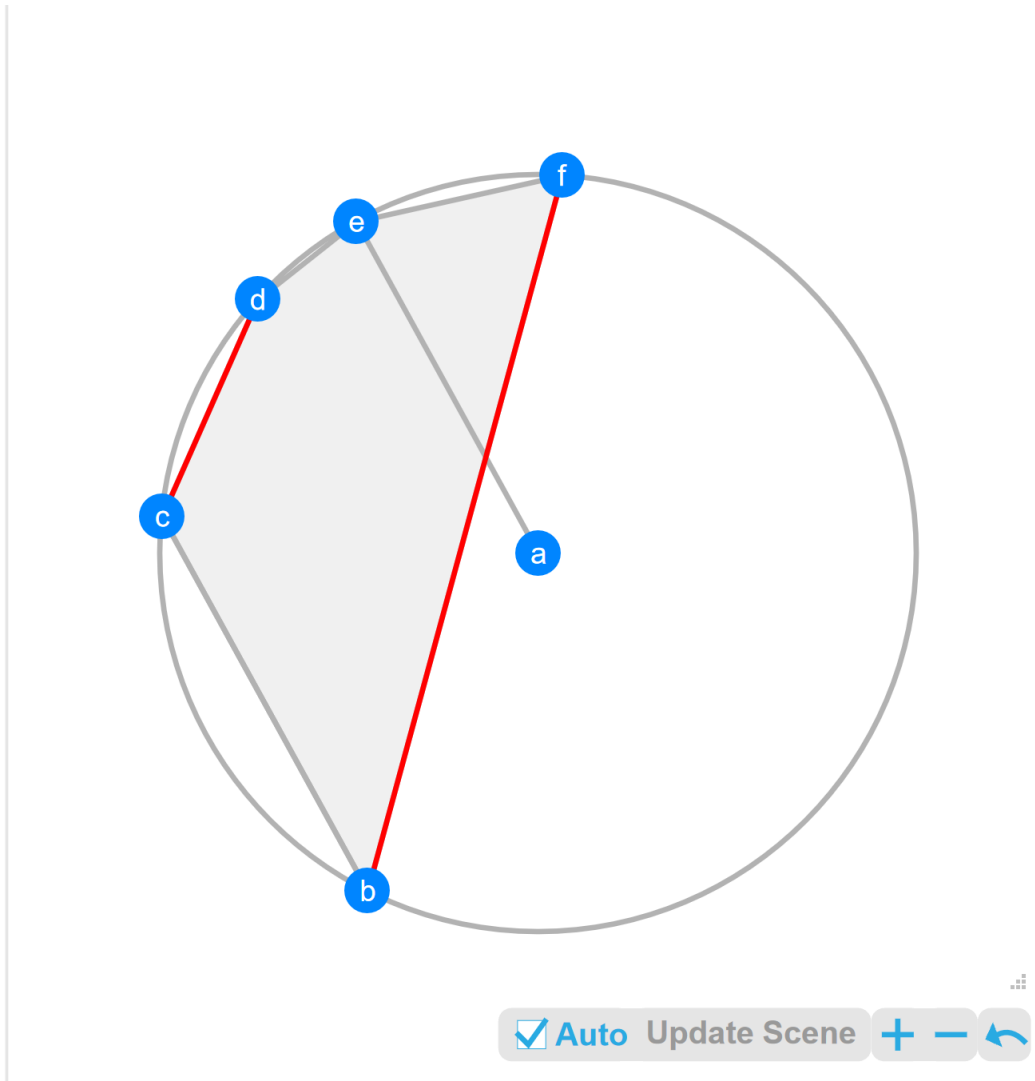


Let $bcde$ be a cyclic quadrilateral with centre u . Let eb be parallel to cd . Let bc be parallel to ed . Let qhp be a triangle with circumcentre f . Let $rpdu$ be a cyclic quadrilateral with centre q . Let qhu be collinear. Let $L1$ be the angle bisector of ph and fq . Let $L2$ be the angle bisector of qr and qd . Let ub be parallel to $L2$. Determine the angle between $L1$ and rp .

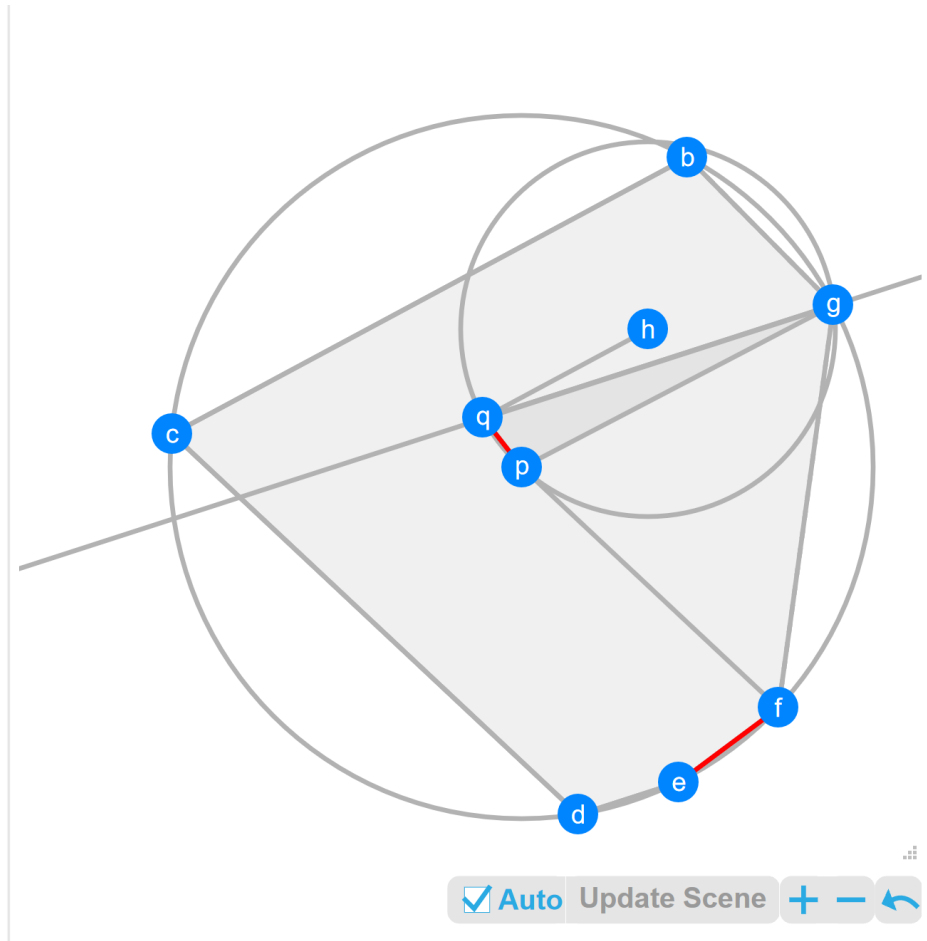


Let $bcdh$ be a cyclic quadrilateral with centre a . Let bc be parallel to dh . Let bhp be a triangle with circumcentre f . Let bap be collinear. Let $L1$ be the angle bisector of hp and fb . Let $L2$ be the reflection of ac in hb . Let $L3$ be the angle bisector of $L2$ and cd . Determine the angle between $L1$ and $L3$.

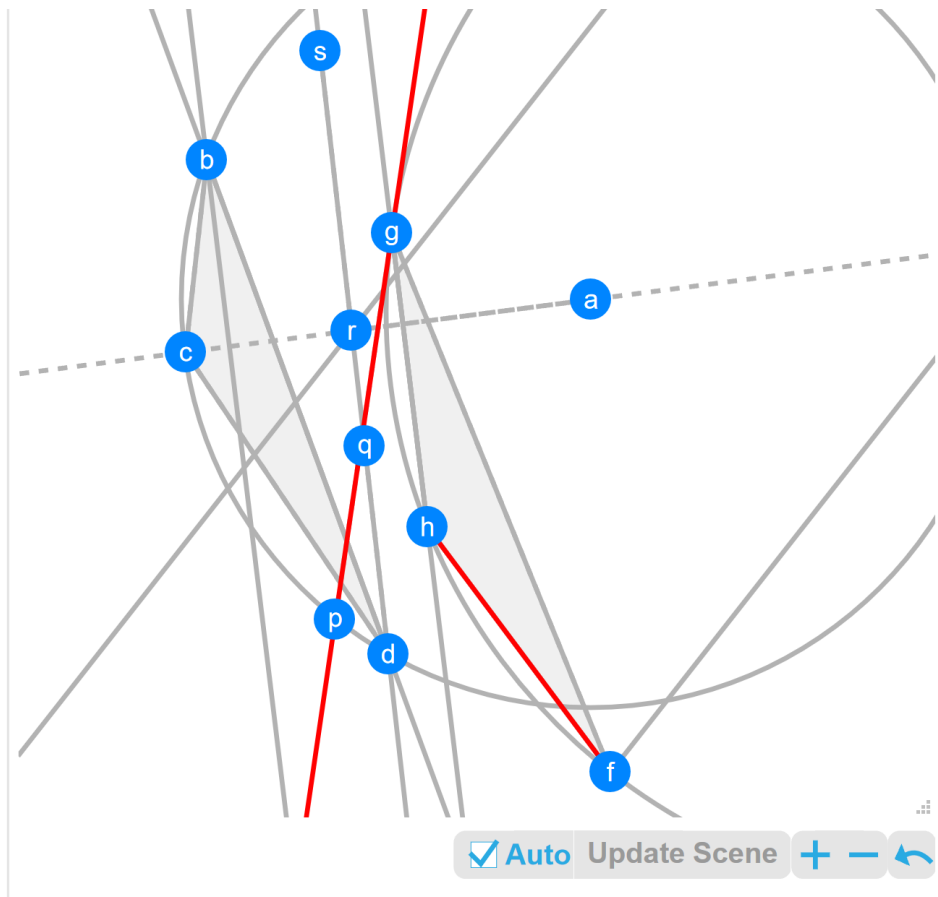




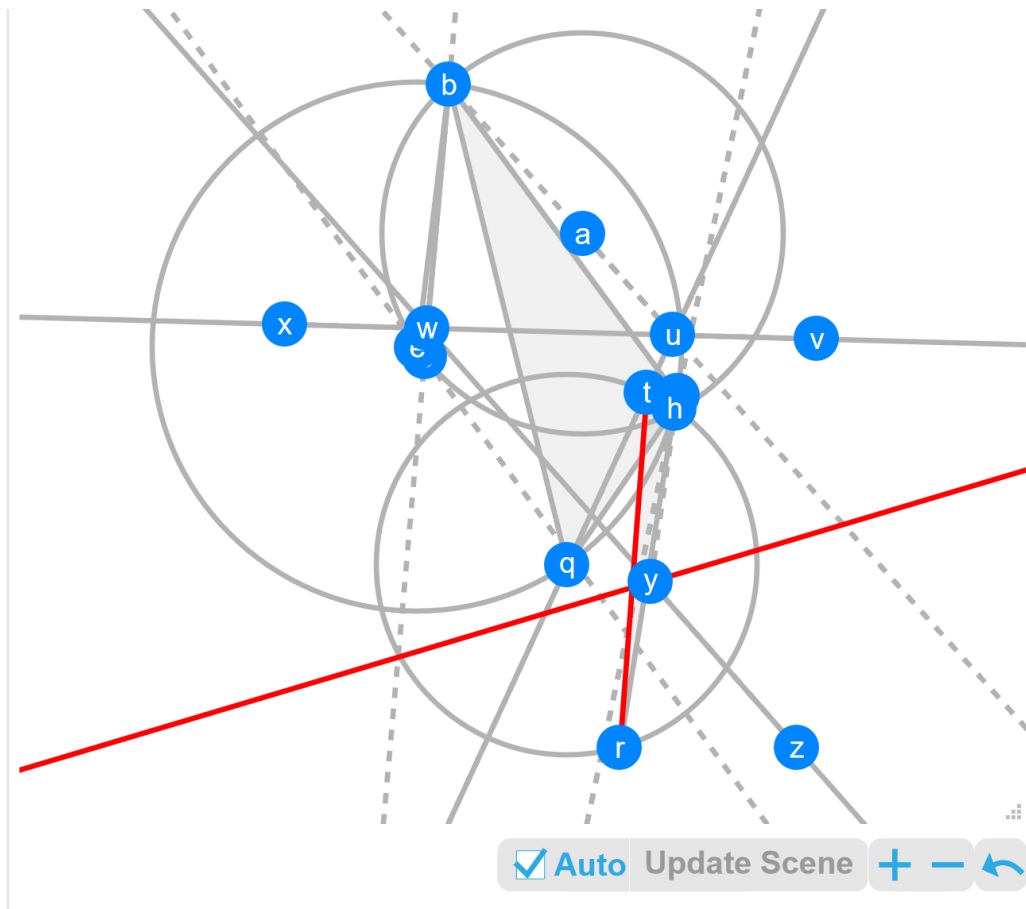
'Let $bcdef$ be a cyclic pentagon with centre a . Let ae be parallel to bc . Determine the angle between cd and fb . "



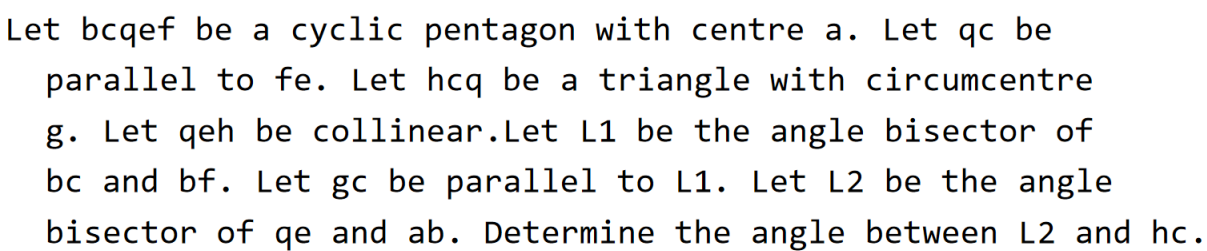
Let $bcdefg$ be a cyclic hexagon with centre p . Let pf be parallel to dc .
 Let pqg be a triangle with circumcentre h . Let de be parallel to gq .
 Let bc be parallel to hq . Let $L1$ be the angle bisector of gf and bg .
 Let de be parallel to $L1$. Determine the angle between pq and fe .

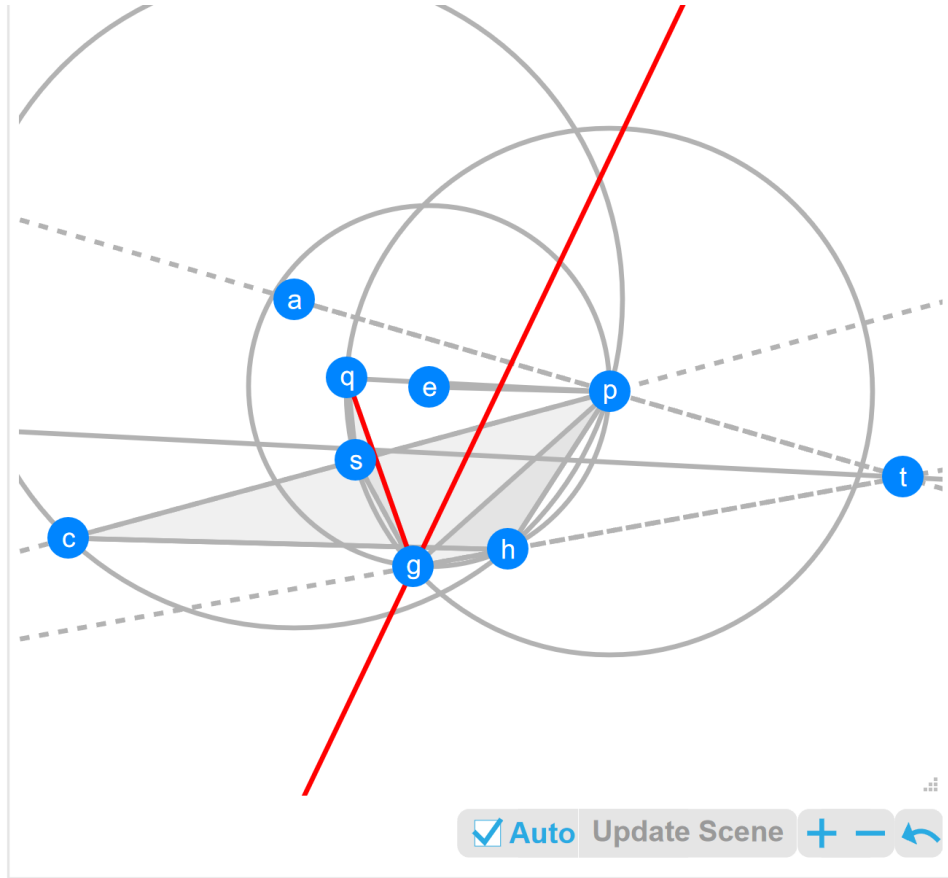


Let bcd be a triangle with circumcentre a . Let fgh be a triangle with circumcentre e . Let L_1 be the reflection of fg in gh . Let L_2 be the angle bisector of bc and bd . Let gh be parallel to L_2 . Let L_3 be the reflection of cd in bd . Let L_4 be the angle bisector of ac and L_3 . Let ef be parallel to L_4 . Determine the angle between L_1 and hf .

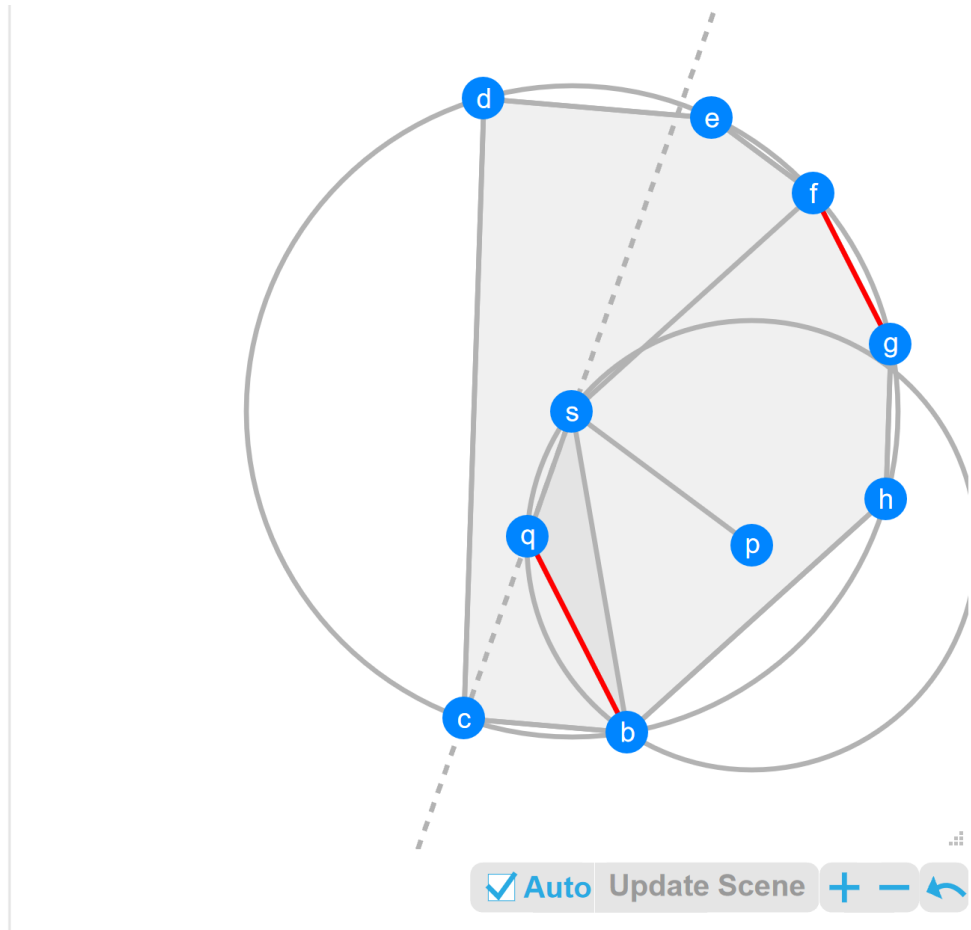


Let bce be a triangle with circumcentre a . Let $bghq$ be a cyclic quadrilateral with centre e . Let ce be parallel to bg . Let ecq be collinear. Let rht be a triangle with circumcentre q . Let hgr be collinear. Let $L1$ be the reflection of ab in qt . Let $L2$ be the angle bisector of $L1$ and bc . Let $L3$ be the angle bisector of $L2$ and hg . Determine the angle between rt and $L3$.

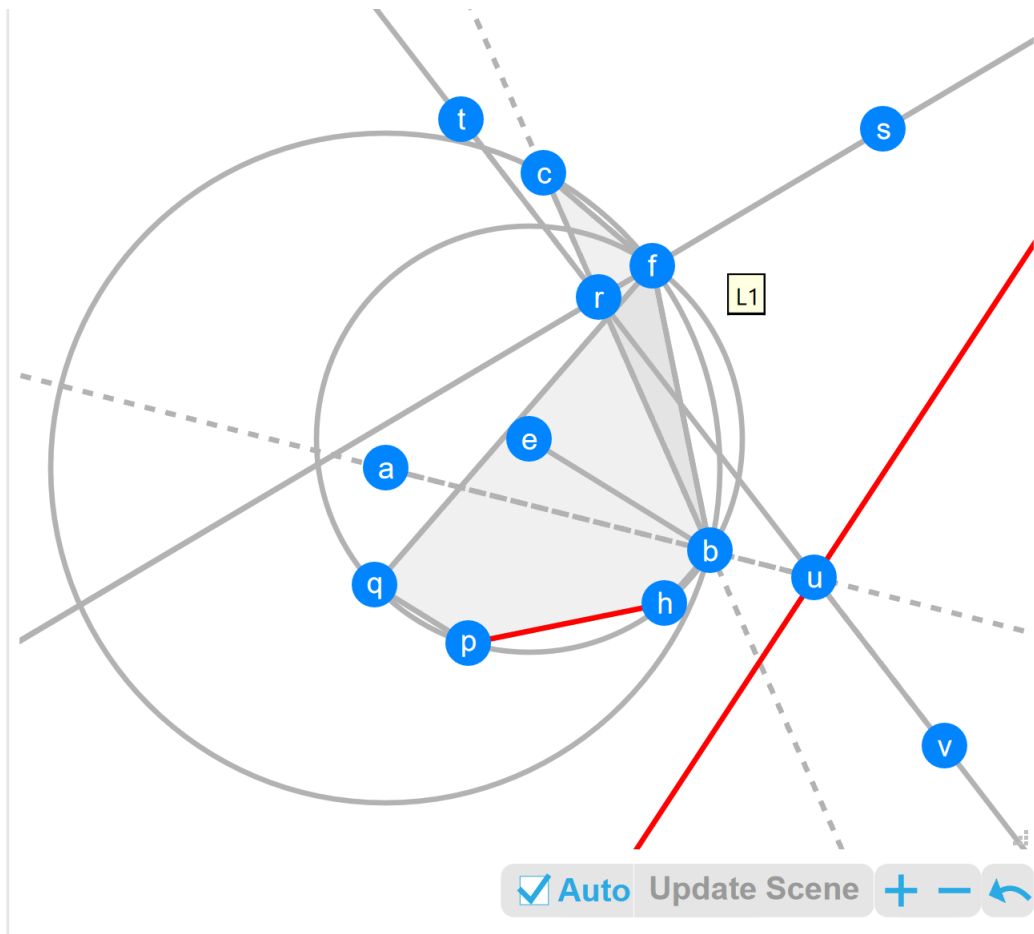




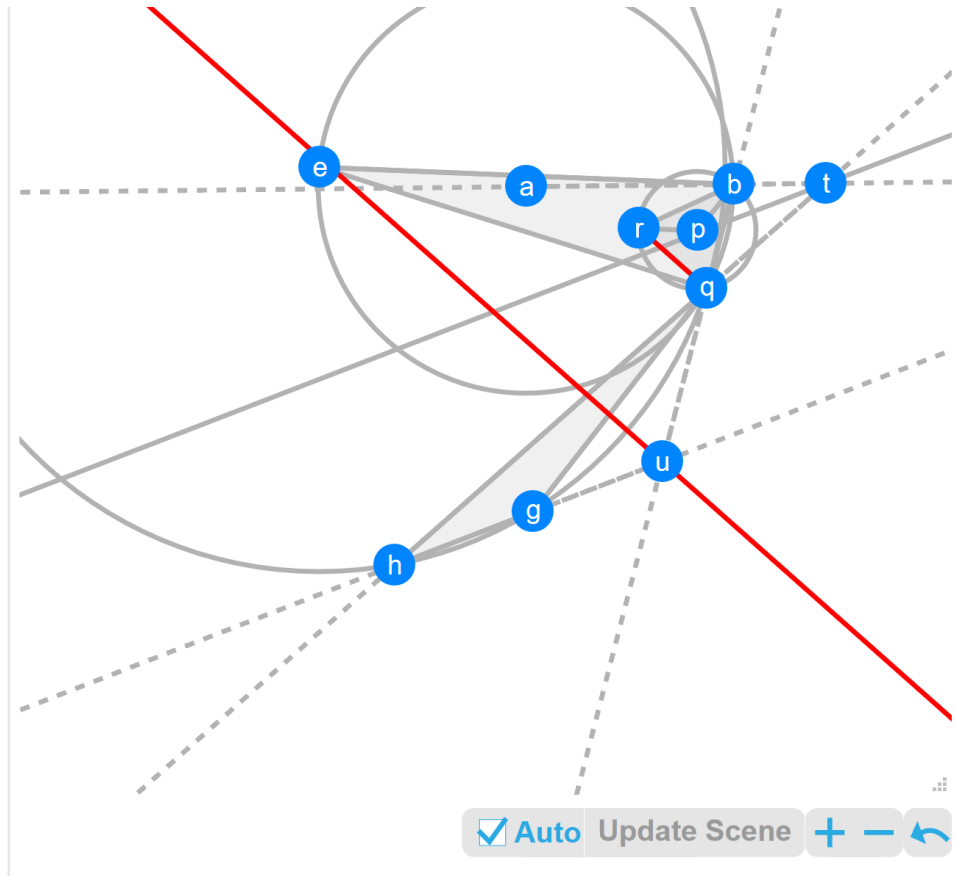
Let pch be a triangle with circumcentre a . Let pgh be a triangle with circumcentre e . Let hc be parallel to ep . Let qgs be a triangle with circumcentre p . Let pcs be collinear. Let $L1$ be the angle bisector of ap and hg . Let pq be parallel to $L1$. Let $L2$ be the angle bisector of hg and sg . Determine the angle between $L2$ and qg .



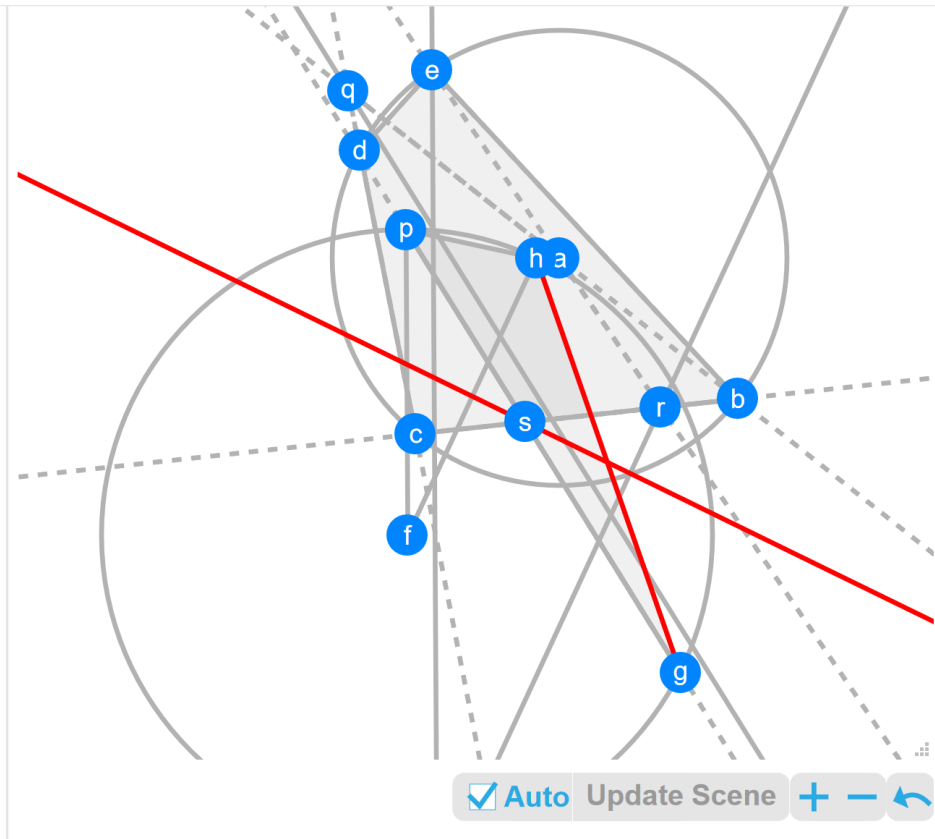
Let $bcdefgh$ be a cyclic heptagon with centre s . Let sf be parallel to hb . Let bc be parallel to de . Let cd be parallel to hg . Let qbs be a triangle with circumcentre p . Let scq be collinear. Let ef be parallel to ps . Determine the angle between qb and gf .



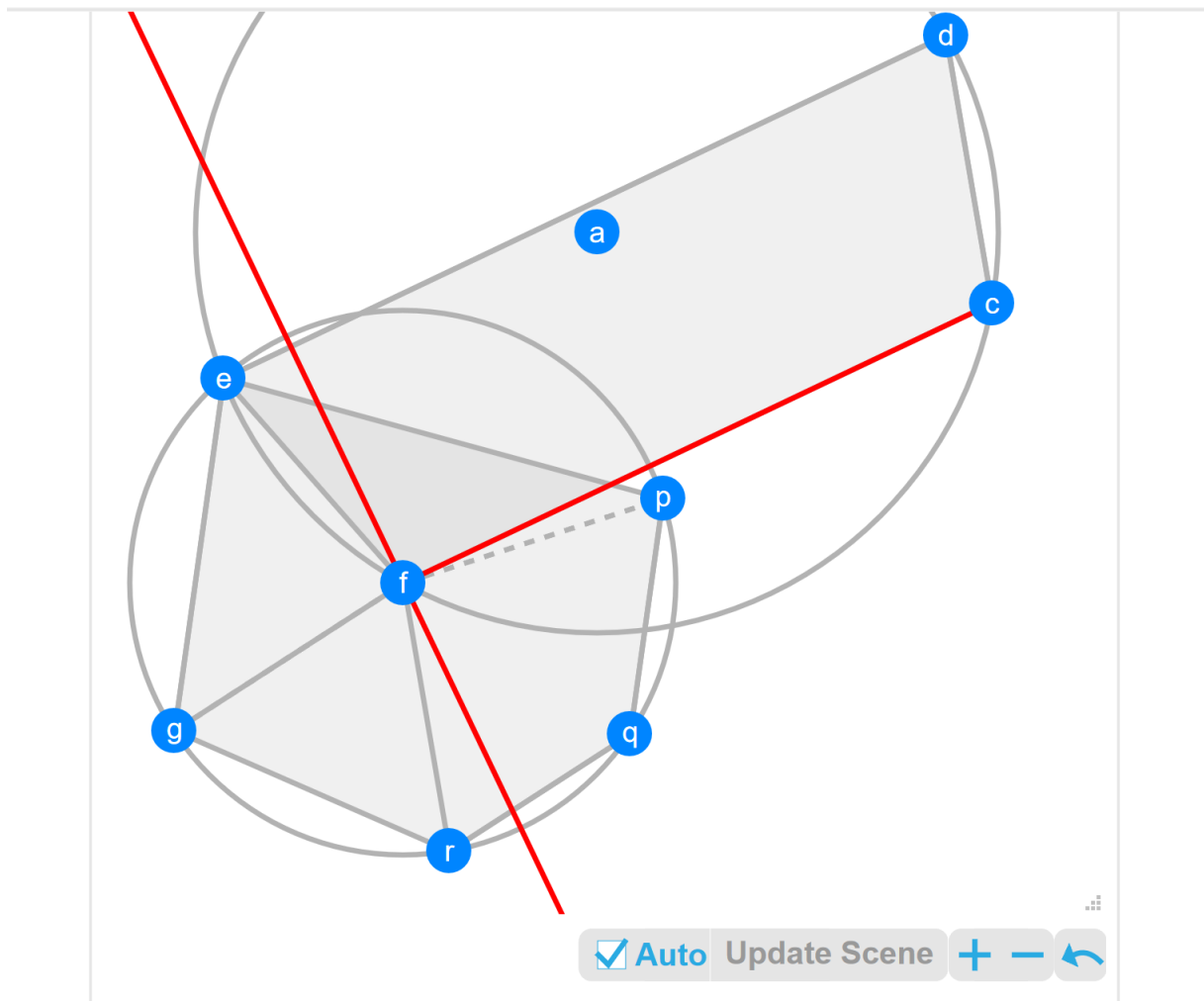
Let bcf be a triangle with circumcentre a . Let $fbhqp$ be a cyclic pentagon with centre e . Let fq be parallel to bh . Let eb be parallel to qp . Let $L1$ be the angle bisector of fc and fb . Let $L2$ be the reflection of bc in $L1$. Let $L3$ be the angle bisector of ab and $L2$. Determine the angle between hp and $L3$.



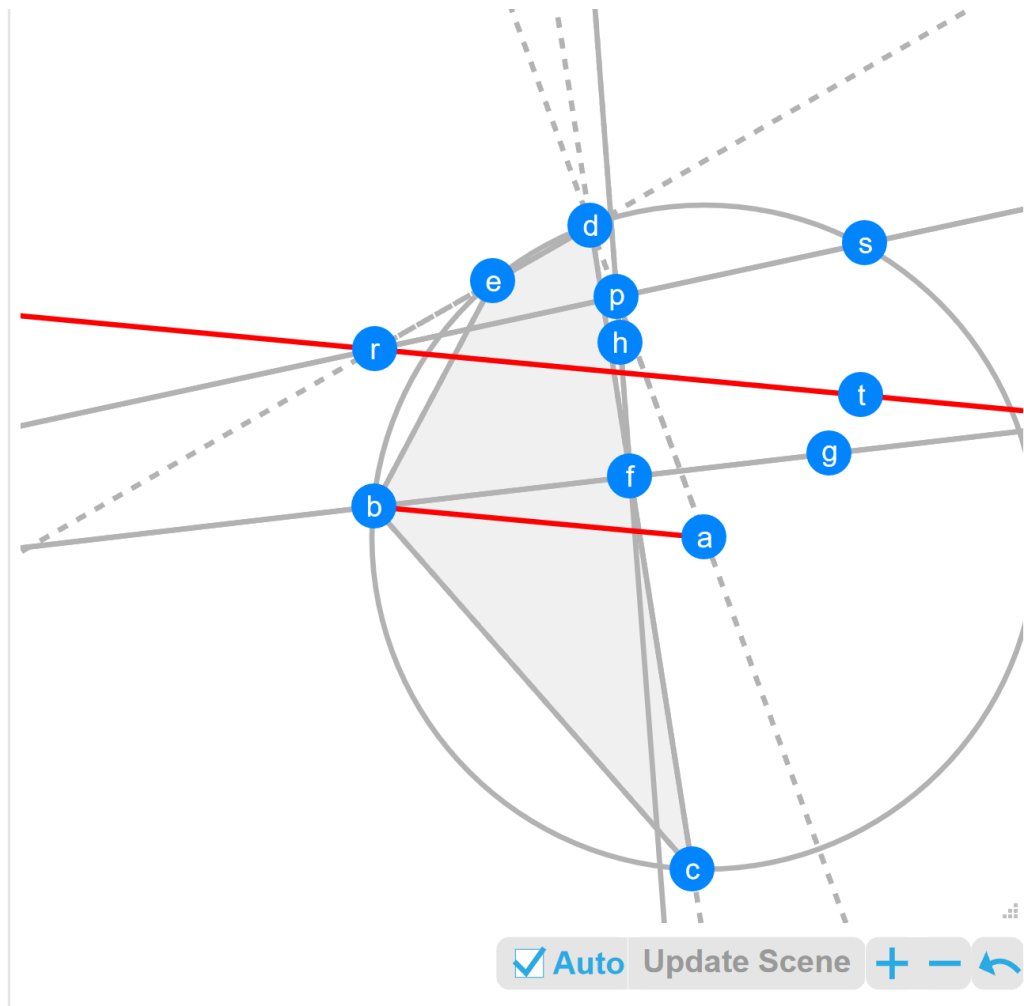
Let beq be a triangle with circumcentre a . Let qgh be a triangle with circumcentre e . Let qrb be a triangle with circumcentre p . Let be be parallel to pr . Let qg be parallel to pb . Let $L1$ be the angle bisector of ab and qh . Let hg be parallel to $L1$. Let $L2$ be the angle bisector of qb and hg . Determine the angle between $L2$ and qr .



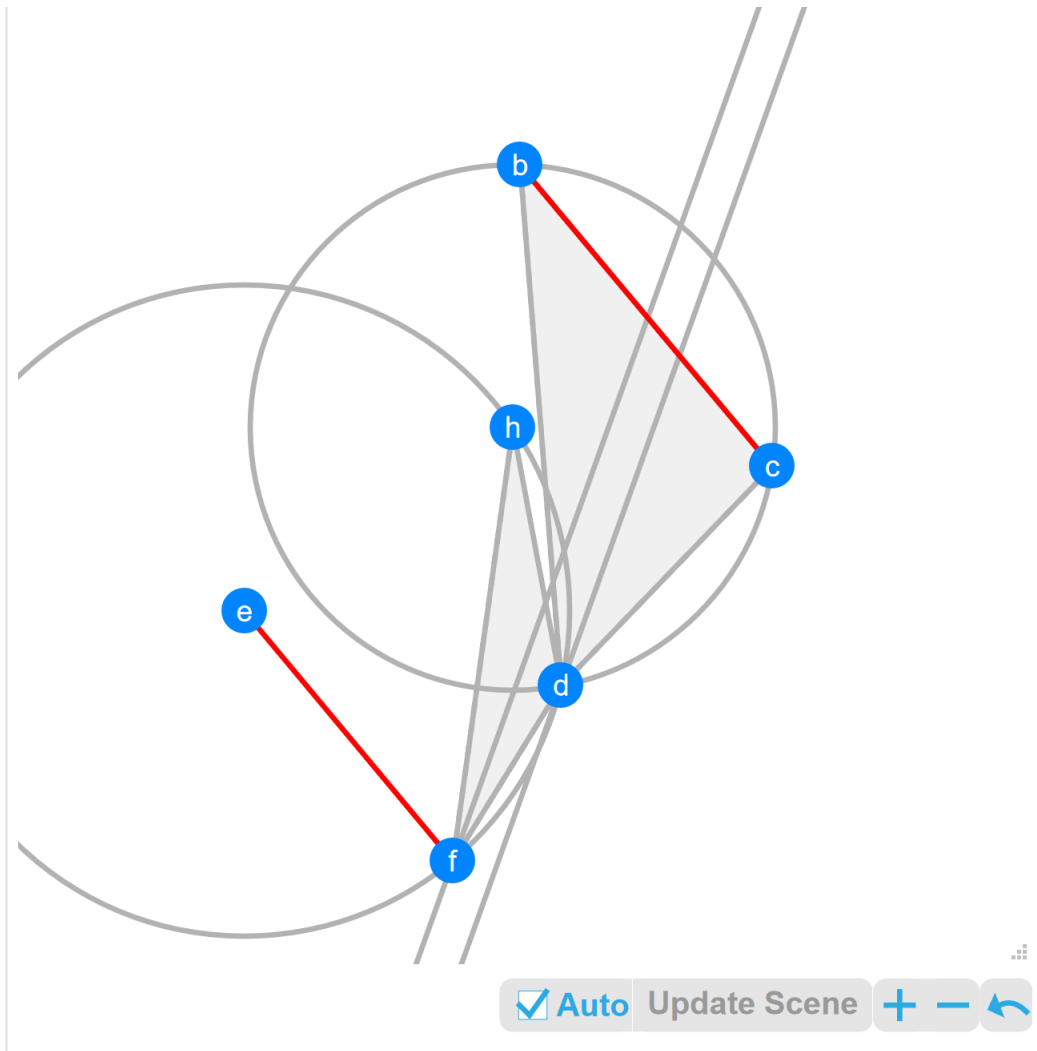
Let $bcde$ be a cyclic quadrilateral with centre a . Let ghp be a triangle with circumcentre f . Let L_1 be the angle bisector of cd and ab . Let gp be parallel to L_1 . Let L_2 be the angle bisector of be and ed . Let fp be parallel to L_2 . Let L_3 be the angle bisector of ae and cb . Let fh be parallel to L_3 . Let L_4 be the angle bisector of cb and gp . Determine the angle between L_4 and gh .



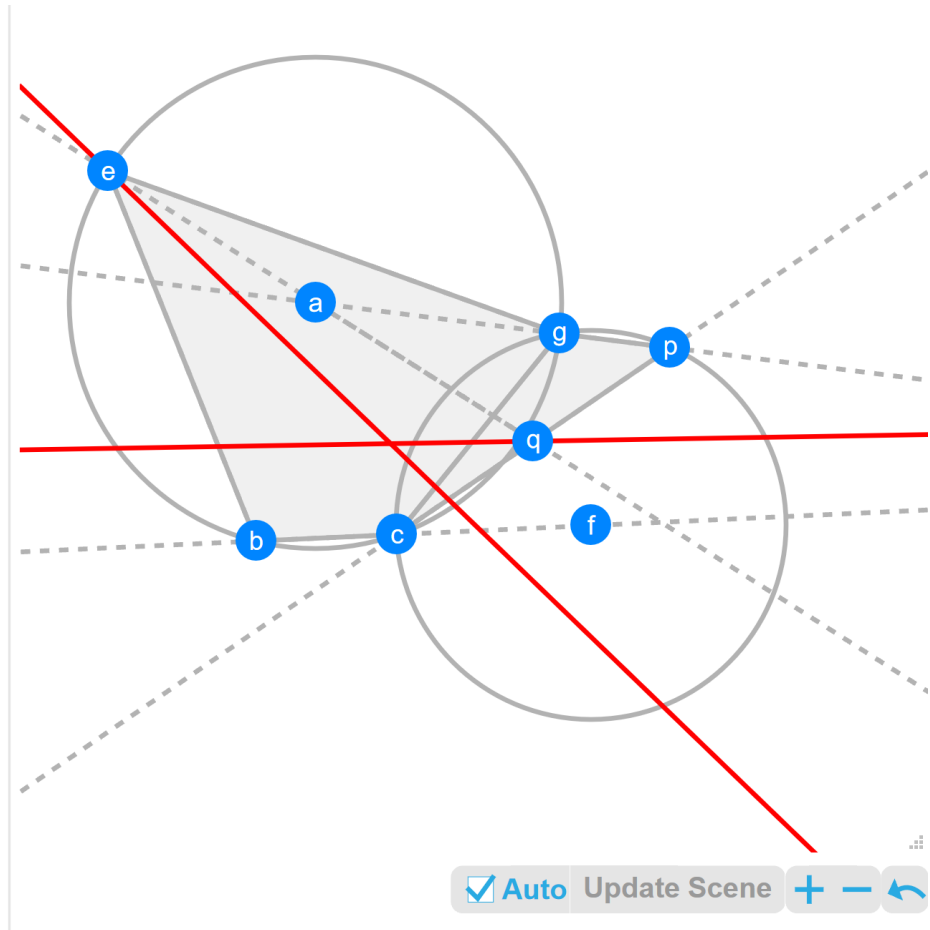
Let $fcde$ be a cyclic quadrilateral with centre a . Let fc be parallel to ed . Let $gepqr$ be a cyclic pentagon with centre f . Let ge be parallel to qp . Let fg be parallel to rq . Let dc be parallel to fr . Let $L1$ be the angle bisector of fg and fp . Determine the angle between fc and $L1$.



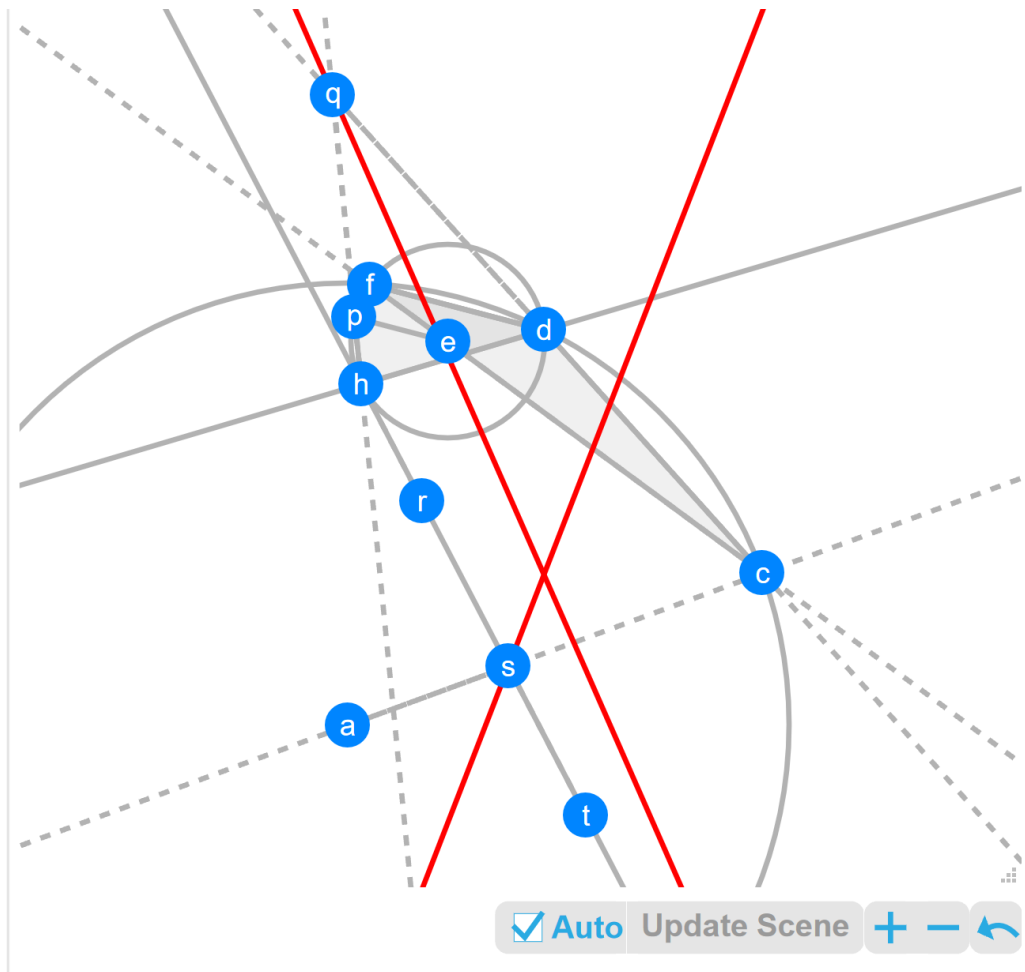
Let $bcde$ be a cyclic quadrilateral with centre a . Let L_1 be the angle bisector of eb and bc . Let L_2 be the reflection of cd in L_1 . Let L_3 be the angle bisector of L_2 and ad . Let L_4 be the reflection of de in L_3 . Determine the angle between ab and L_4 .



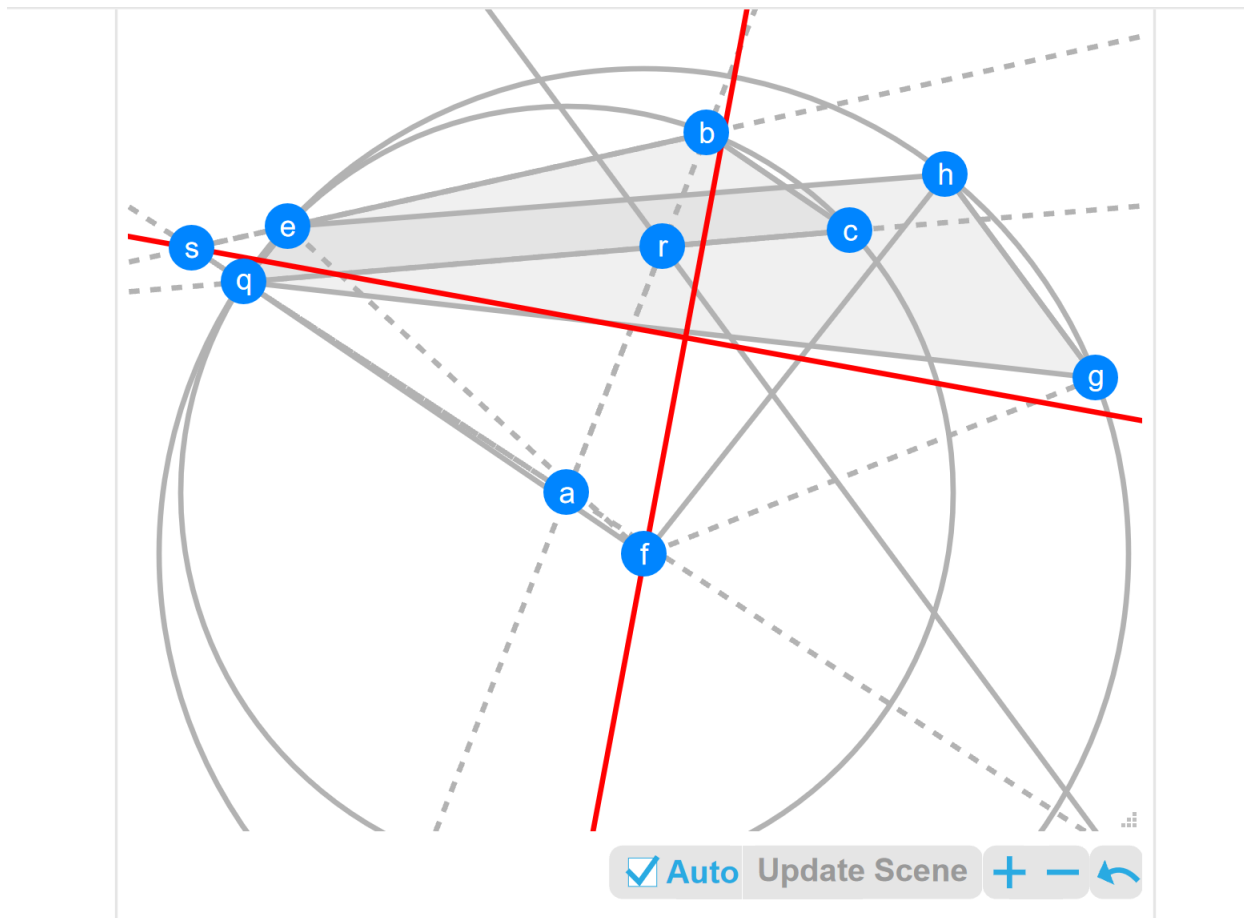
Let bcd be a triangle with circumcentre h . Let fdh be a triangle with circumcentre e . Let L_1 be the angle bisector of bd and dc . Let L_2 be the angle bisector of hf and fd . Let L_1 be parallel to L_2 . Determine the angle between ef and bc .



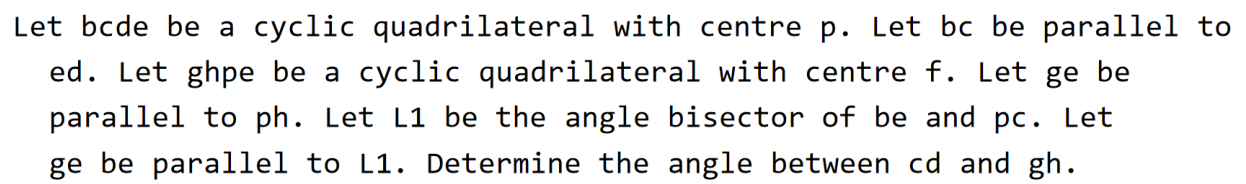
Let $bcge$ be a cyclic quadrilateral with centre a . Let gcp be a triangle with circumcentre f . Let gap be collinear. Let cbf be collinear. Let $L1$ be the angle bisector of ae and pc . Let $L2$ be the angle bisector of ge and be . Determine the angle between $L1$ and $L2$.

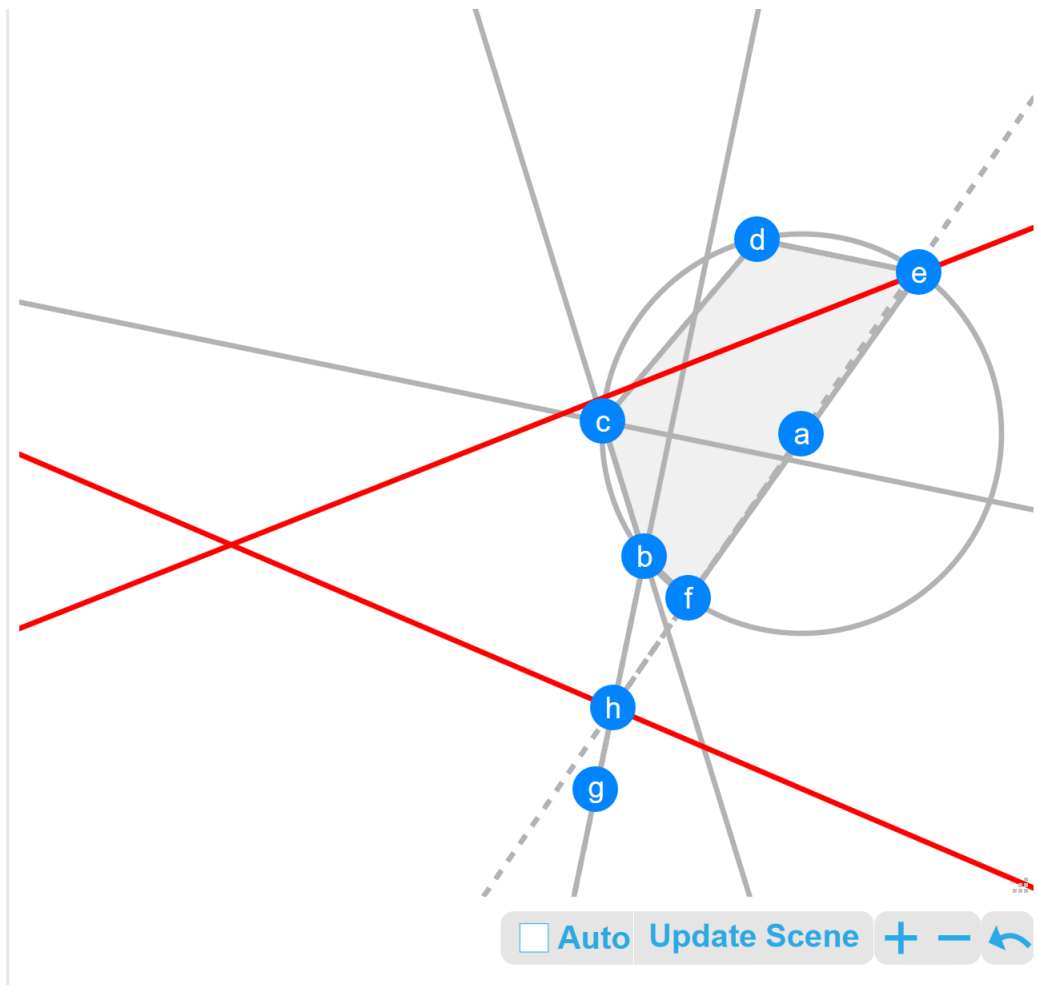


Let fcd be a triangle with circumcentre a . Let $fdhp$ be a cyclic quadrilateral with centre e . Let fce be collinear. Let fd be parallel to ep . Let $L1$ be the angle bisector of hp and dc . Let $L2$ be the reflection of hp in hd . Let $L3$ be the angle bisector of ac and $L2$. Determine the angle between $L3$ and $L1$.

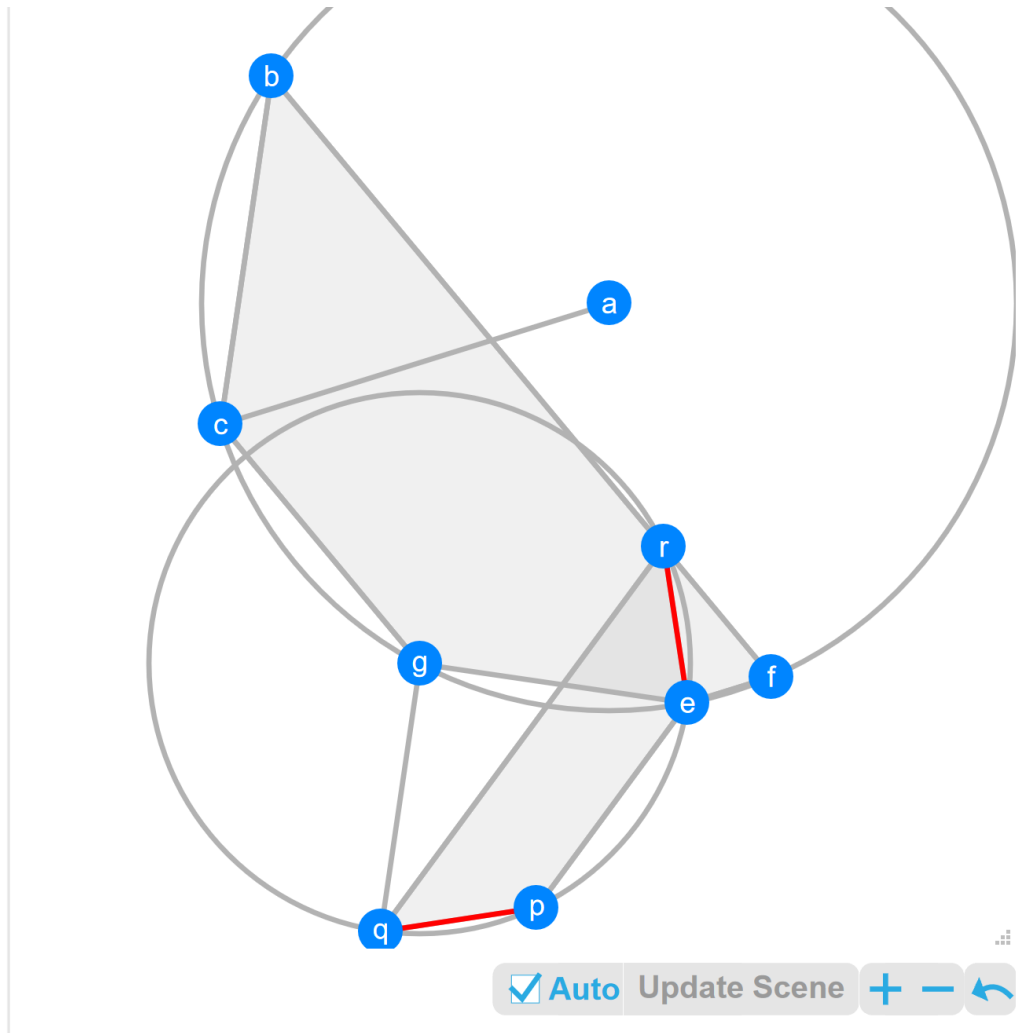


Let $bcqe$ be a cyclic quadrilateral with centre a . Let $gheq$ be a cyclic quadrilateral with centre f . Let qe be parallel to fh . Let bc be parallel to fq . Let L_1 be the angle bisector of qc and ab . Let gh be parallel to L_1 . Let L_2 be the angle bisector of be and aq . Let L_3 be the angle bisector of fg and fe . Determine the angle between L_2 and L_3 .

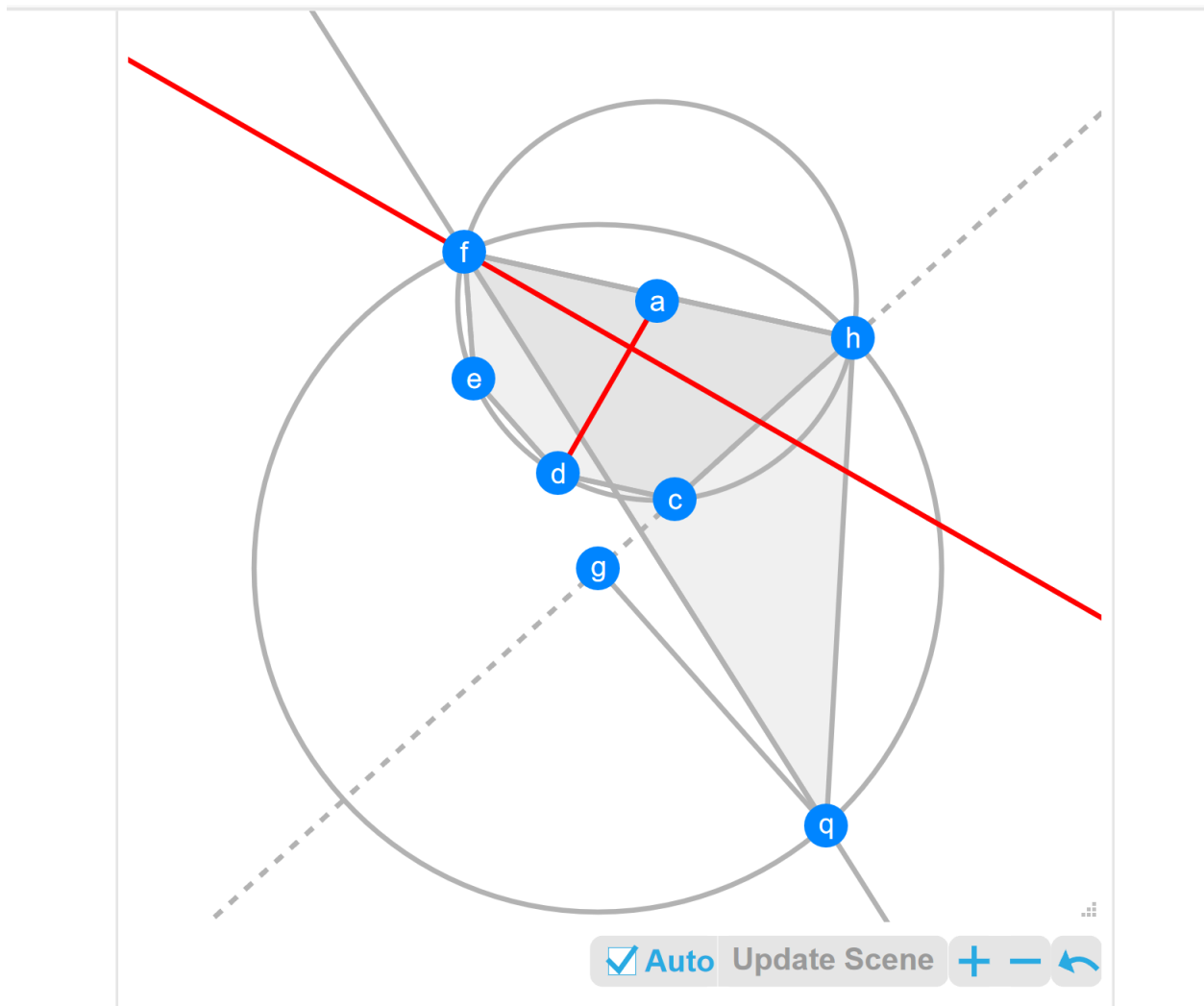




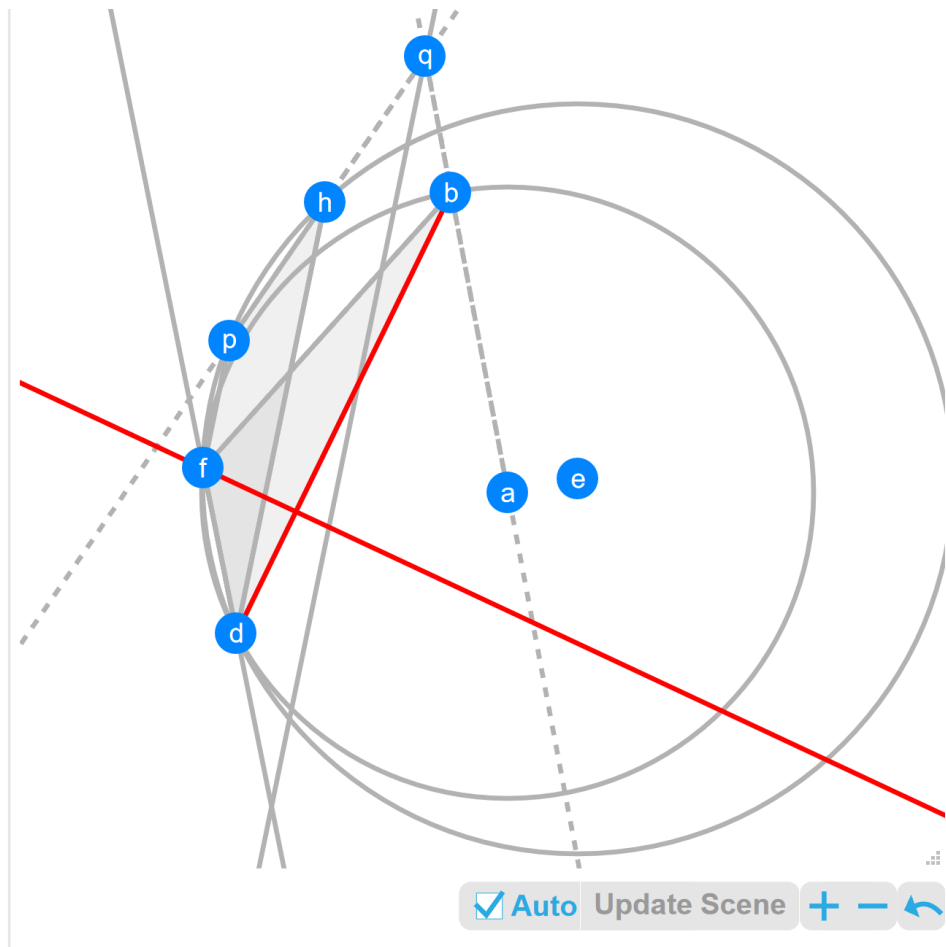
Let $bcdef$ be a cyclic pentagon with centre a . Let $L1$ be the reflection of bf in bc . Let $L2$ be the angle bisector of $L1$ and af . Let $L3$ be the angle bisector of fe and de . Let $L4$ be the angle bisector of dc and bc . Let de be parallel to $L4$. Determine the angle between $L2$ and $L3$.



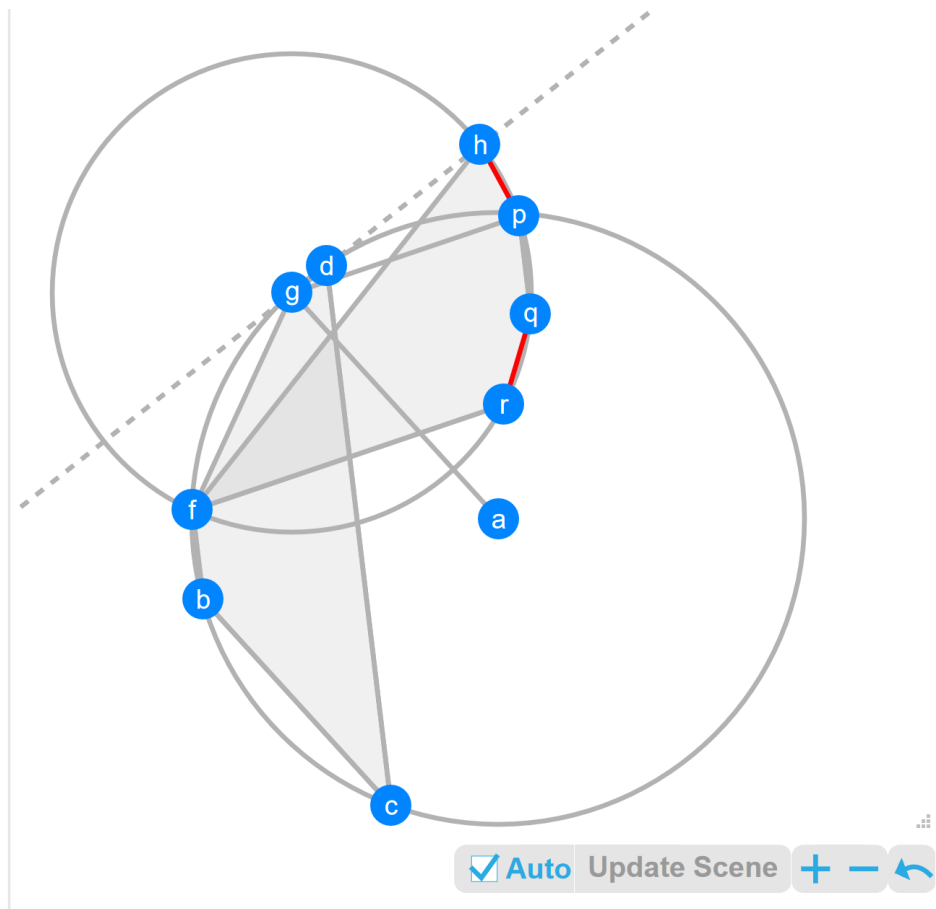
Let $bcgef$ be a cyclic pentagon with centre a . Let bf be parallel to cg . Let ac be parallel to fe . Let $epqr$ be a cyclic quadrilateral with centre g . Let ep be parallel to rq . Let bc be parallel to gq . Determine the angle between pq and re .



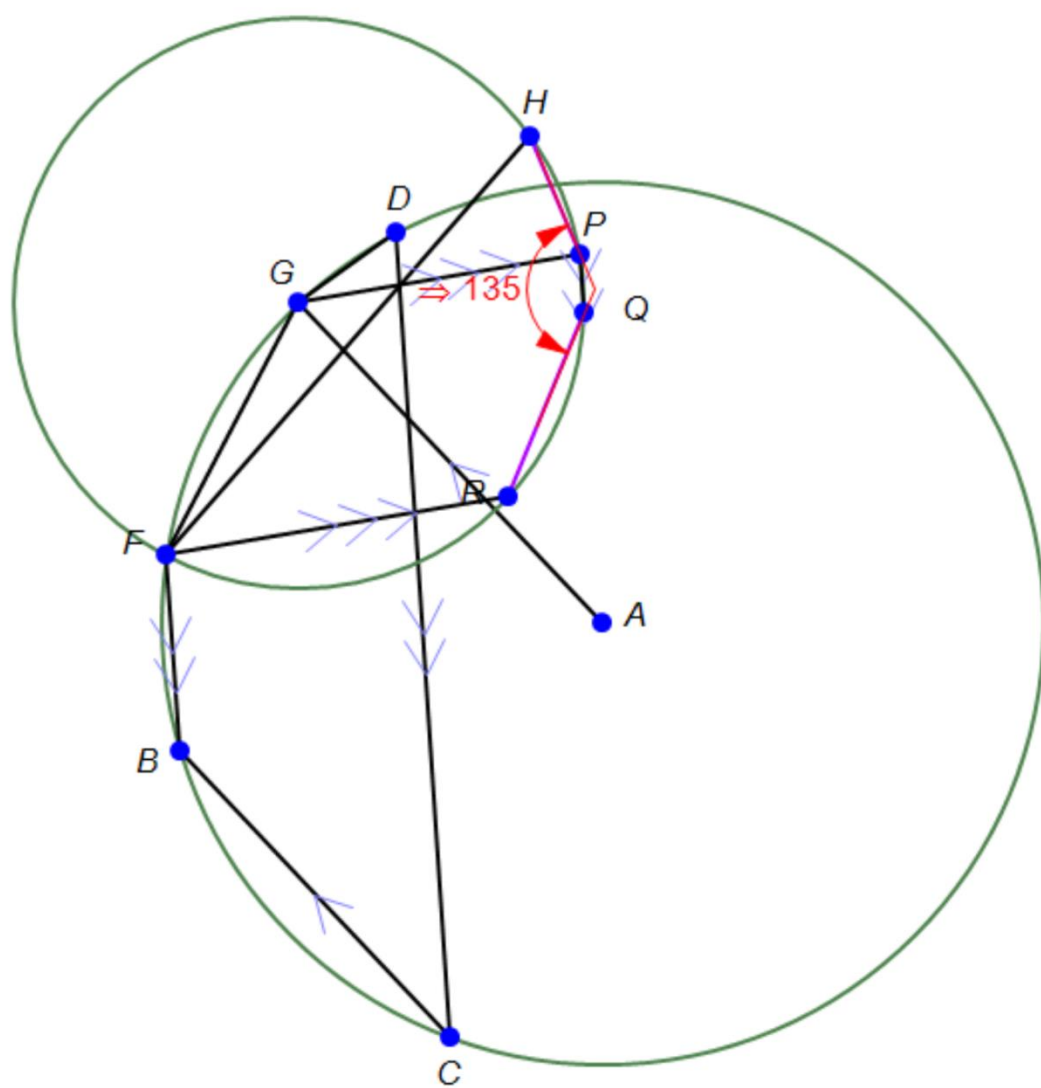
Let $h c d e f$ be a cyclic pentagon with centre a . Let $h f$ be parallel to $d c$. Let $h f q$ be a triangle with circumcentre g . Let $h c g$ be collinear. Let $e d$ be parallel to $g q$. Let L_1 be the reflection of $f e$ in $q f$. Determine the angle between $a d$ and L_1 .

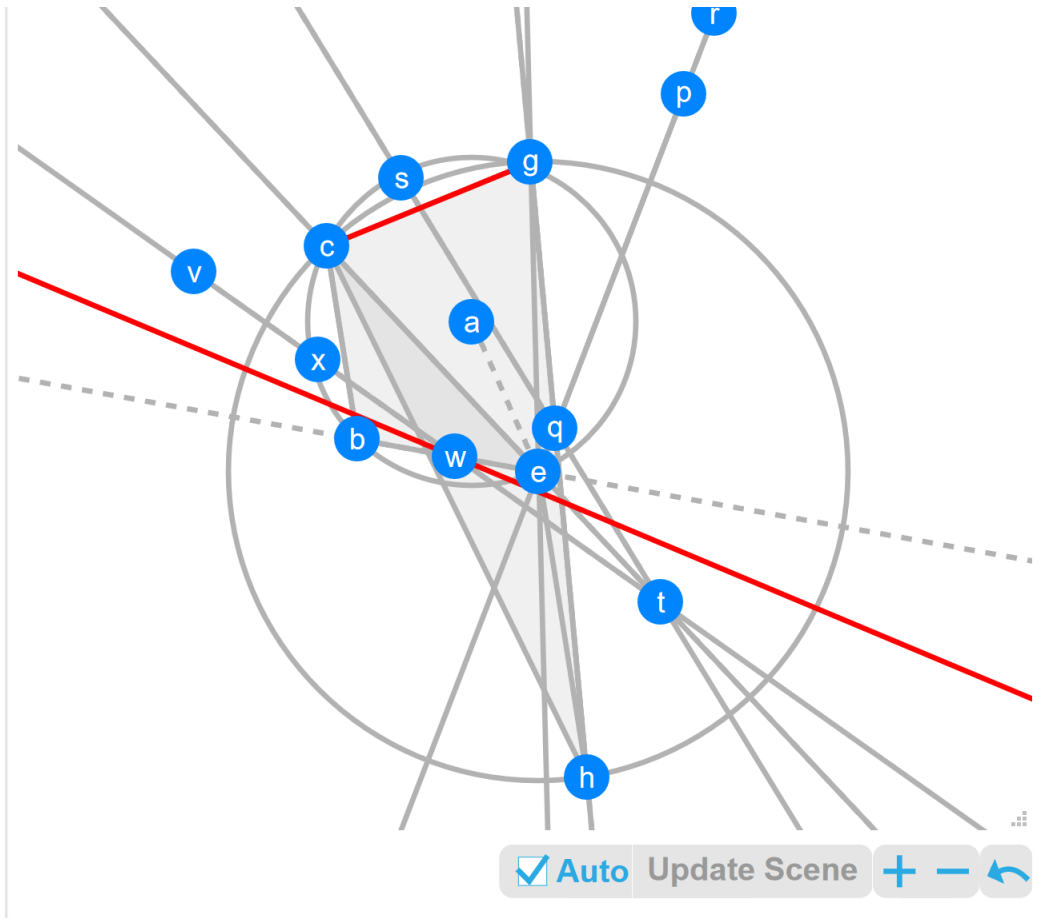


Let bfd be a triangle with circumcentre a . Let $fdhp$ be a cyclic quadrilateral with centre e . Let fp be parallel to hd . Let L_1 be the angle bisector of ab and ph . Let fp be parallel to L_1 . Let L_2 be the reflection of bf in fd . Determine the angle between L_2 and db .

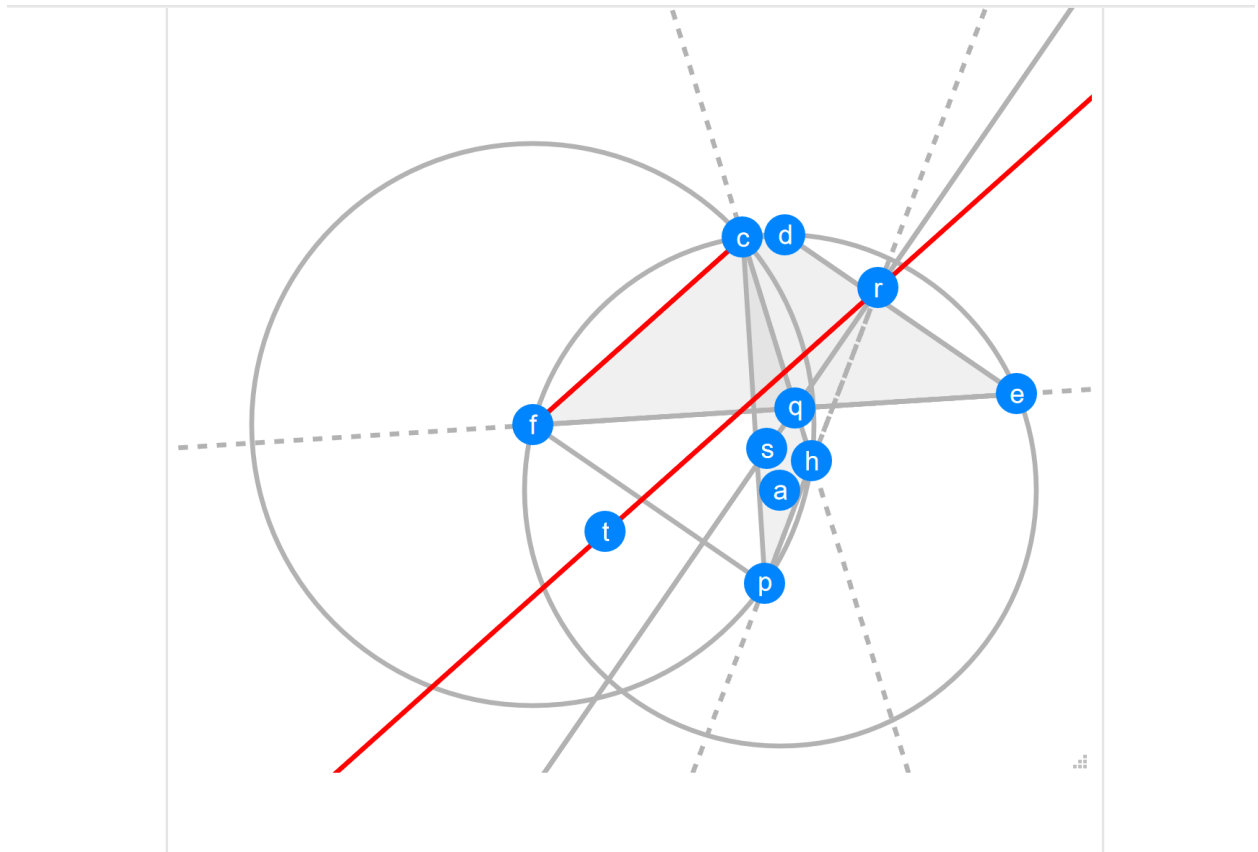


Let $bcdgf$ be a cyclic pentagon with centre a . Let ag be parallel to bc .
 Let bf be parallel to dc . Let $hpqrf$ be a cyclic pentagon with
 centre g . Let bf be parallel to pq . Let gp be parallel to rf .
 Let gdh be collinear. Determine the angle between hp and qr .

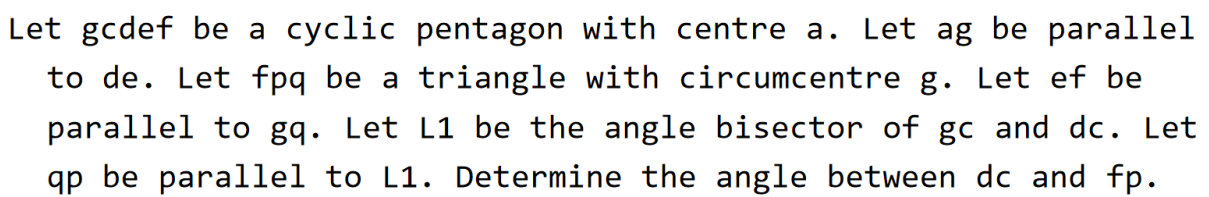


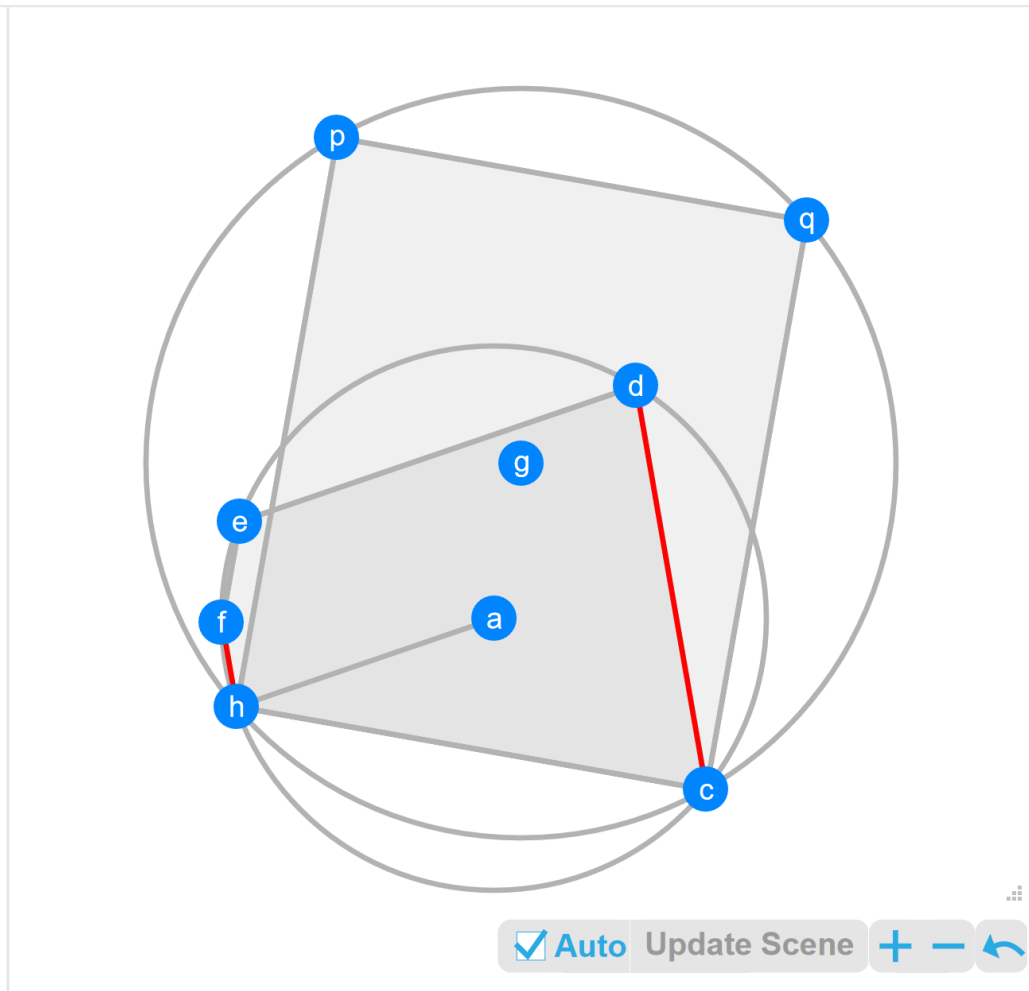


Let bce be a triangle with circumcentre a . Let cgh be a triangle with circumcentre e . Let bc be parallel to eh . Let $L1$ be the reflection of ae in eg . Let $L2$ be the reflection of $L1$ in gh . Let $L3$ be the reflection of $L2$ in ec . Let $L4$ be the angle bisector of be and $L3$. Determine the angle between $L4$ and cg .

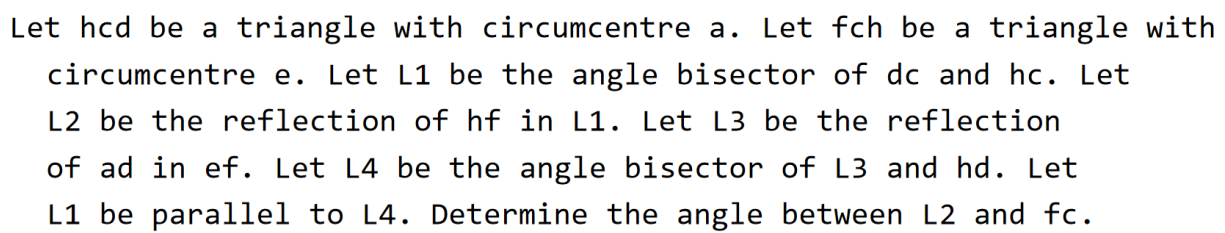


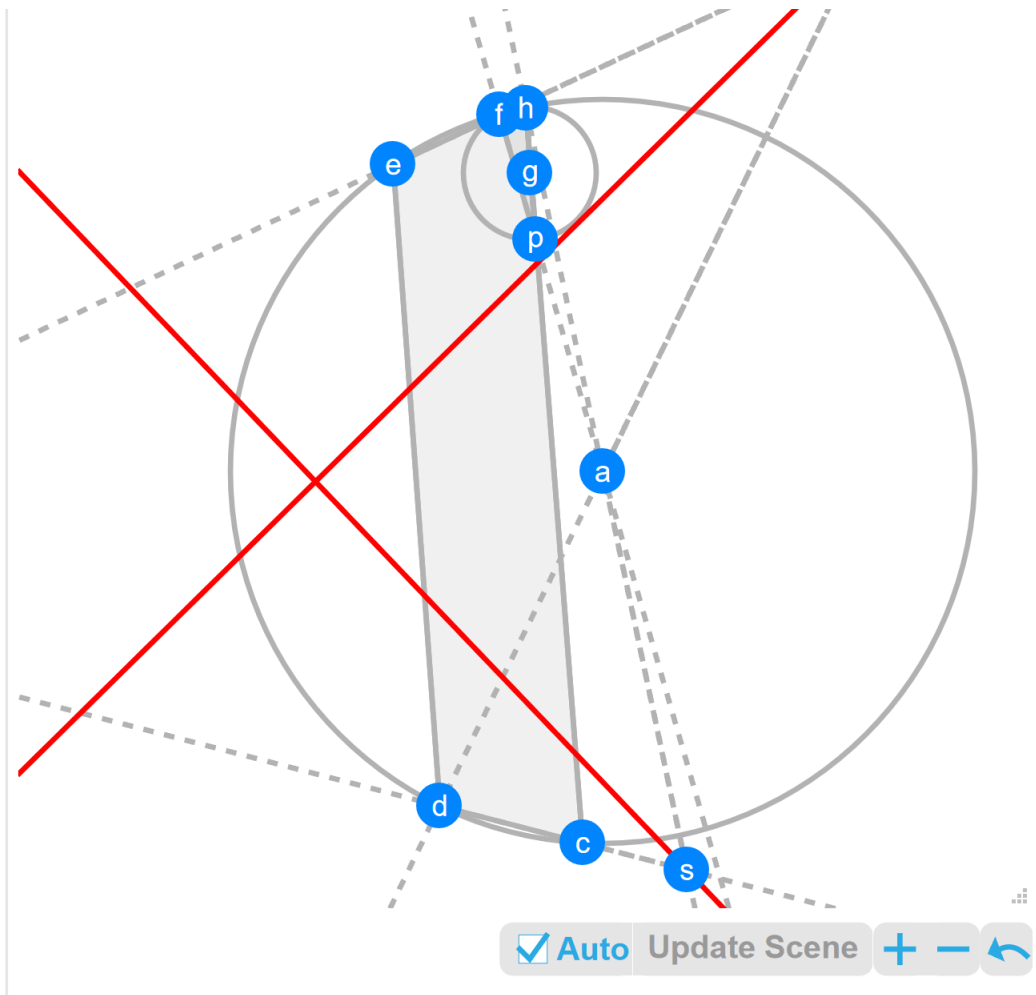
Let $fcde$ be a cyclic quadrilateral with centre a . Let fe be parallel to dc . Let chp be a triangle with circumcentre f . Let de be parallel to fp . Let $L1$ be the angle bisector of ch and fe . Let $L2$ be the reflection of ph in $L1$. Determine the angle between fc and $L2$.



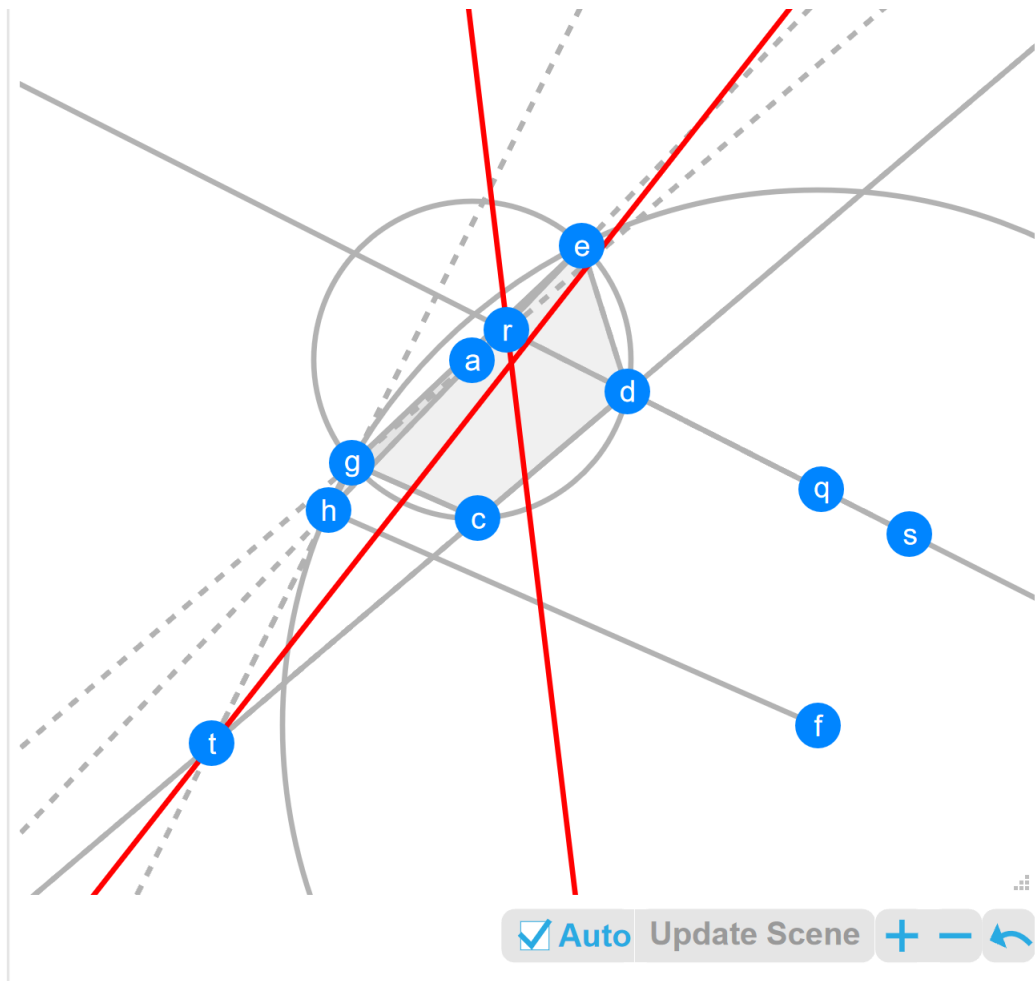


Let $h c d e f$ be a cyclic pentagon with centre a . Let ah be parallel to de . Let $h p q c$ be a cyclic quadrilateral with centre g . Let ef be parallel to hp . Let hc be parallel to qp . Let ef be parallel to cq . Determine the angle between hf and dc .

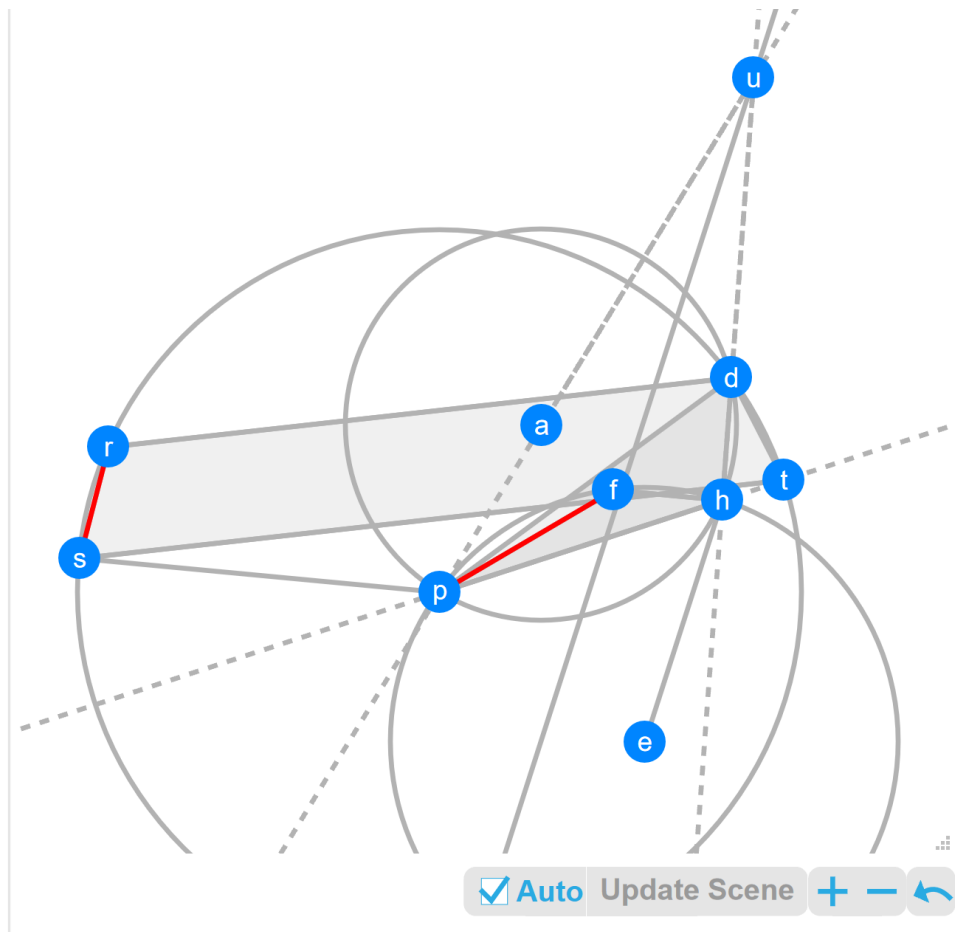




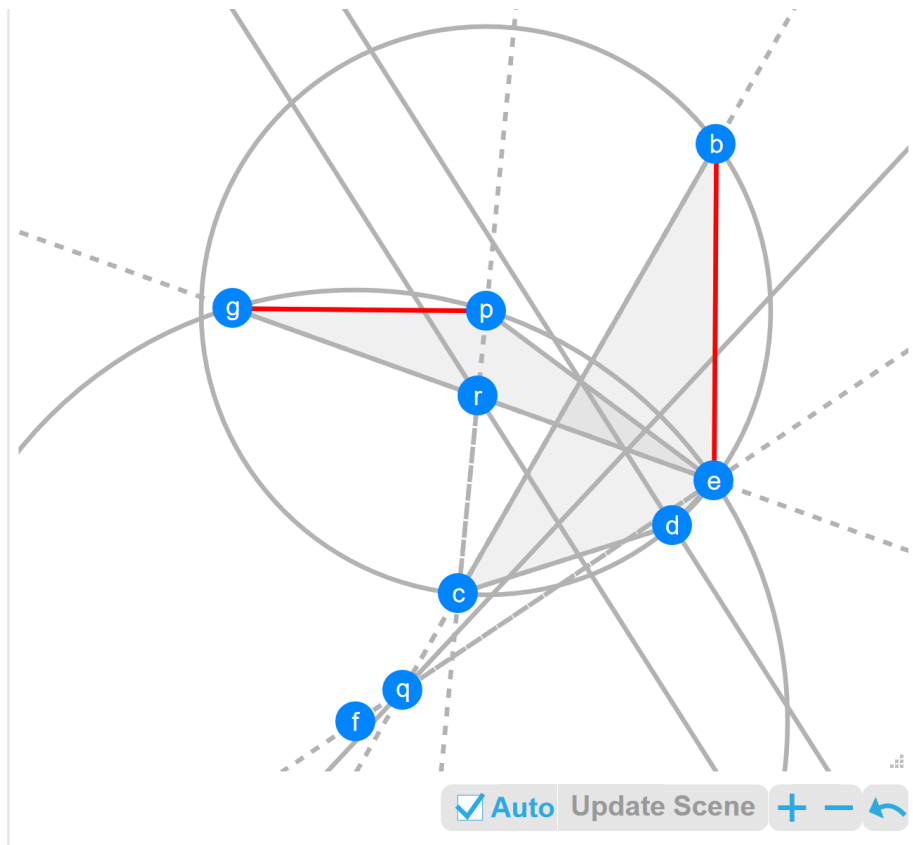
Let $h c d e f$ be a cyclic pentagon with centre a . Let $h p f$ be a triangle with circumcentre g . Let $d e$ be parallel to $h p$. Let $f a p$ be collinear. Let $h c$ be parallel to $g p$. Let L_1 be the angle bisector of $f e$ and $a d$. Let L_2 be the angle bisector of $d c$ and $a h$. Determine the angle between L_1 and L_2 .



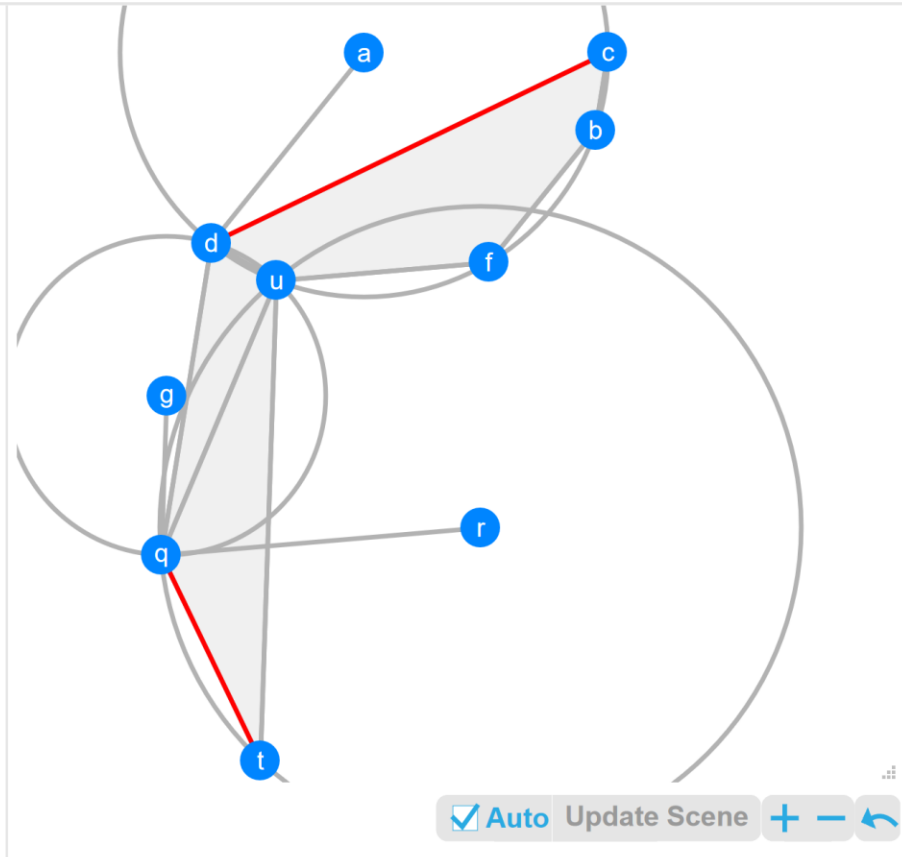
Let $gcde$ be a cyclic quadrilateral with centre a . Let ghe be a triangle with circumcentre f . Let eah be collinear. Let gc be parallel to fh . Let $L1$ be the reflection of ed in dc . Let $L2$ be the angle bisector of $L1$ and ag . Let $L3$ be the angle bisector of gh and dc . Determine the angle between $L2$ and $L3$.



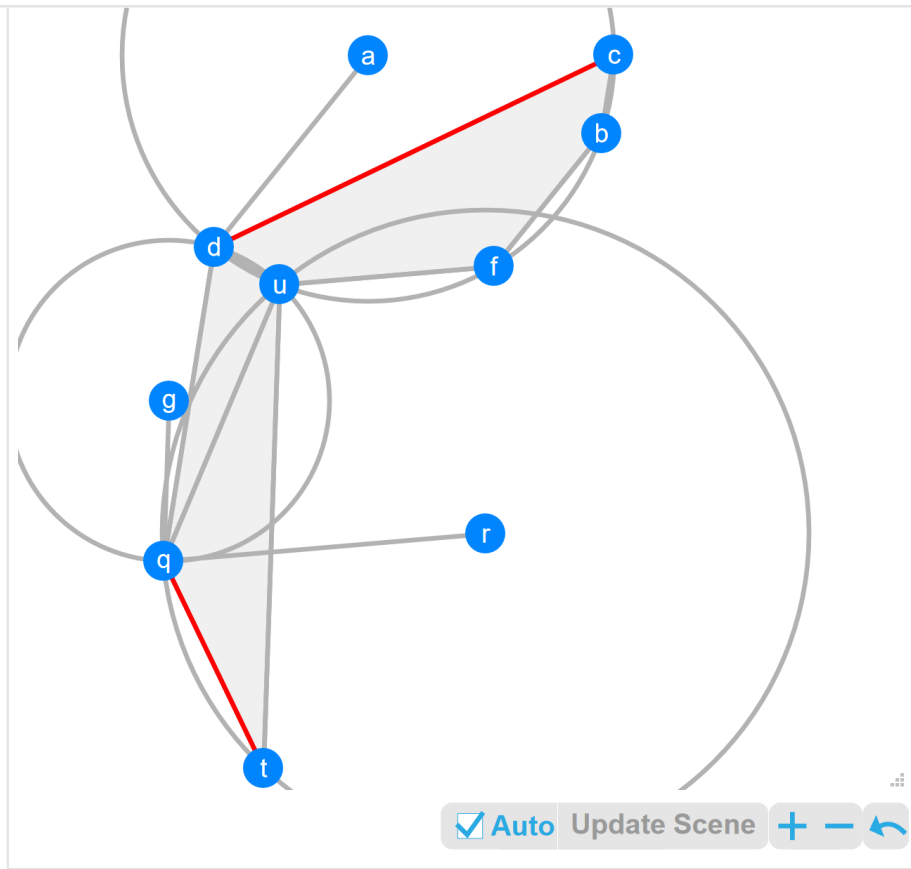
Let phd be a triangle with circumcentre a . Let fph be a triangle with circumcentre e . Let $drst$ be a cyclic quadrilateral with centre p . Let dr be parallel to st . Let fh be parallel to ps . Let pht be collinear. Let $L1$ be the angle bisector of hd and ap . Let eh be parallel to $L1$. Determine the angle between rs and fp .



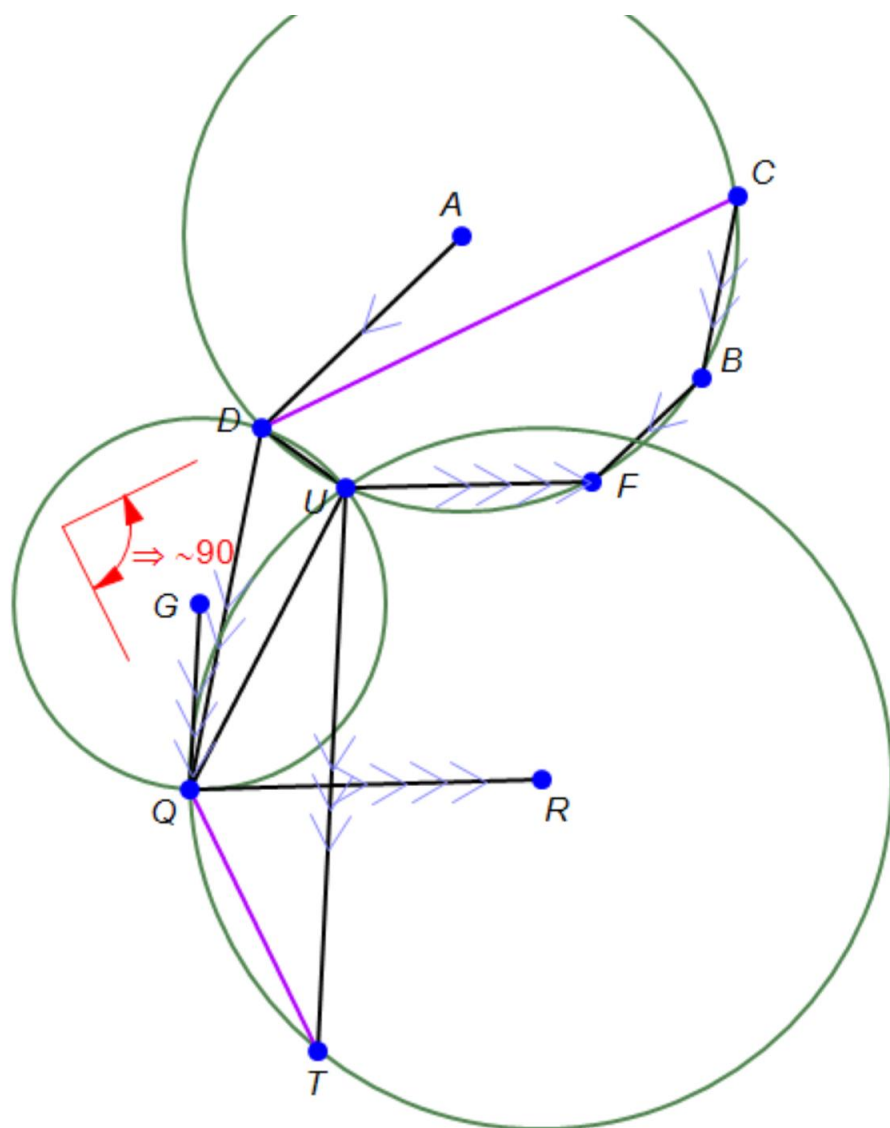
Let $bcde$ be a cyclic quadrilateral with centre p . Let gep be a triangle with circumcentre f . Let L_1 be the angle bisector of fe and bc . Let ed be parallel to L_1 . Let L_2 be the angle bisector of ed and cd . Let L_3 be the angle bisector of pc and ge . Let L_2 be parallel to L_3 . Determine the angle between gp and be .

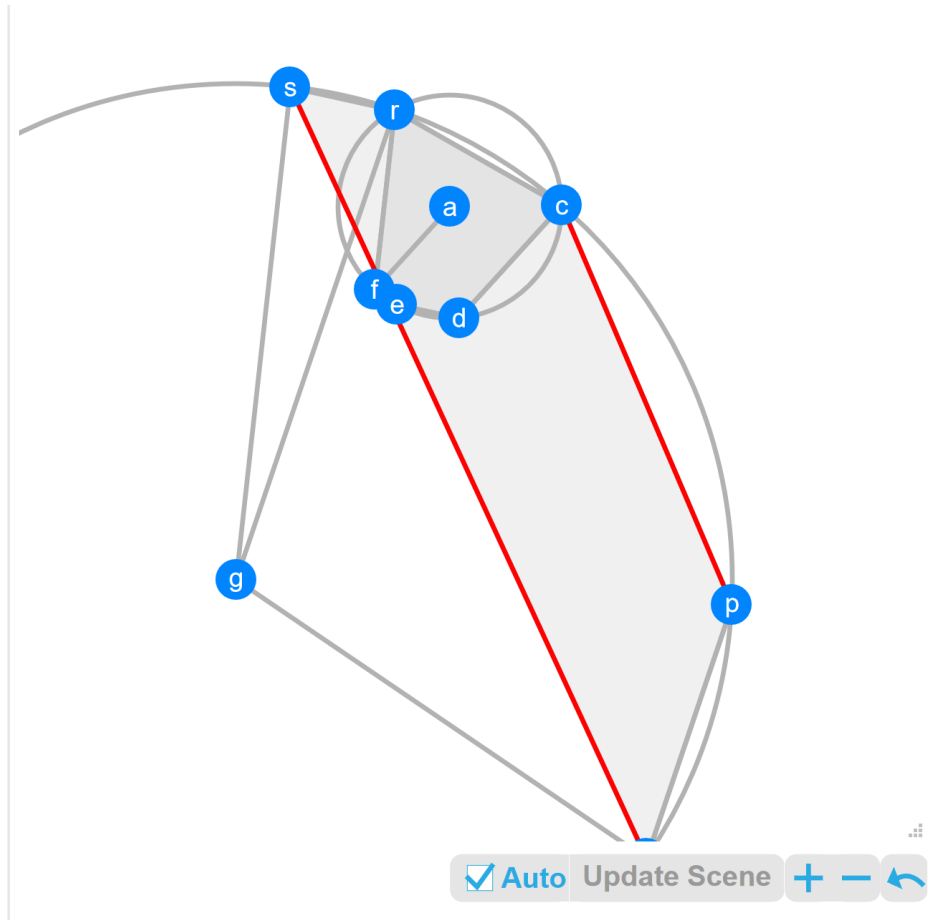


Let $bcdue$ be a cyclic pentagon with centre a . Let ad be parallel to bf .
 Let udq be a triangle with circumcentre g . Let bc be parallel to qd .
 Let qtu be a triangle with circumcentre r . Let gq be parallel to ut .
 Let uf be parallel to rq . Determine the angle between dc and qt .

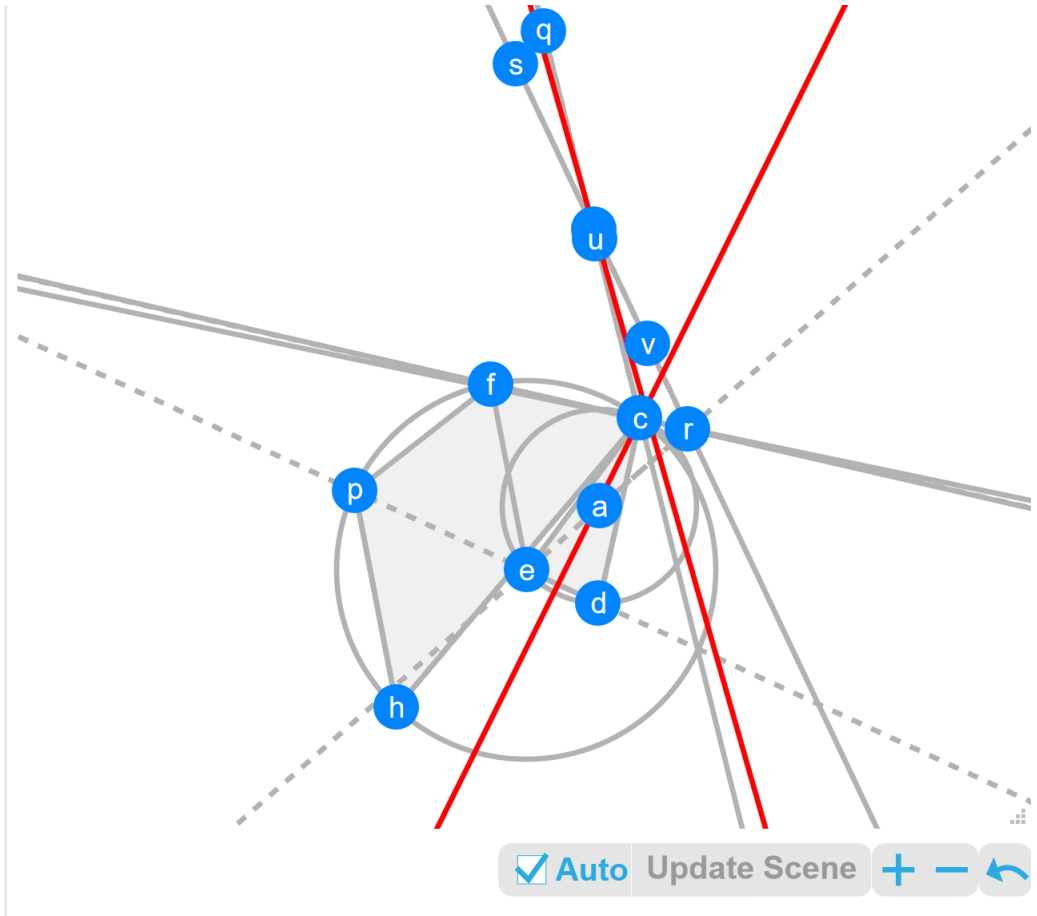


Let $bcduf$ be a cyclic pentagon with centre a . Let ad be parallel to bf .
 Let udq be a triangle with circumcentre g . Let bc be parallel to qd .
 Let qtu be a triangle with circumcentre r . Let gq be parallel to ut .
 Let uf be parallel to rq . Determine the angle between dc and qt .

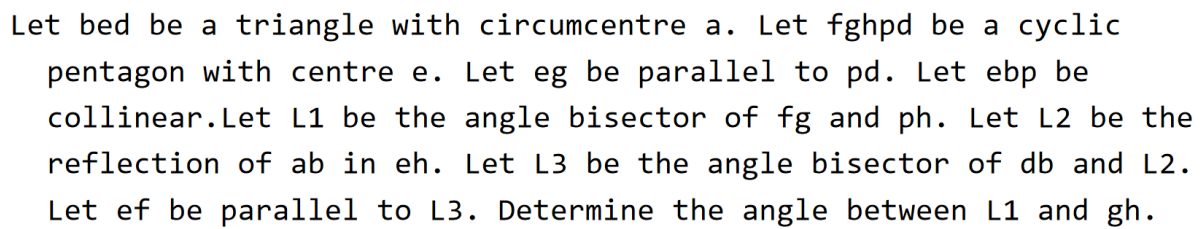


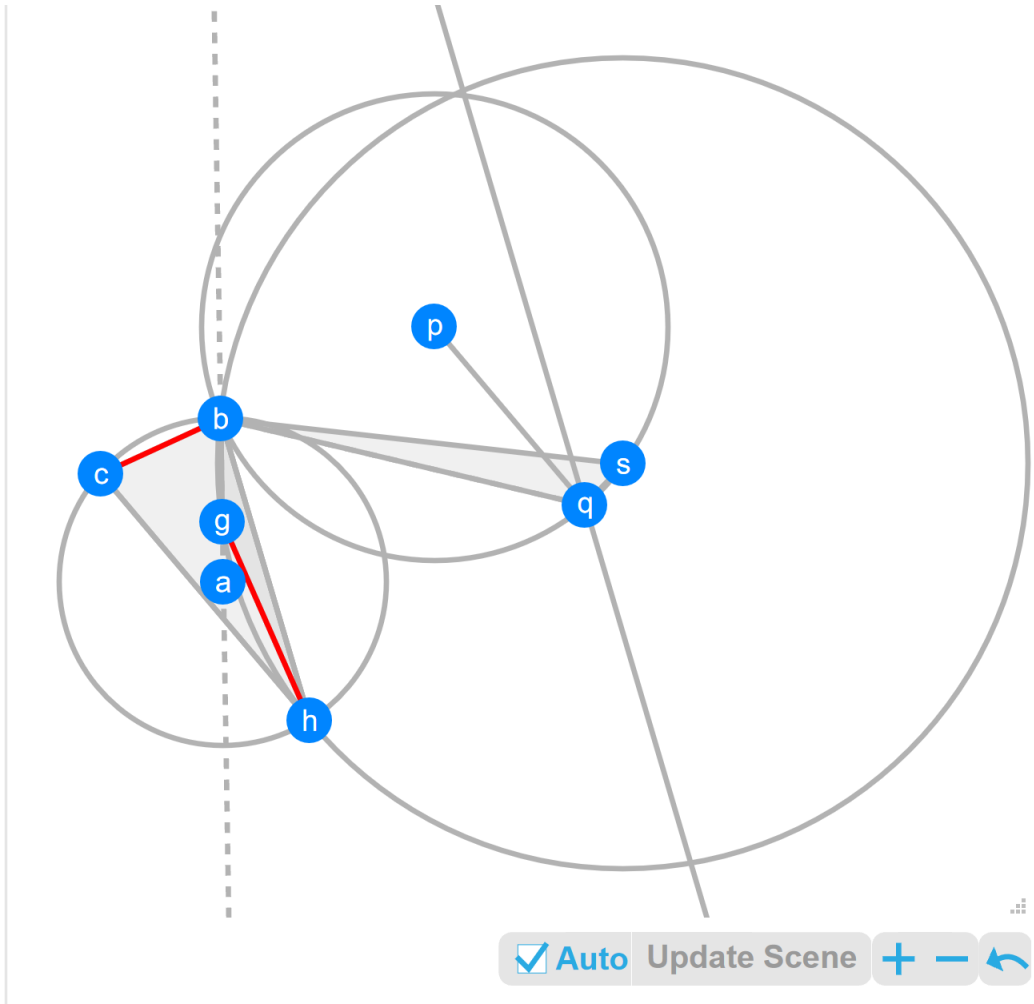


Let $rcdef$ be a cyclic pentagon with centre a . Let af be parallel to dc .
 Let $hpcrs$ be a cyclic pentagon with centre g . Let gr be parallel
 to hp . Let de be parallel to sr . Let ef be parallel to gh . Let
 rf be parallel to gs . Determine the angle between pc and sh .

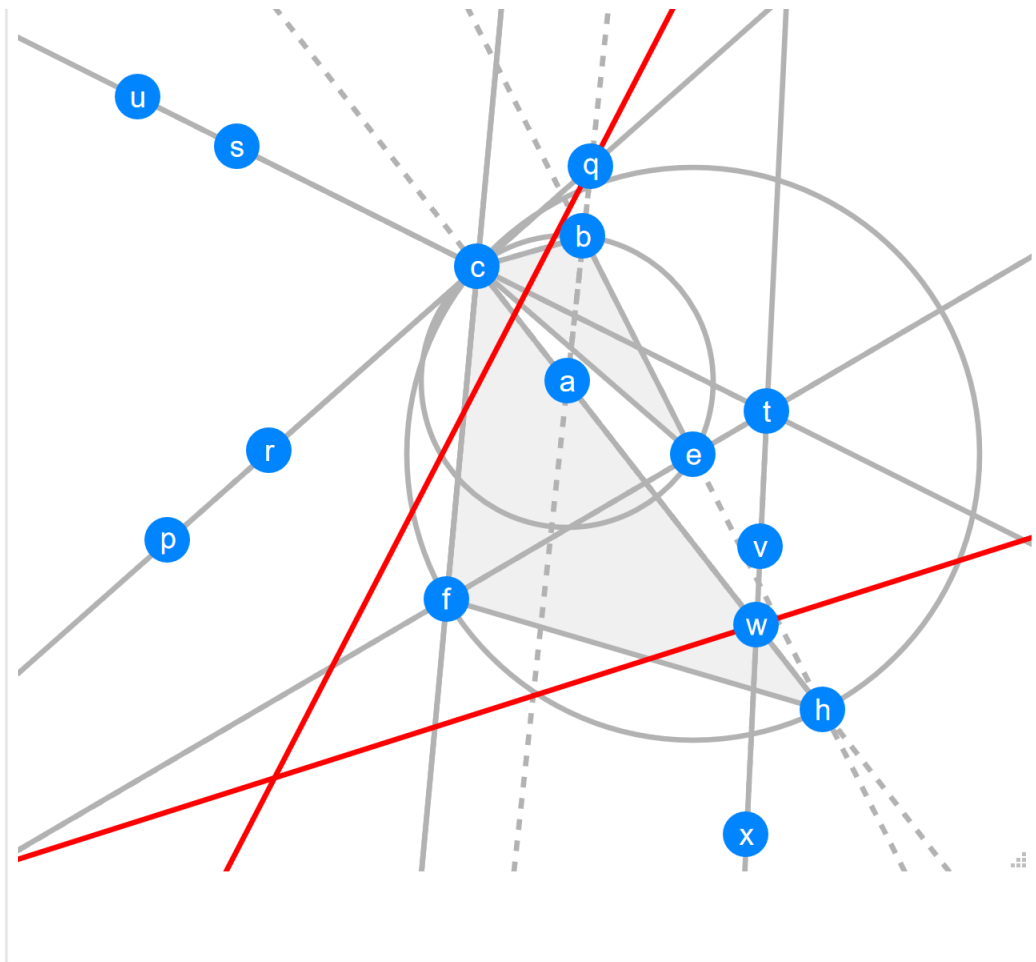


Let ecd be a triangle with circumcentre a . Let $fchp$ be a cyclic quadrilateral with centre e . Let ef be parallel to hp . Let edp be collinear. Let $L1$ be the angle bisector of dc and hc . Let $L2$ be the reflection of hc in fc . Let $L3$ be the reflection of ae in fc . Let $L4$ be the angle bisector of $L2$ and $L3$. Determine the angle between $L1$ and $L4$.

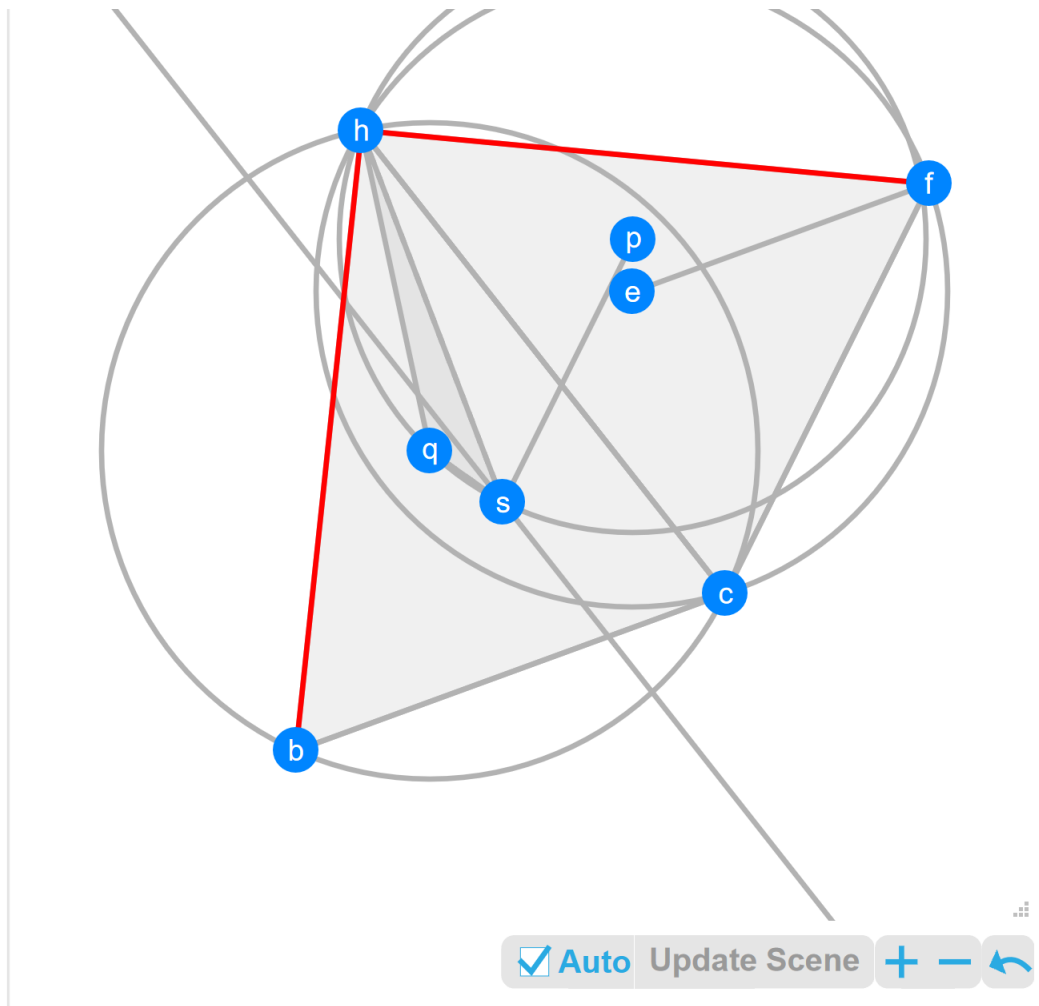




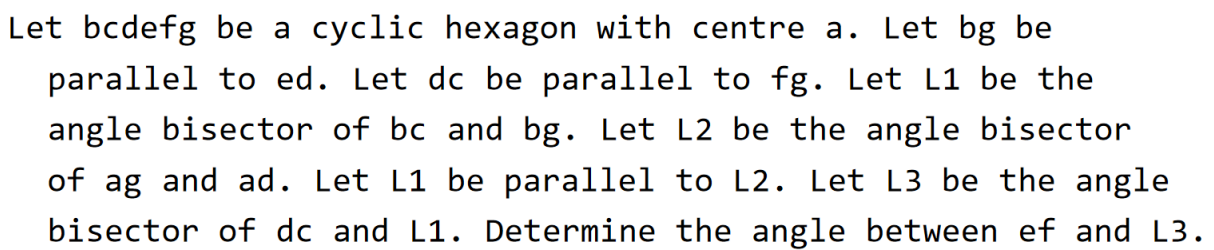
Let bch be a triangle with circumcentre a . Let bgh be a triangle with circumcentre s . Let bag be collinear. Let qbs be a triangle with circumcentre p . Let hc be parallel to pq . Let $L1$ be the angle bisector of qb and sq . Let hb be parallel to $L1$. Determine the angle between bc and hg .

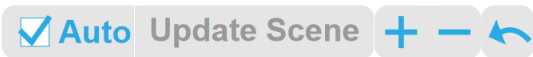


Let bce be a triangle with circumcentre a . Let fch be a triangle with circumcentre e . Let ebh be collinear. Let $L1$ be the reflection of ch in fc . Let $L2$ be the angle bisector of $L1$ and ab . Let $L3$ be the reflection of bc in fc . Let $L4$ be the reflection of $L3$ in ef . Let $L5$ be the angle bisector of $L4$ and ch . Determine the angle between $L2$ and $L5$.

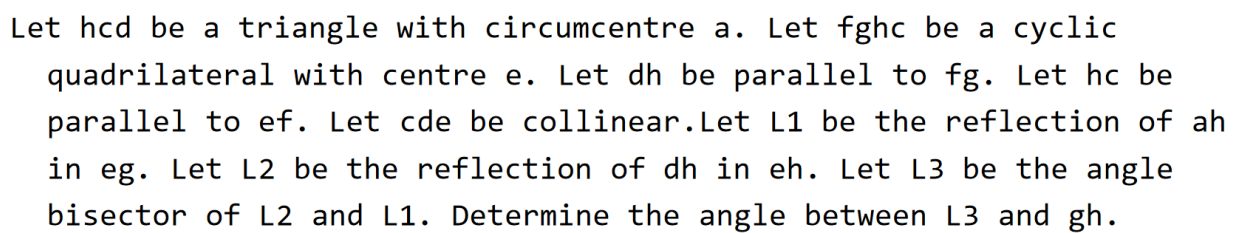


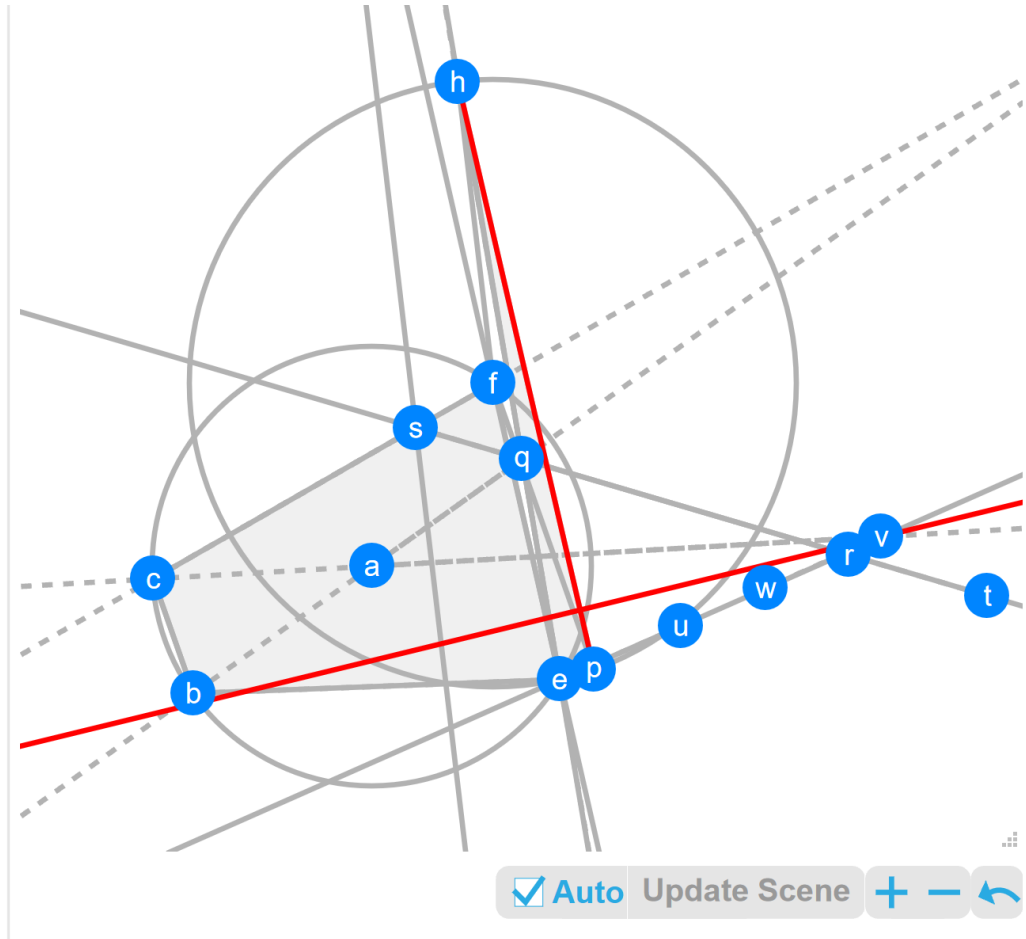
Let bch be a triangle with circumcentre q . Let fch be a triangle with circumcentre e . Let bc be parallel to ef . Let qhs be a triangle with circumcentre p . Let fc be parallel to ps . Let $L1$ be the angle bisector of qs and sh . Let hc be parallel to $L1$. Determine the angle between bh and hf .



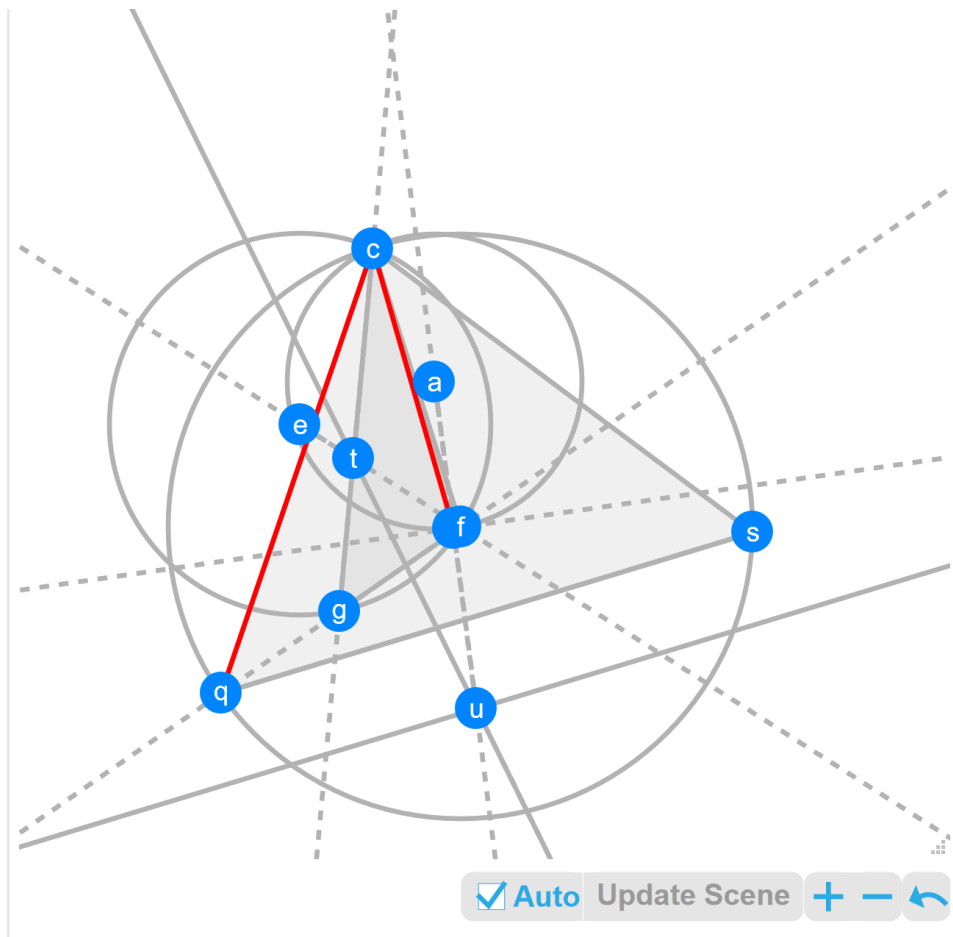


Let $fcde$ be a cyclic quadrilateral with centre a . Let gcp be a triangle with circumcentre f . Let $L1$ be the reflection of gc in cp . Let $L2$ be the angle bisector of fe and cp . Let de be parallel to $L2$. Let $L3$ be the angle bisector of dc and de . Let gc be parallel to $L3$. Determine the angle between $L1$ and gp .

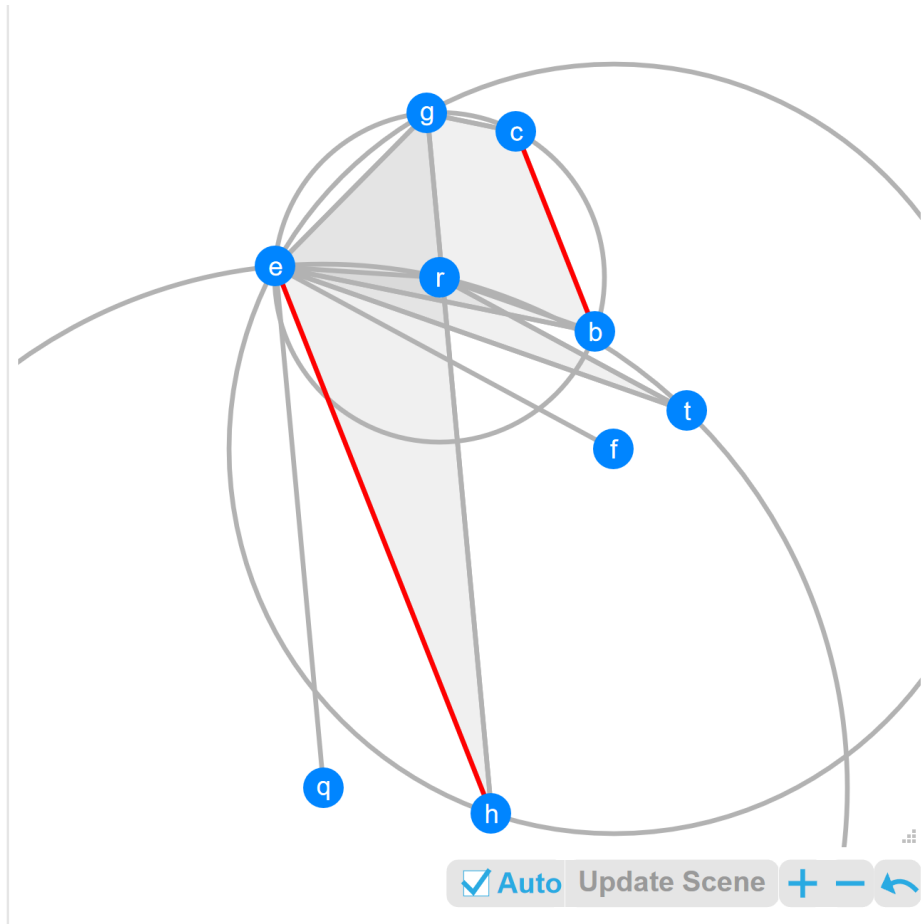




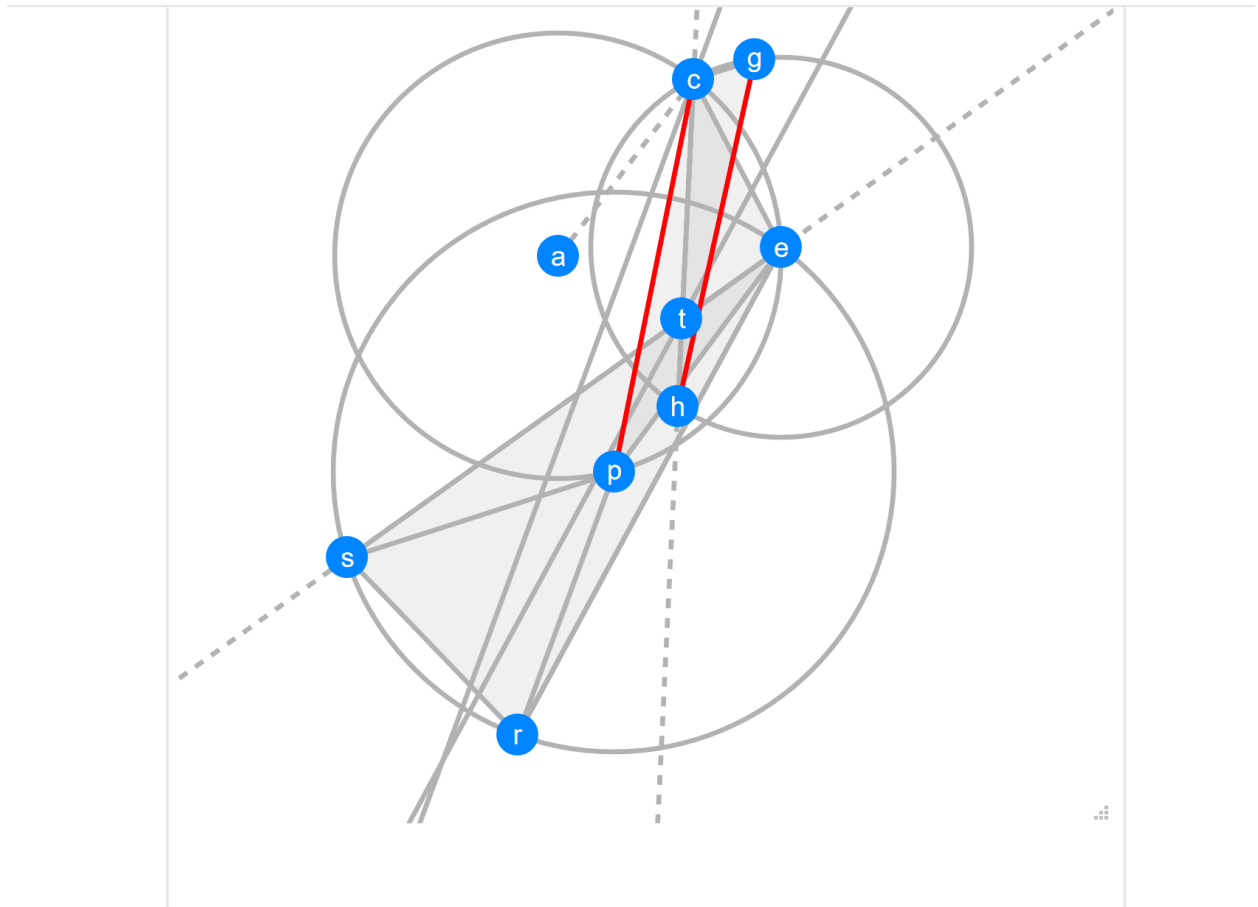
Let $bcfe$ be a cyclic quadrilateral with centre a . Let ehp be a triangle with circumcentre f . Let bc be parallel to fp . Let $L1$ be the reflection of ab in eh . Let $L2$ be the angle bisector of $L1$ and cf . Let fh be parallel to $L2$. Let $L3$ be the reflection of eb in fe . Let $L4$ be the angle bisector of ac and $L3$. Determine the angle between ph and $L4$.



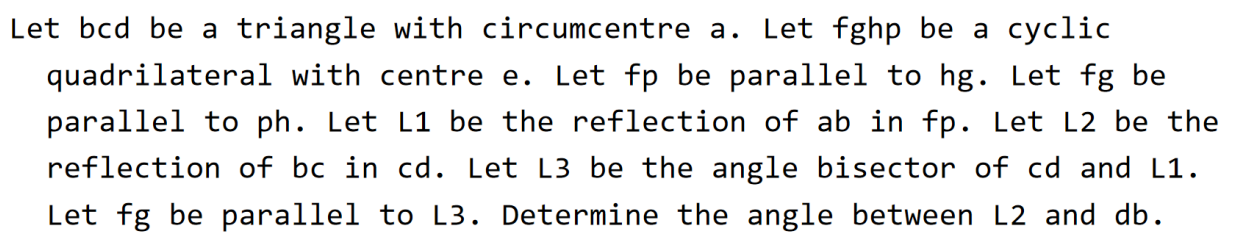
Let fcd be a triangle with circumcentre a . Let fgc be a triangle with circumcentre e . Let qcs be a triangle with circumcentre f . Let fgq be collinear. Let fds be collinear. Let $L1$ be the angle bisector of gc and ef . Let $L2$ be the angle bisector of $L1$ and ad . Let qs be parallel to $L2$. Determine the angle between dc and qc .

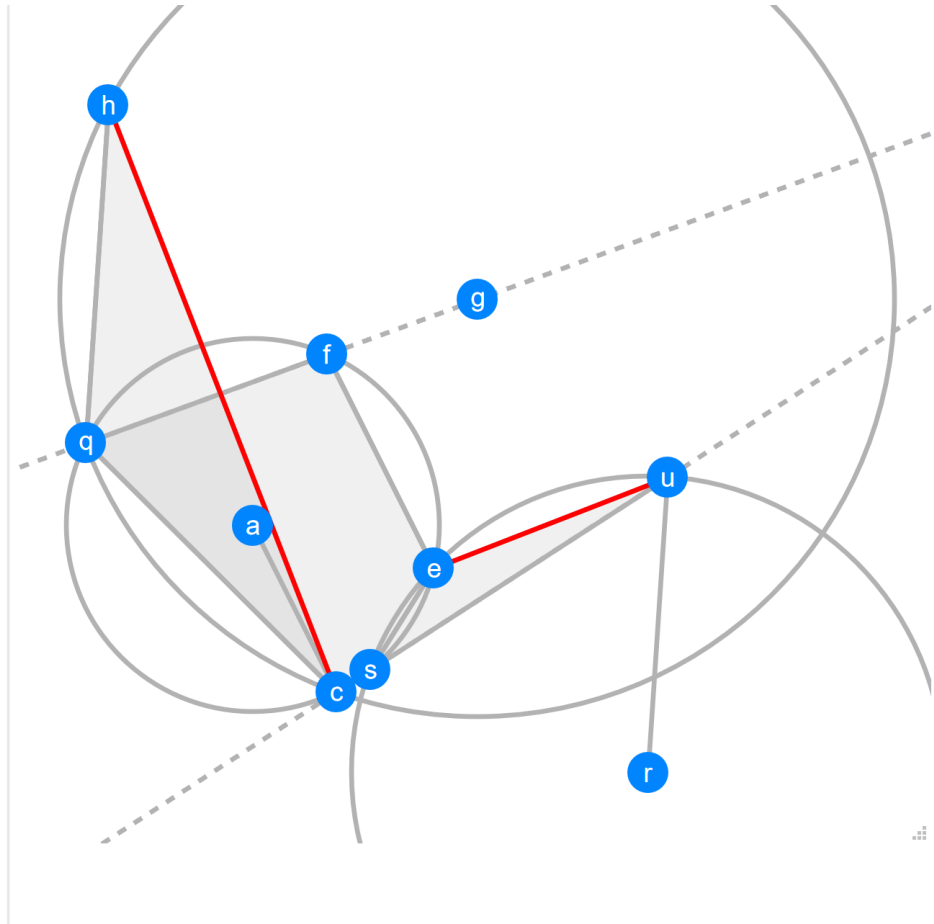


Let $bcge$ be a cyclic quadrilateral with centre r . Let be be parallel to gc . Let ghe be a triangle with circumcentre f . Let ret be a triangle with circumcentre q . Let fe be parallel to rt . Let rb be parallel to te . Let gh be parallel to qe . Determine the angle between eh and bc .

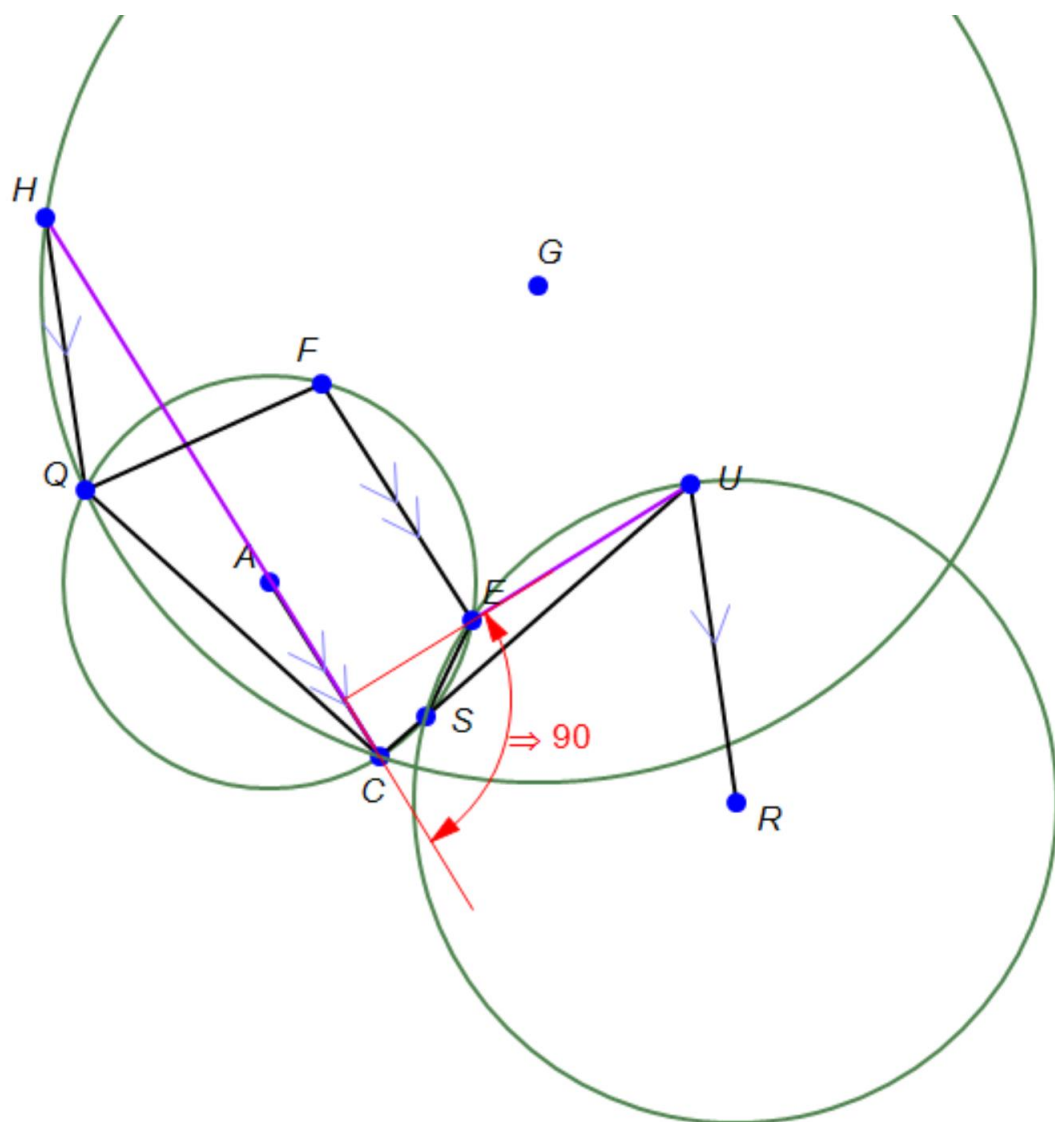


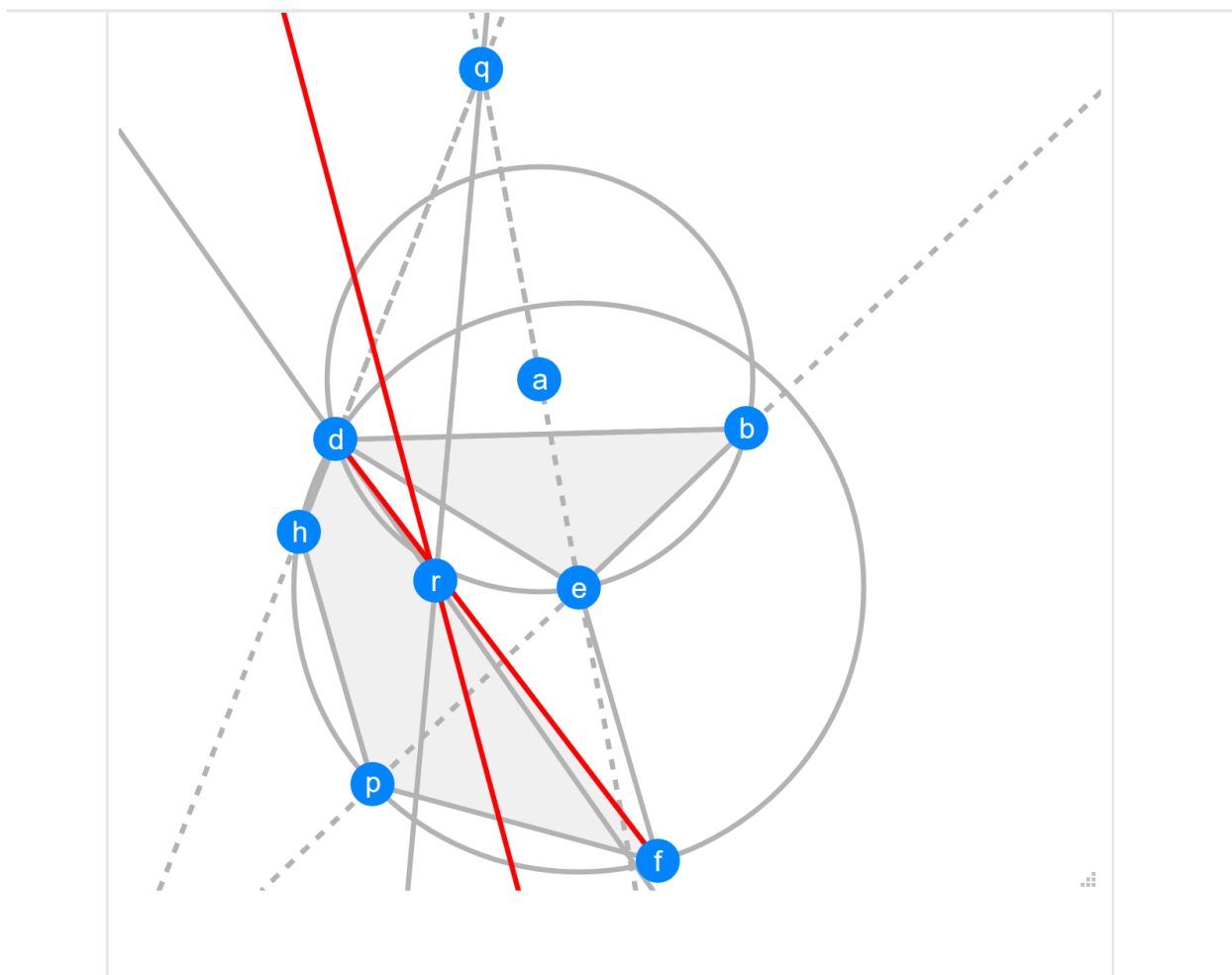
Let pce be a triangle with circumcentre a . Let cgh be a triangle with circumcentre e . Let ers be a triangle with circumcentre p . Let cg be parallel to ps . Let L_1 be the angle bisector of ac and ch . Let pr be parallel to L_1 . Let L_2 be the angle bisector of ch and es . Let er be parallel to L_2 . Determine the angle between hg and pc .



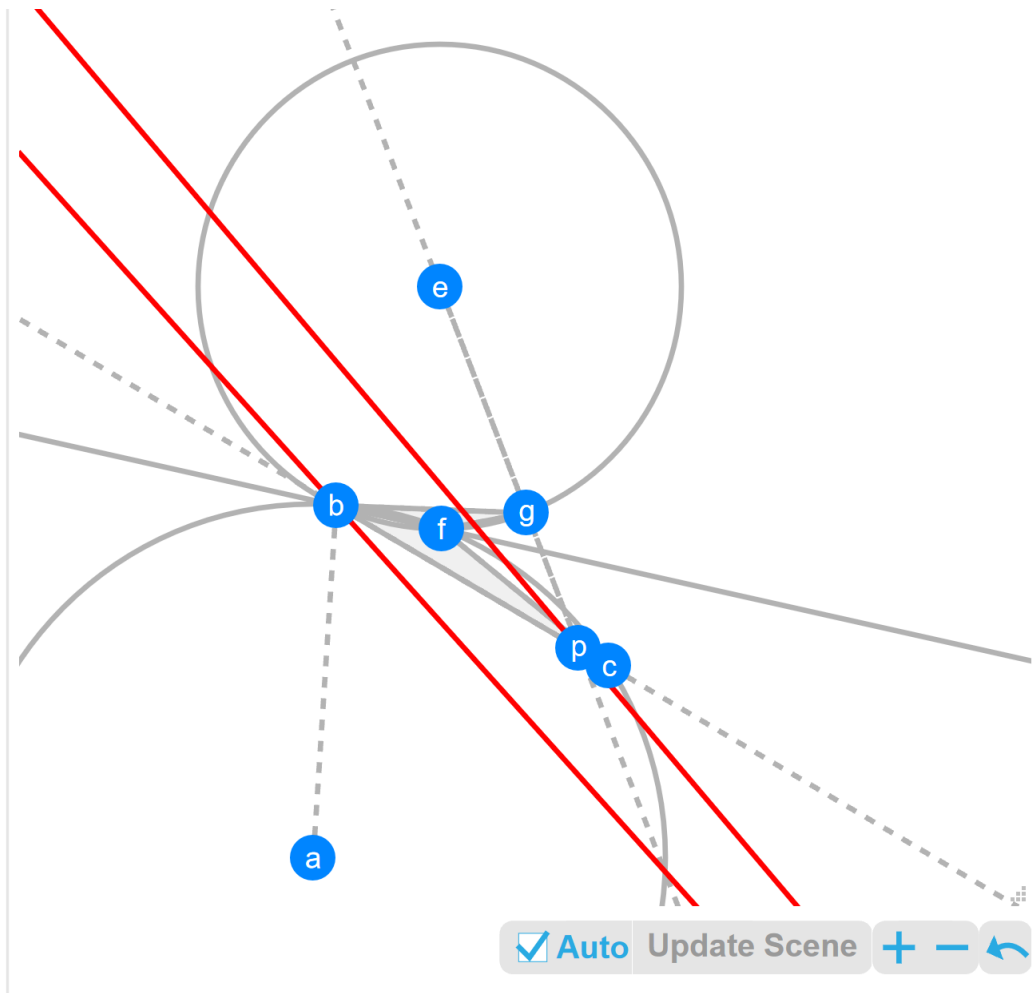


Let $qcsef$ be a cyclic pentagon with centre a . Let ac be parallel to fe .
 Let hcq be a triangle with circumcentre g . Let qfg be collinear. Let
 seu be a triangle with circumcentre r . Let scu be collinear. Let
 hq be parallel to ru . Determine the angle between ue and hc .

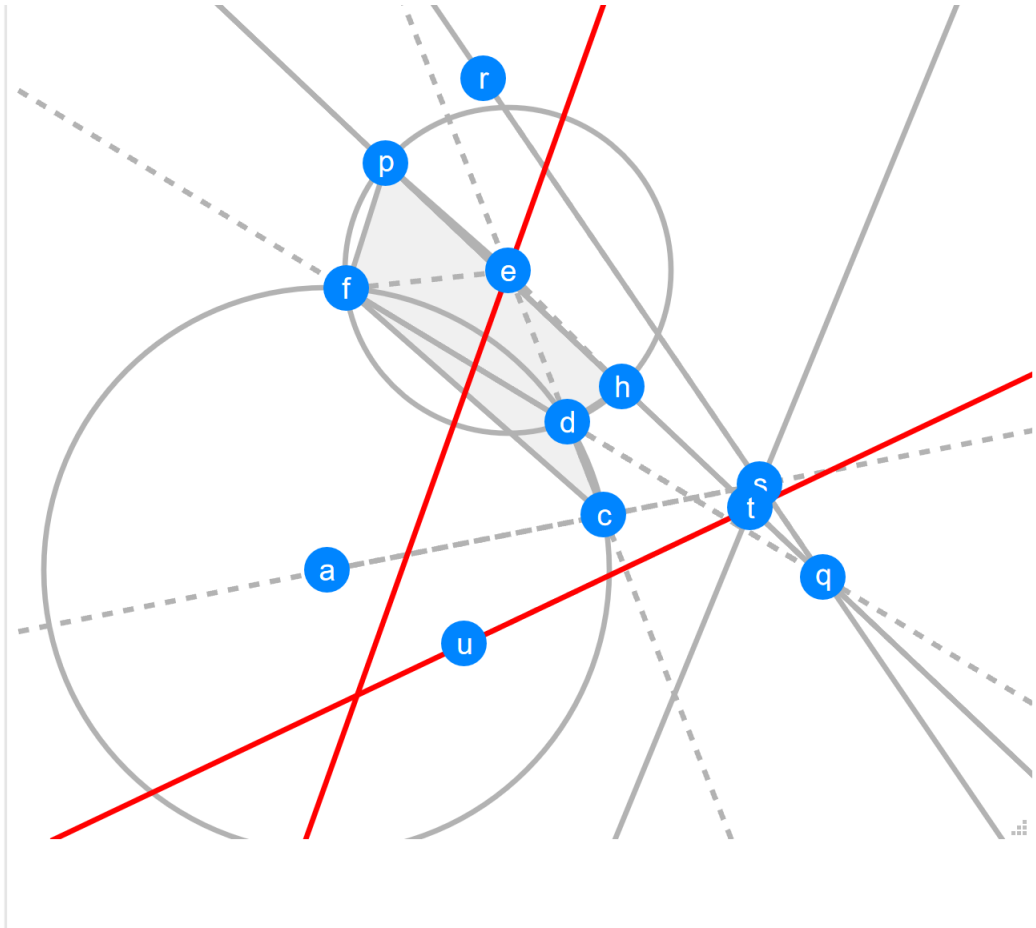




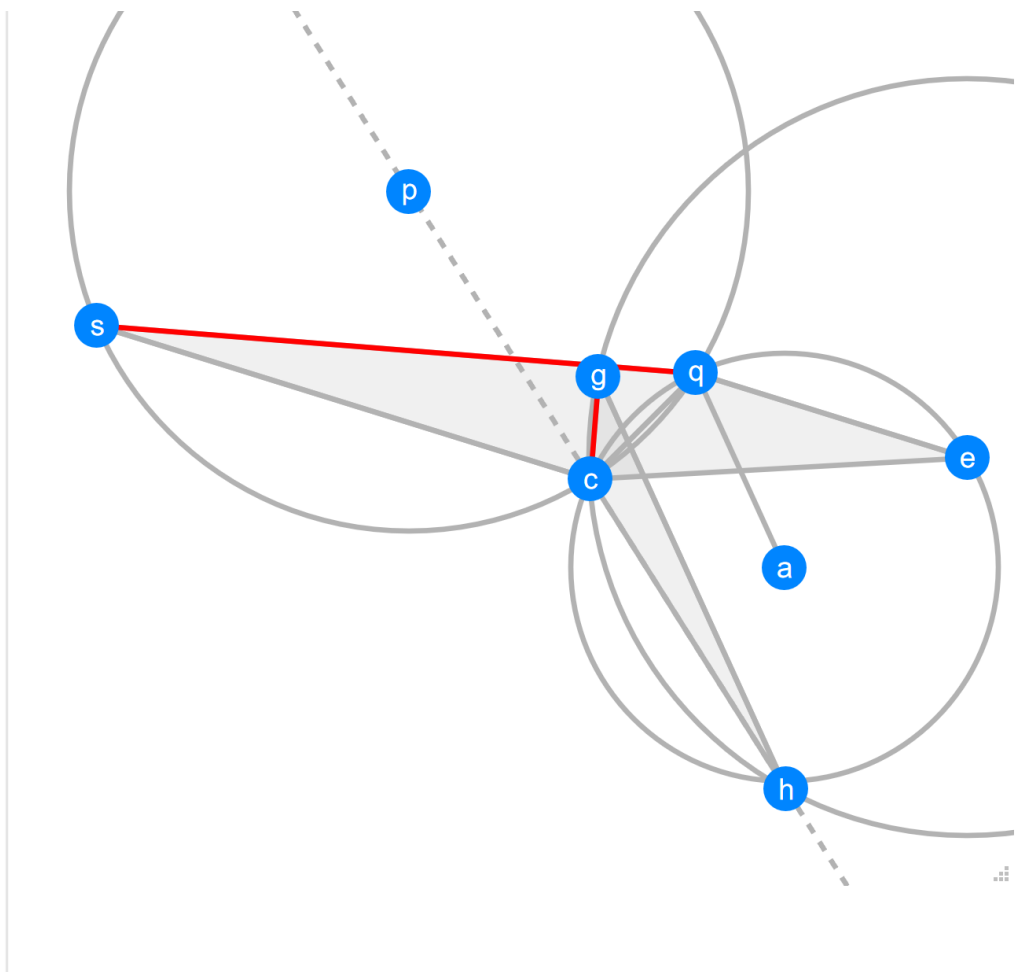
Let bed be a triangle with circumcentre a . Let $fdhp$ be a cyclic quadrilateral with centre e . Let ef be parallel to ph . Let ebp be collinear. Let $L1$ be the angle bisector of bd and dh . Let $L2$ be the angle bisector of ae and dh . Let $L3$ be the angle bisector of $L2$ and $L1$. Determine the angle between fd and $L3$.



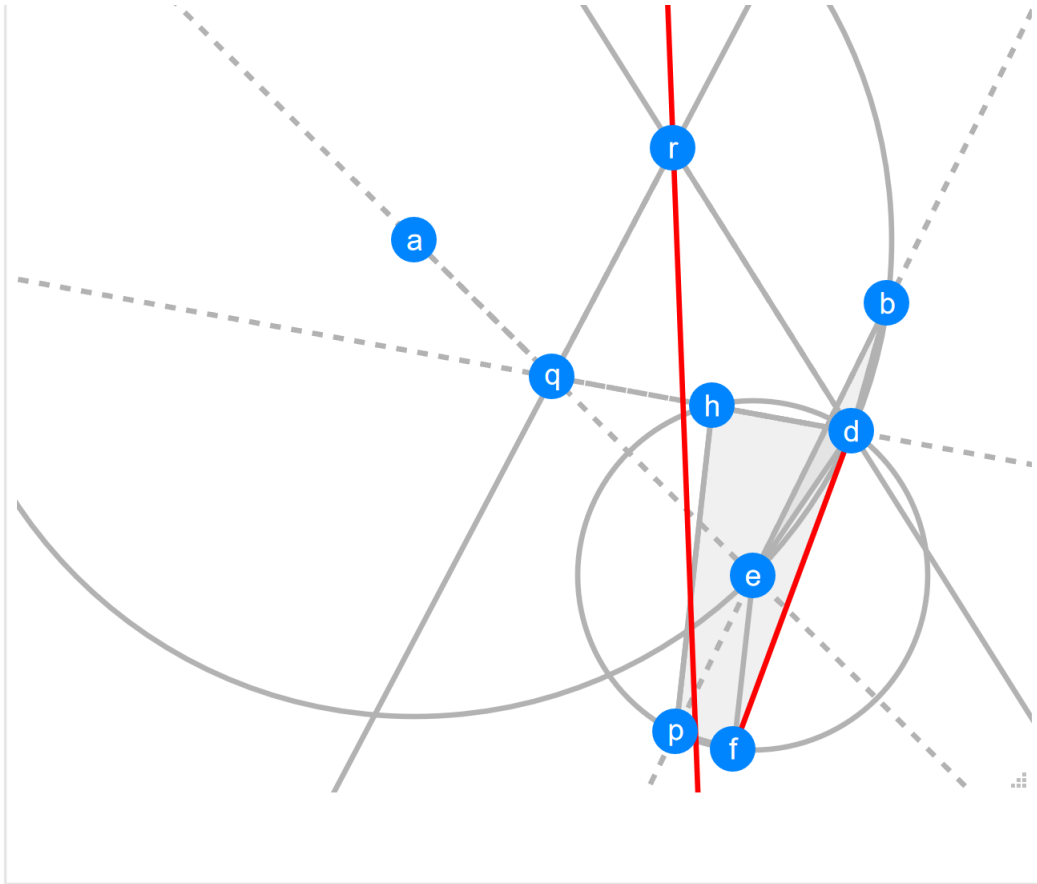
Let bcf be a triangle with circumcentre a . Let fgb be a triangle with circumcentre e . Let L_1 be the angle bisector of fg and cf . Let fb be parallel to L_1 . Let L_2 be the angle bisector of eg and bc . Let L_3 be the angle bisector of ab and bg . Determine the angle between L_2 and L_3 .



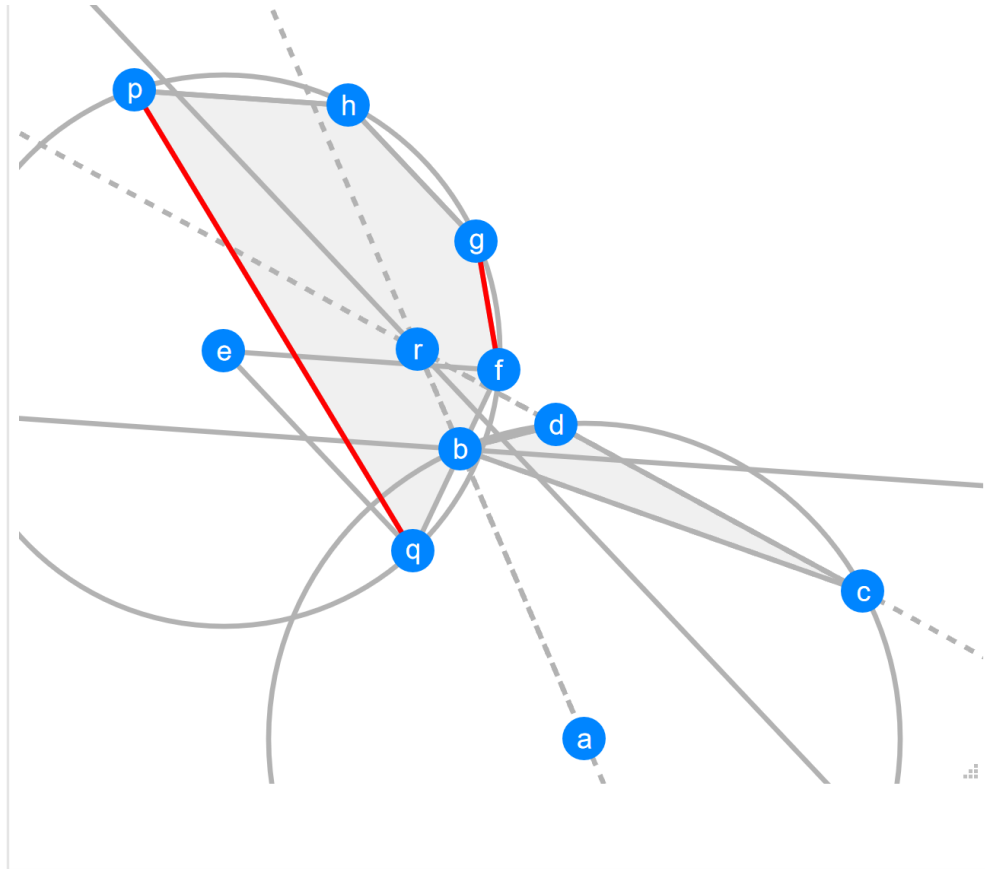
Let fcd be a triangle with circumcentre a . Let $fdhp$ be a cyclic quadrilateral with centre e . Let dce be collinear. Let fc be parallel to ep . Let $L1$ be the reflection of fd in ph . Let $L2$ be the angle bisector of ac and $L1$. Let $L3$ be the angle bisector of ef and eh . Let $L4$ be the reflection of $L2$ in ph . Determine the angle between $L4$ and $L3$.



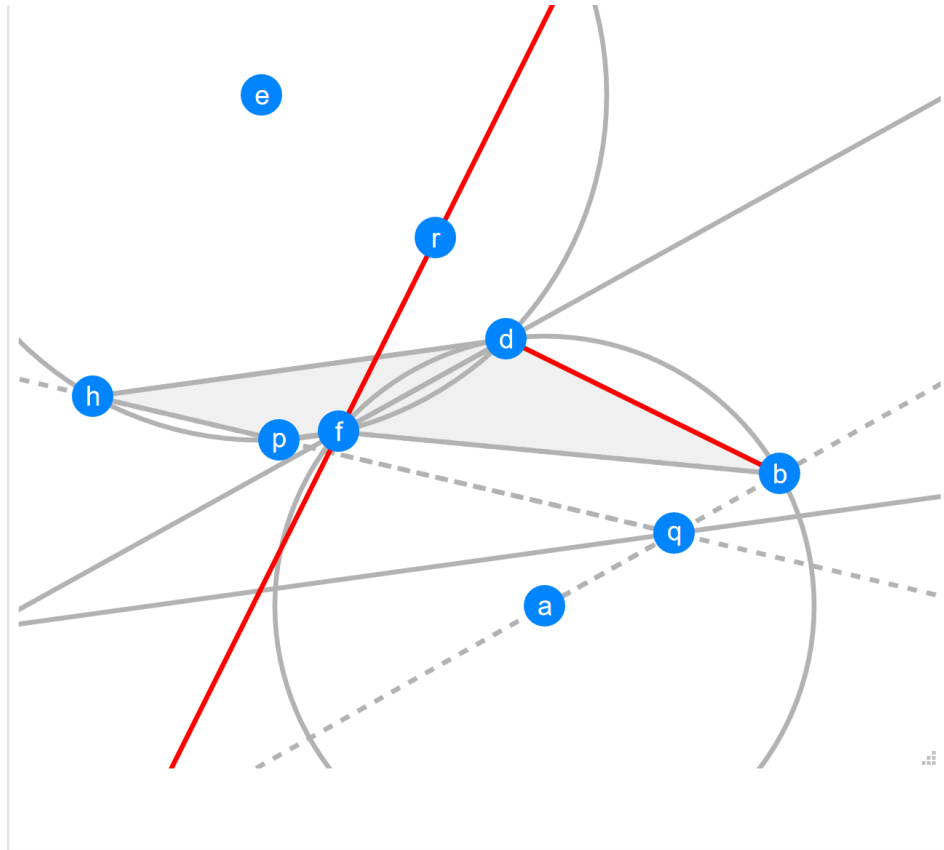
Let ecq be a triangle with circumcentre a . Let cgh be a triangle with circumcentre e . Let aq be parallel to hg . Let qcs be a triangle with circumcentre p . Let eq be parallel to cs . Let chp be collinear. Determine the angle between qs and cg .



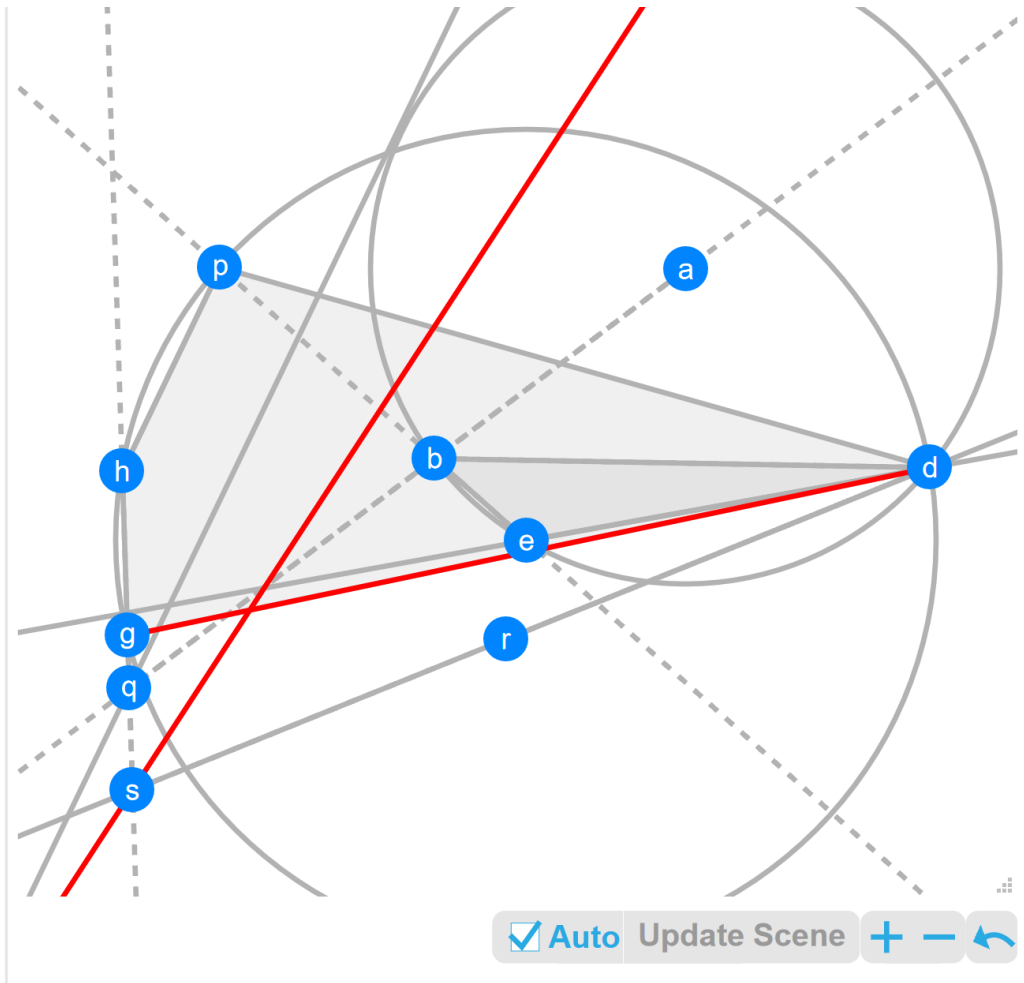
Let bed be a triangle with circumcentre a . Let $fdhp$ be a cyclic quadrilateral with centre e . Let ef be parallel to ph . Let ebp be collinear. Let $L1$ be the angle bisector of bd and dh . Let $L2$ be the angle bisector of ae and dh . Let $L3$ be the angle bisector of $L2$ and $L1$. Determine the angle between fd and $L3$.



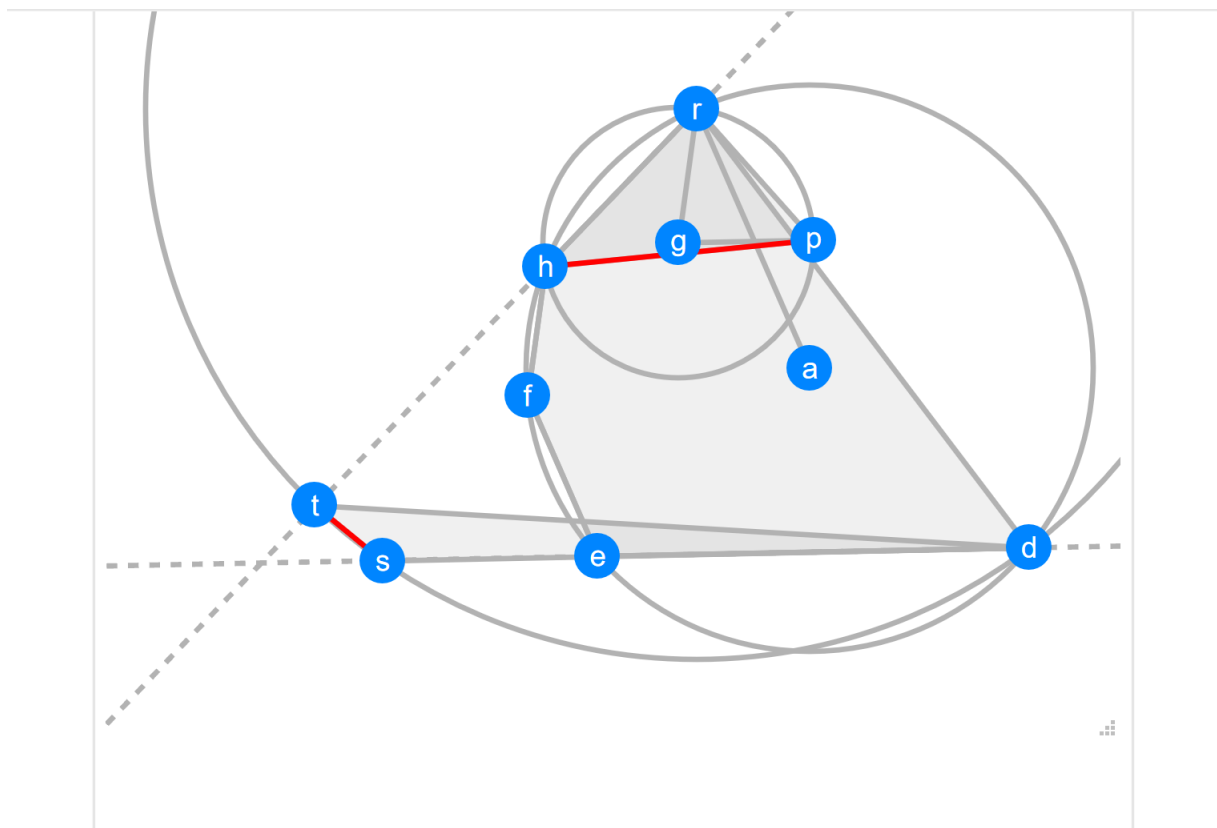
Let bcd be a triangle with circumcentre a . Let $fg hpq$ be a cyclic pentagon with centre e . Let eq be parallel to gh . Let ef be parallel to hp . Let L_1 be the angle bisector of cd and ab . Let eq be parallel to L_1 . Let L_2 be the angle bisector of bd and cb . Let ef be parallel to L_2 . Determine the angle between fg and pq .



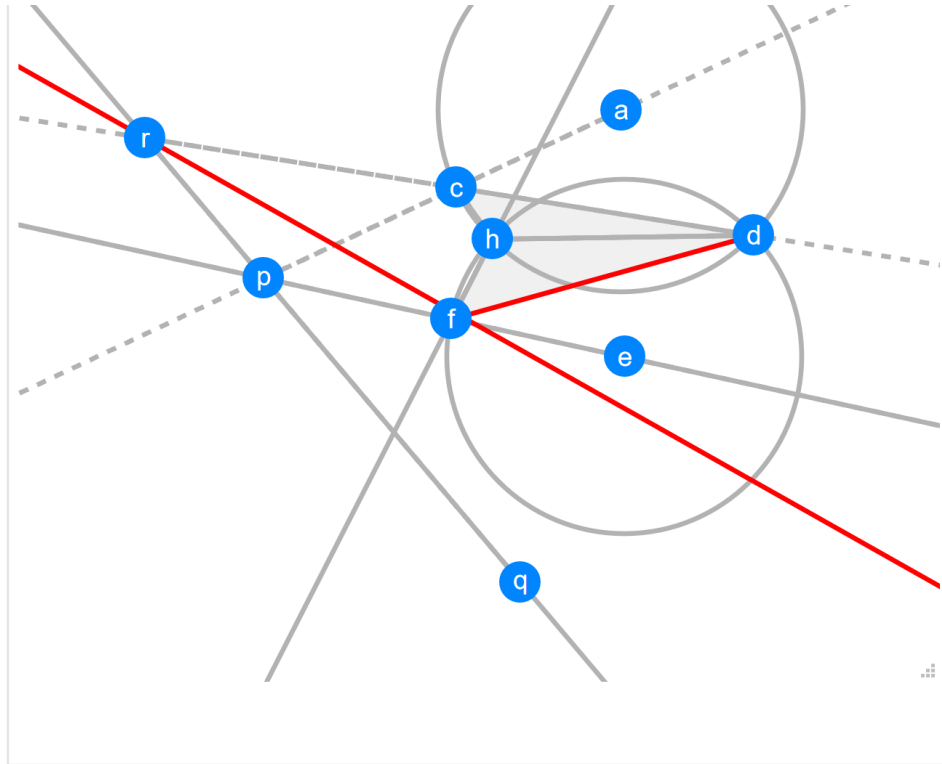
Let bfd be a triangle with circumcentre a . Let $fdhp$ be a cyclic quadrilateral with centre e . Let fp be parallel to hd . Let $L1$ be the angle bisector of ab and ph . Let fp be parallel to $L1$. Let $L2$ be the reflection of bf in fd . Determine the angle between $L2$ and db .



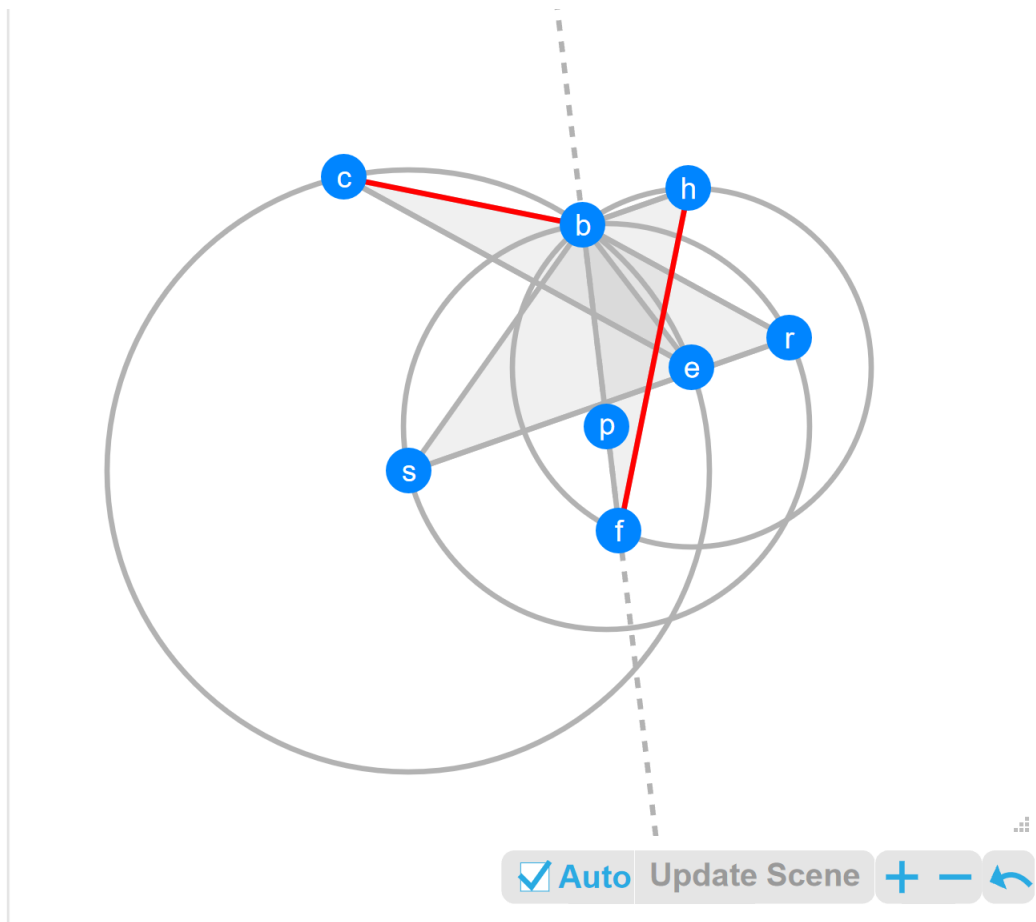
Let bed be a triangle with circumcentre a . Let $dghp$ be a cyclic quadrilateral with centre e . Let ebp be collinear. Let $L1$ be the angle bisector of ab and hg . Let hp be parallel to $L1$. Let $L2$ be the reflection of db in ed . Let $L3$ be the angle bisector of hg and $L2$. Determine the angle between dg and $L3$.



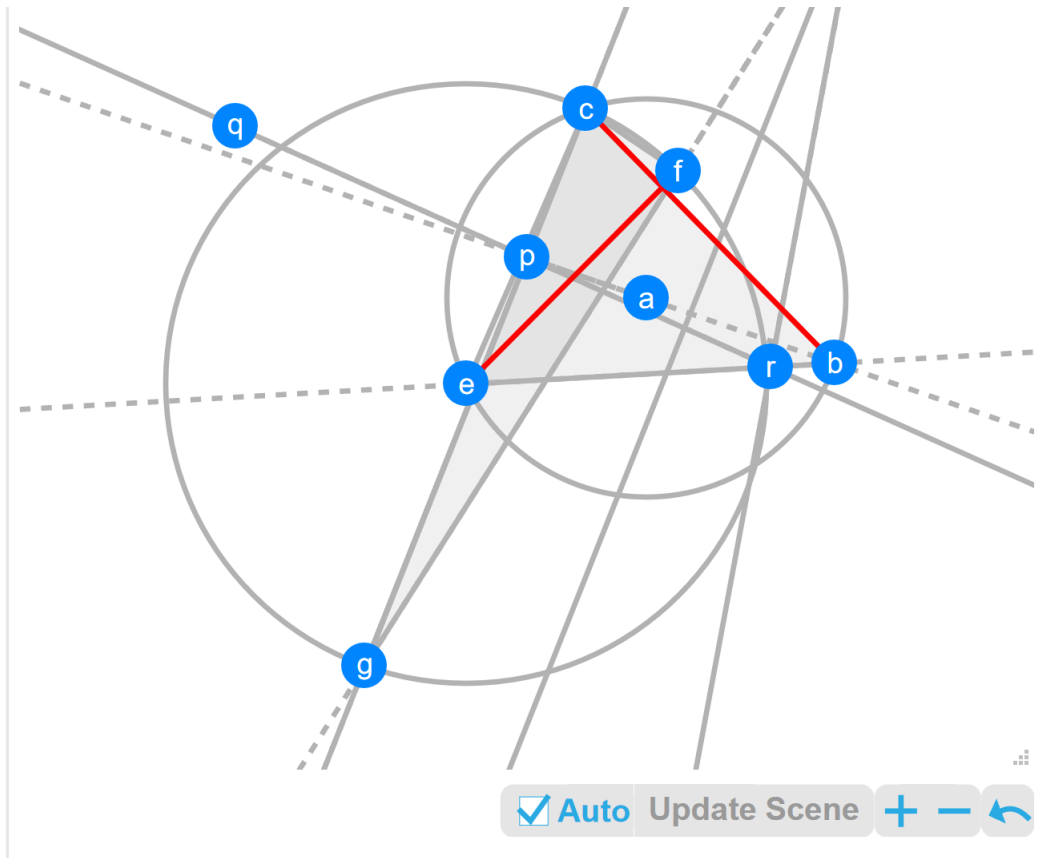
Let $hrdef$ be a cyclic pentagon with centre a . Let ar be parallel to fe . Let hpr be a triangle with circumcentre g . Let de be parallel to gp . Let hf be parallel to gr . Let std be a triangle with circumcentre r . Let des be collinear. Let rht be collinear. Determine the angle between st and hp .



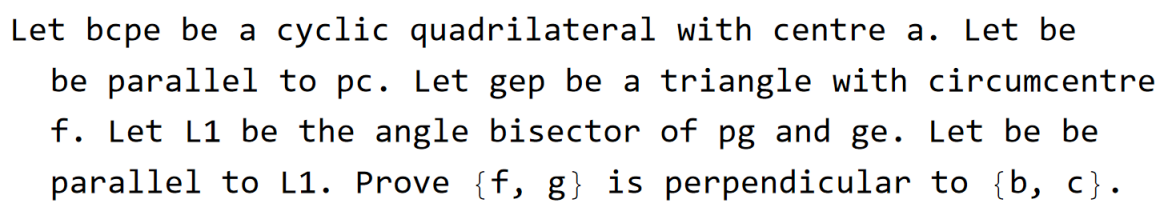
Let hcd be a triangle with circumcentre a . Let fdh be a triangle with circumcentre e . Let L_1 be the reflection of ac in ef . Let L_2 be the angle bisector of L_1 and dc . Let L_3 be the angle bisector of hd and hc . Let fh be parallel to L_3 . Determine the angle between L_2 and fd .

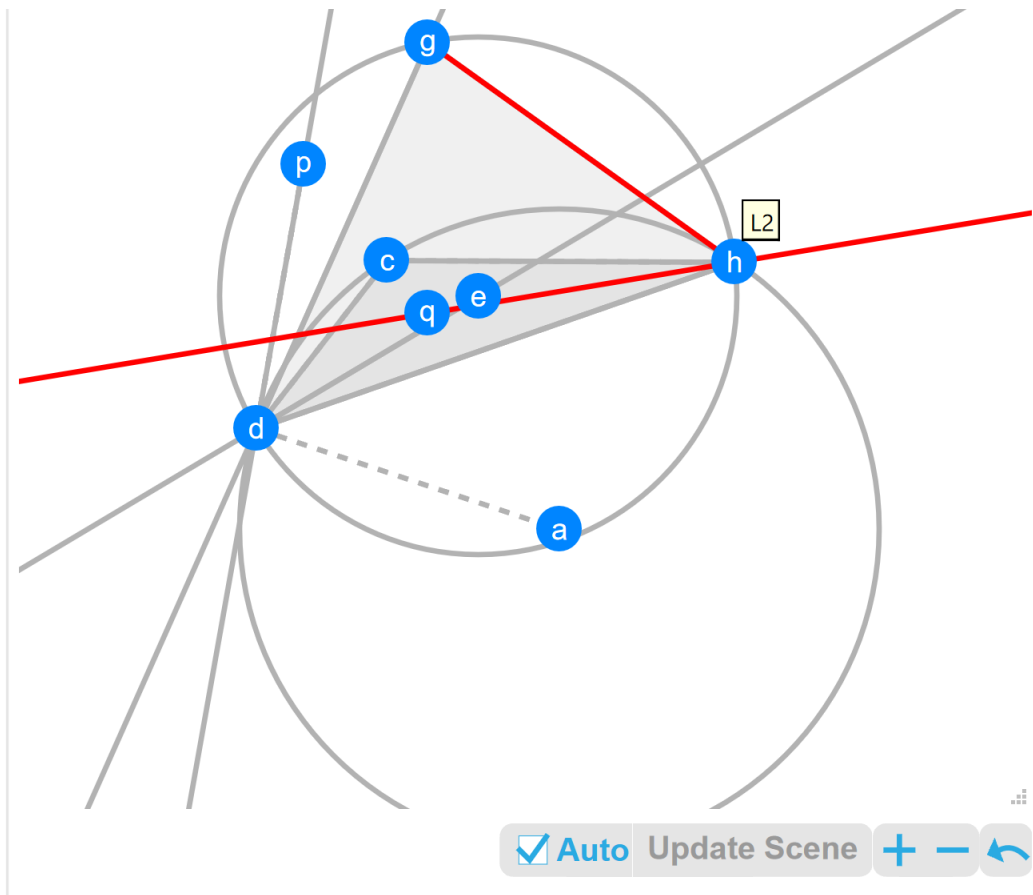


Let bce be a triangle with circumcentre s . Let fbh be a triangle with circumcentre e . Let brs be a triangle with circumcentre p . Let ec be parallel to br . Let bh be parallel to sr . Let bfp be collinear. Prove $\{f, h\}$ is perpendicular to $\{b, c\}$.

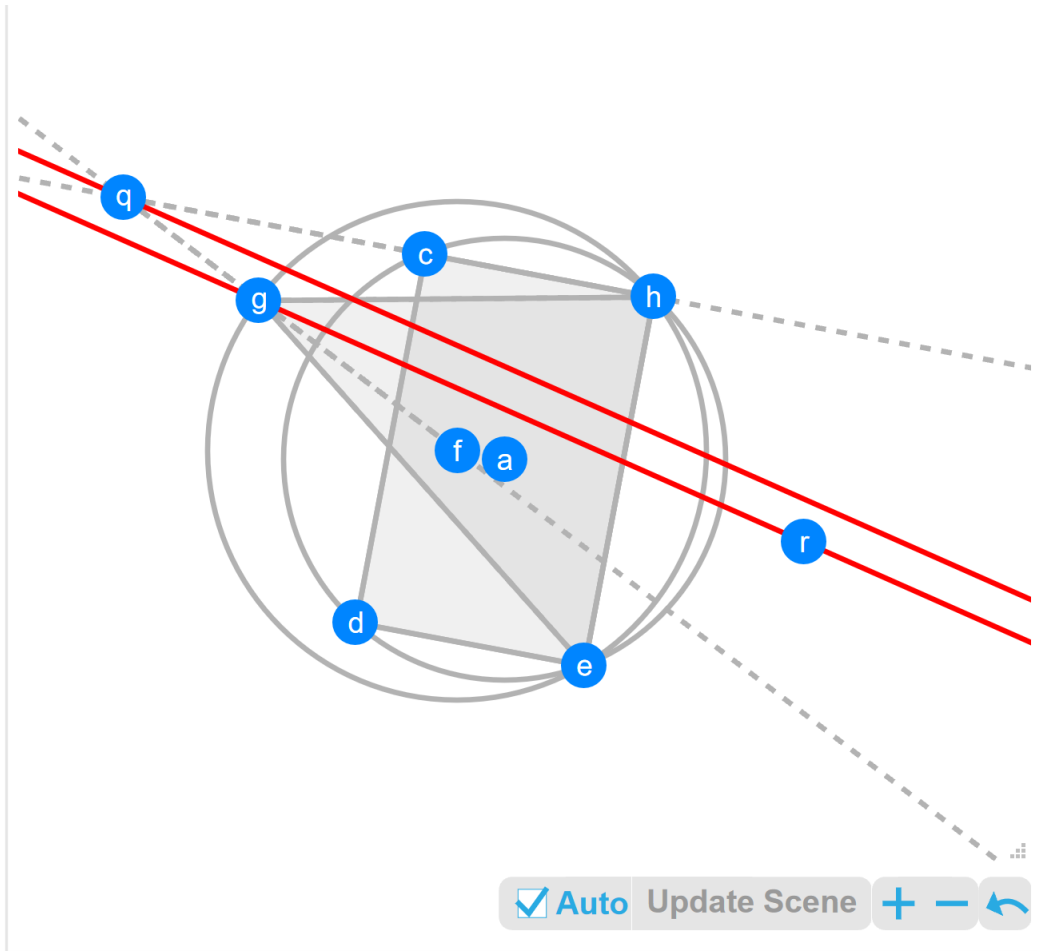


Let bce be a triangle with circumcentre a . Let fgc be a triangle with circumcentre e . Let $L1$ be the reflection of ab in cg . Let $L2$ be the angle bisector of eb and $L1$. Let $L3$ be the angle bisector of $L2$ and fg . Let cg be parallel to $L3$. Prove $\{e, f\}$ is perpendicular to $\{b, c\}$.



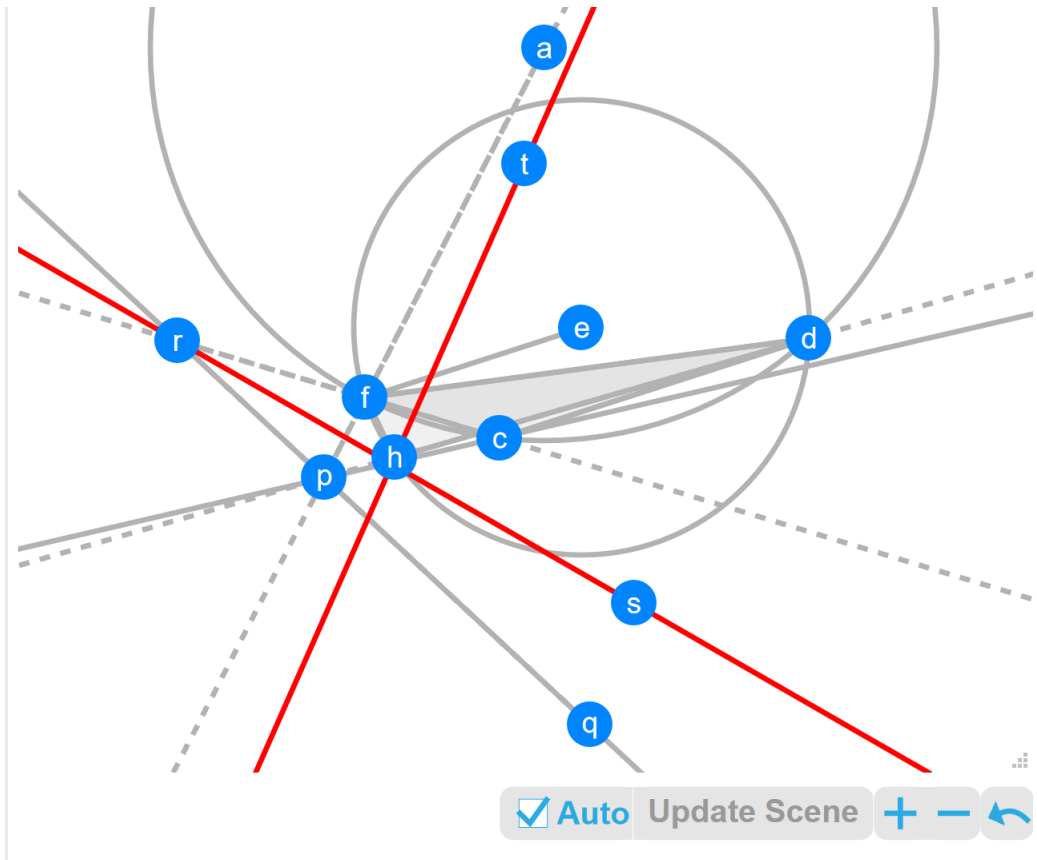


Let hcd be a triangle with circumcentre a . Let dgh be a triangle with circumcentre e . Let $L1$ be the reflection of dc in dg . Let $L2$ be the angle bisector of $L1$ and ad . Let ed be parallel to $L2$. Let $L3$ be the angle bisector of hd and hc . Determine the angle between $L3$ and $\{g, h\}$.

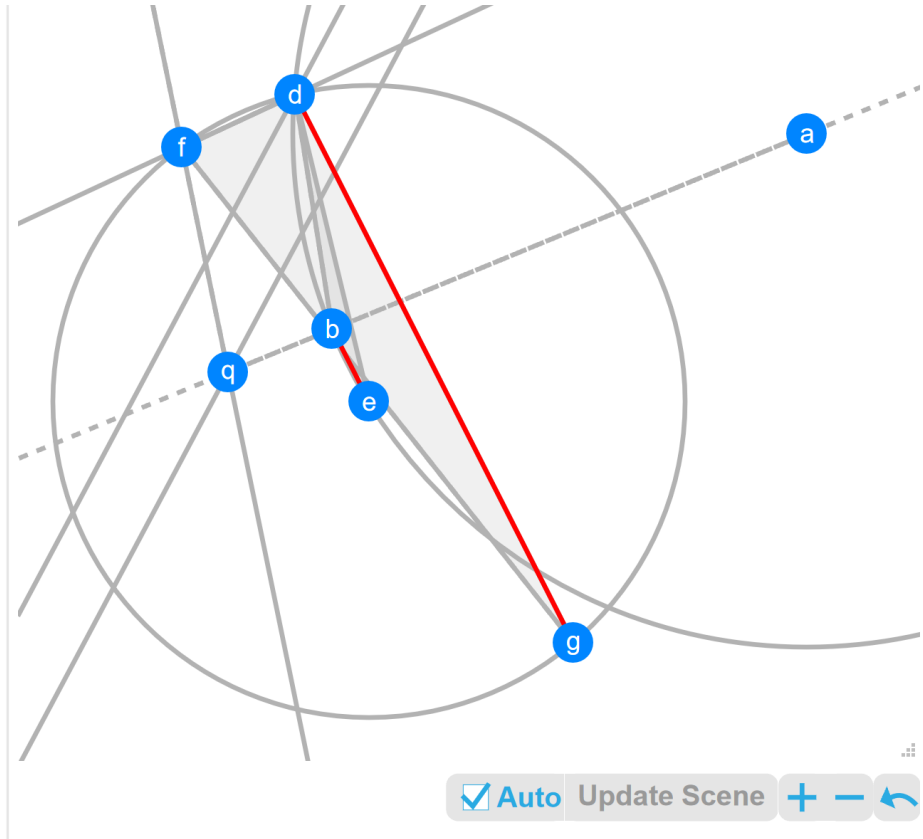


Let $hcde$ be a cyclic quadrilateral with centre a .

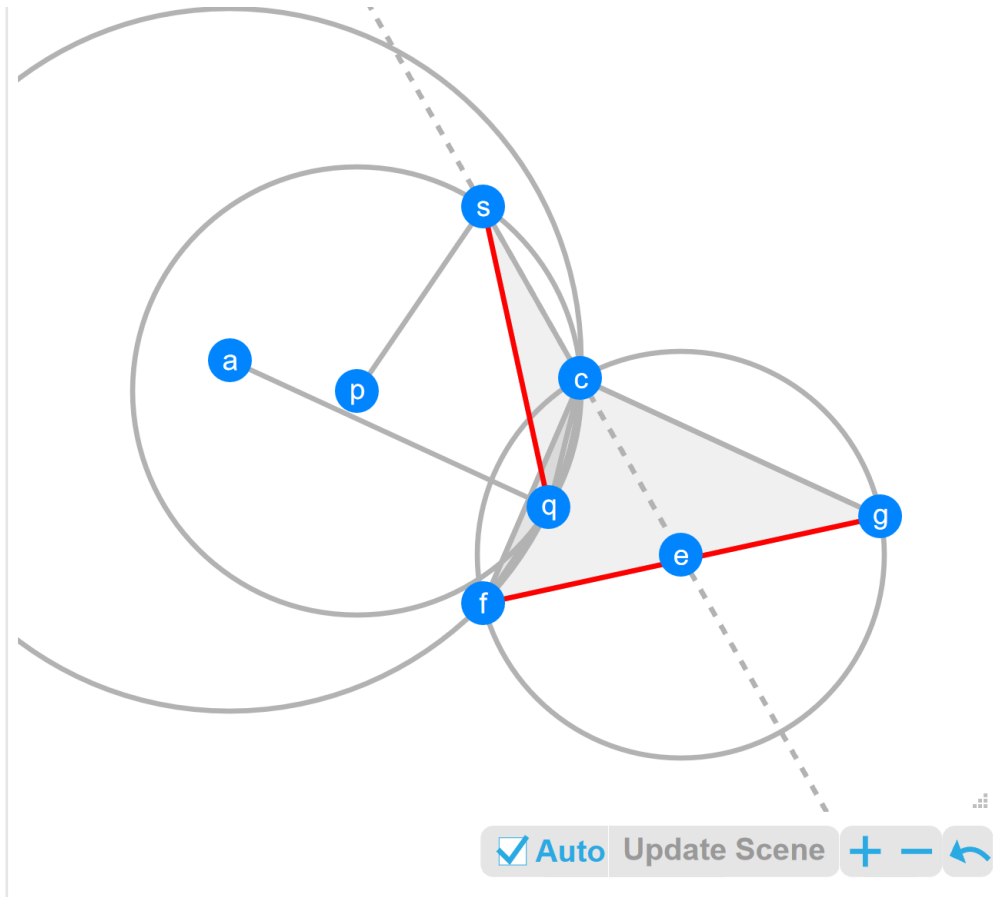
Let he be parallel to dc . Let hc be parallel to ed . Let ghe be a triangle with circumcentre f . Let $L1$ be the angle bisector of hc and fg . Let $L2$ be the angle bisector of ge and hg . Determine the angle between $L2$ and $L1$.



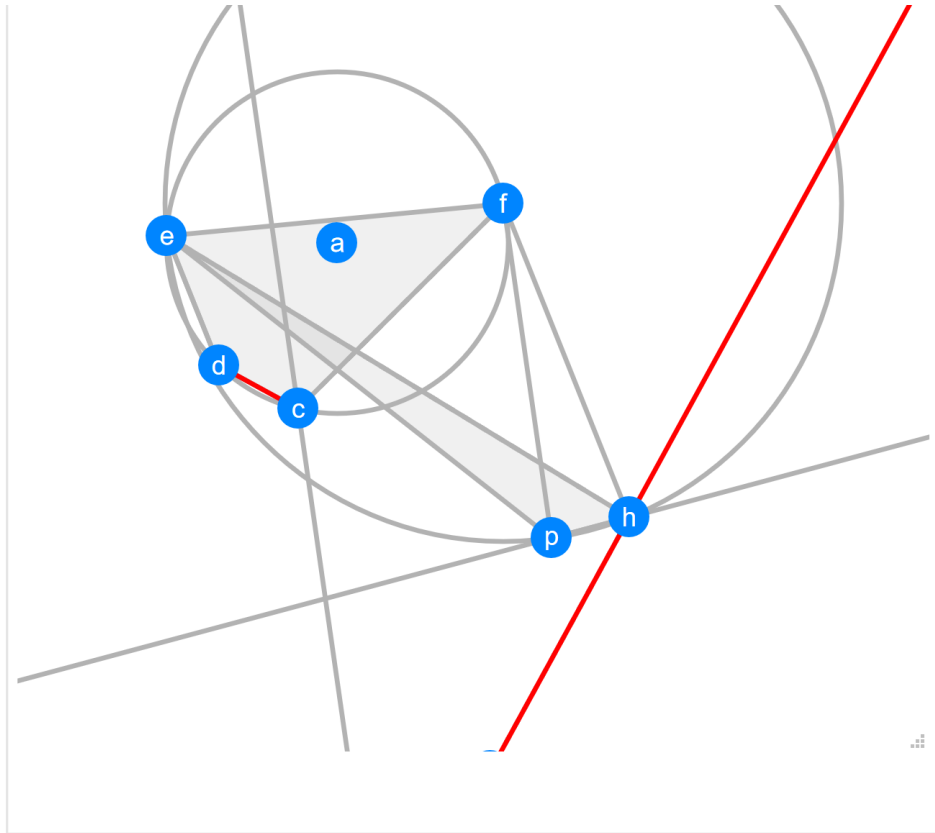
Let fcd be a triangle with circumcentre a . Let fdh be a triangle with circumcentre e . Let dc be parallel to ef . Let L_1 be the angle bisector of hf and dh . Let L_2 be the reflection of af in dh . Let L_3 be the angle bisector of L_2 and fc . Determine the angle between L_3 and L_1 .



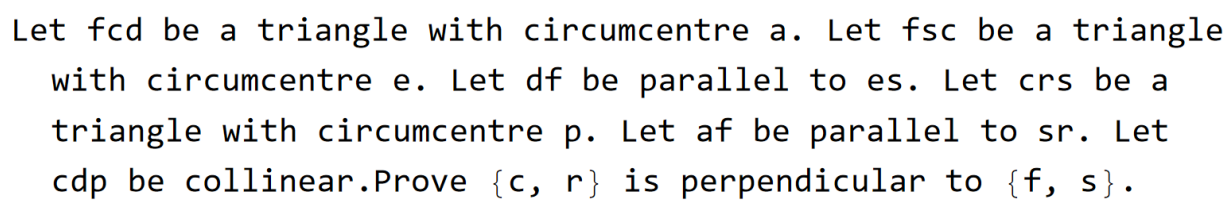
Let bed be a triangle with circumcentre a . Let fgd be a triangle with circumcentre e . Let L_1 be the reflection of fg in fd . Let L_2 be the angle bisector of ab and L_1 . Let L_3 be the angle bisector of fd and db . Let L_2 be parallel to L_3 . Prove $\{d, g\}$ is parallel to $\{e, b\}$.

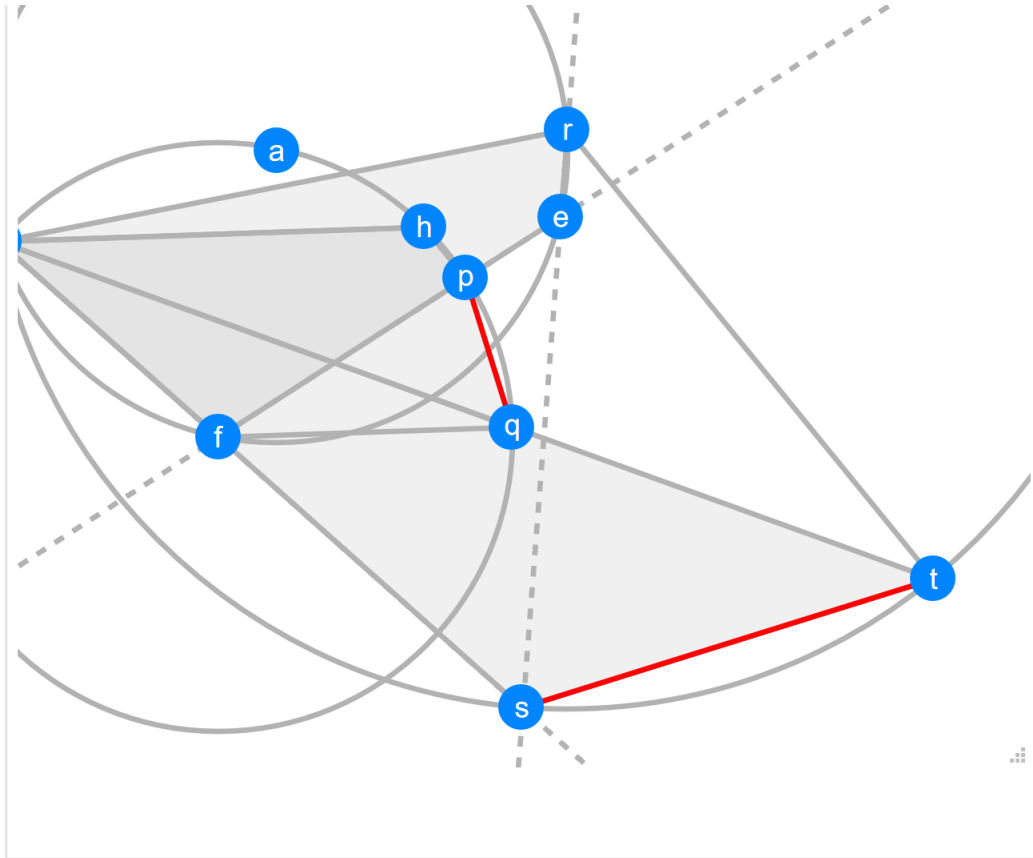


Let fcq be a triangle with circumcentre a . Let fgc be a triangle with circumcentre e . Let aq be parallel to cg . Let qcs be a triangle with circumcentre p . Let ces be collinear. Let fq be parallel to ps . Prove $\{q, s\}$ is perpendicular to $\{f, g\}$.

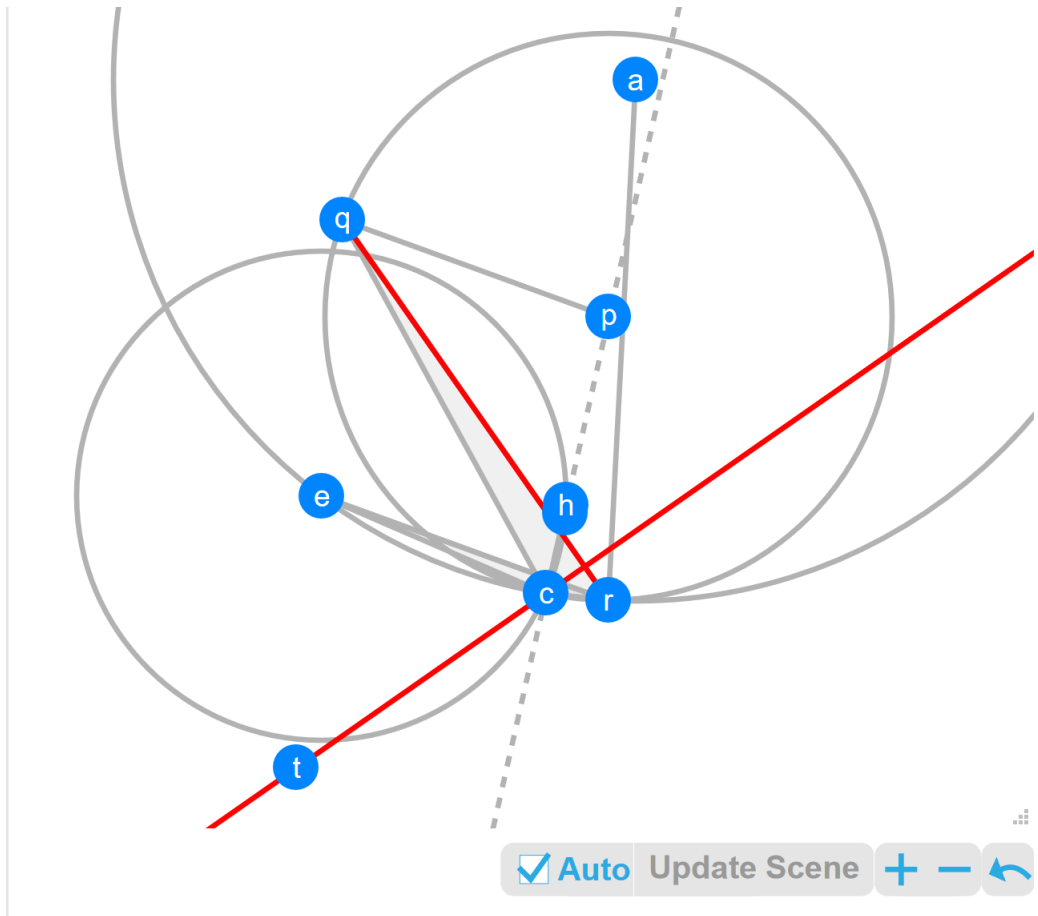


Let $fcde$ be a cyclic quadrilateral with centre a . Let ehp be a triangle with circumcentre f . Let de be parallel to fh . Let L_1 be the angle bisector of fc and dc . Let fp be parallel to L_1 . Let L_2 be the reflection of eh in hp . Prove $\{d, c\}$ is perpendicular to L_2 .

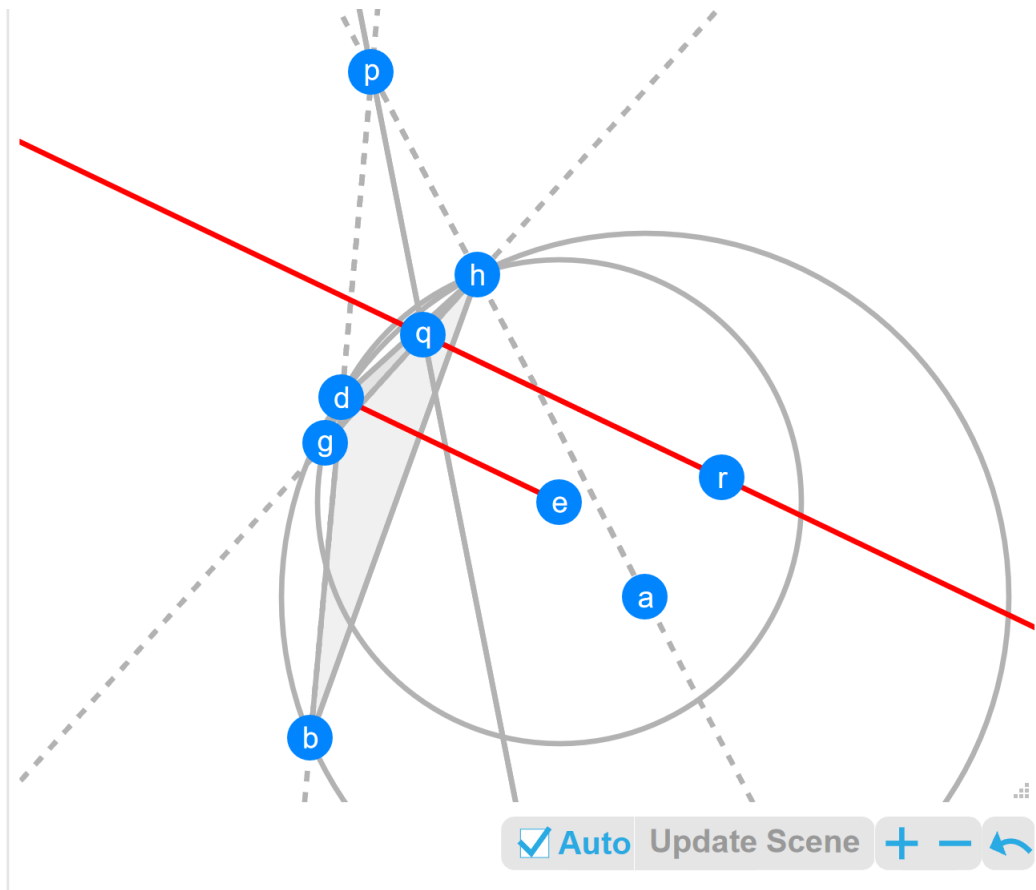




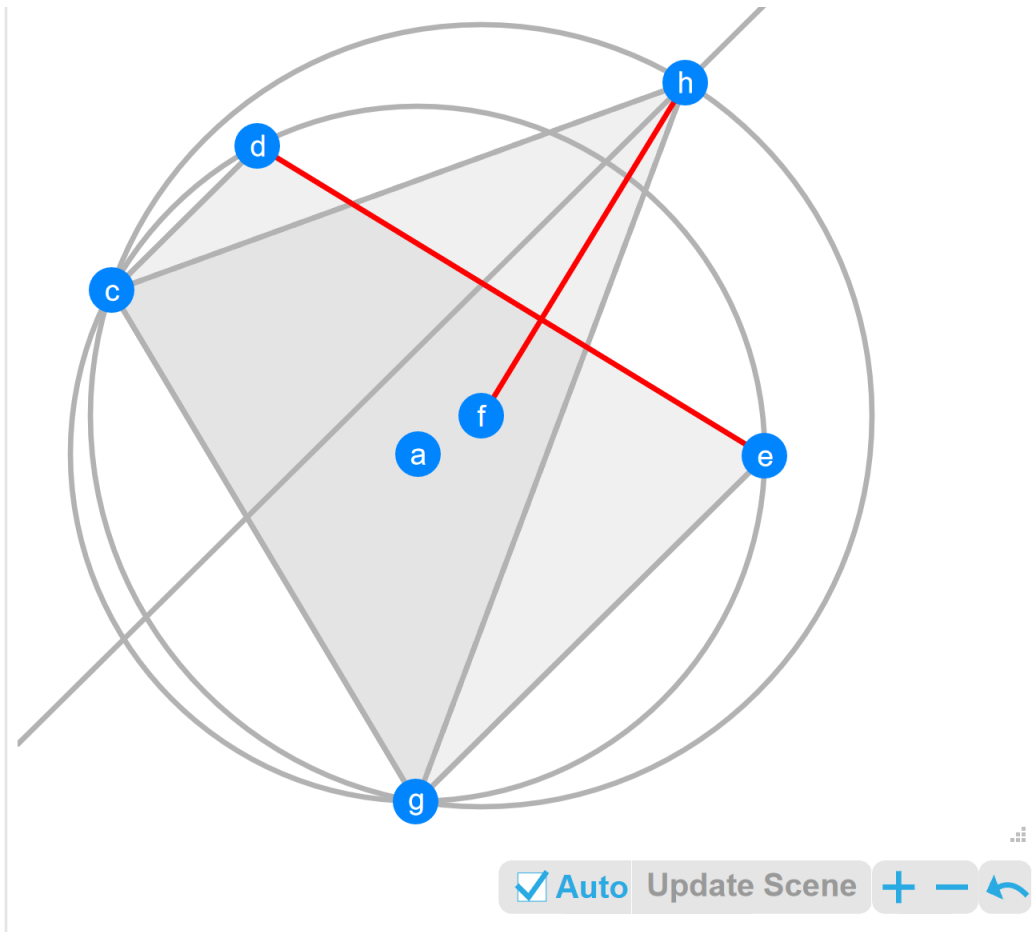
Let $rcfe$ be a cyclic quadrilateral with centre a . Let $chpq$ be a cyclic quadrilateral with centre f . Let fq be parallel to ch . Let fep be collinear. Let stc be a triangle with circumcentre r . Let cfs be collinear. Let res be collinear. Let hp be parallel to rt . Prove $\{p, q\}$ is perpendicular to $\{s, t\}$.



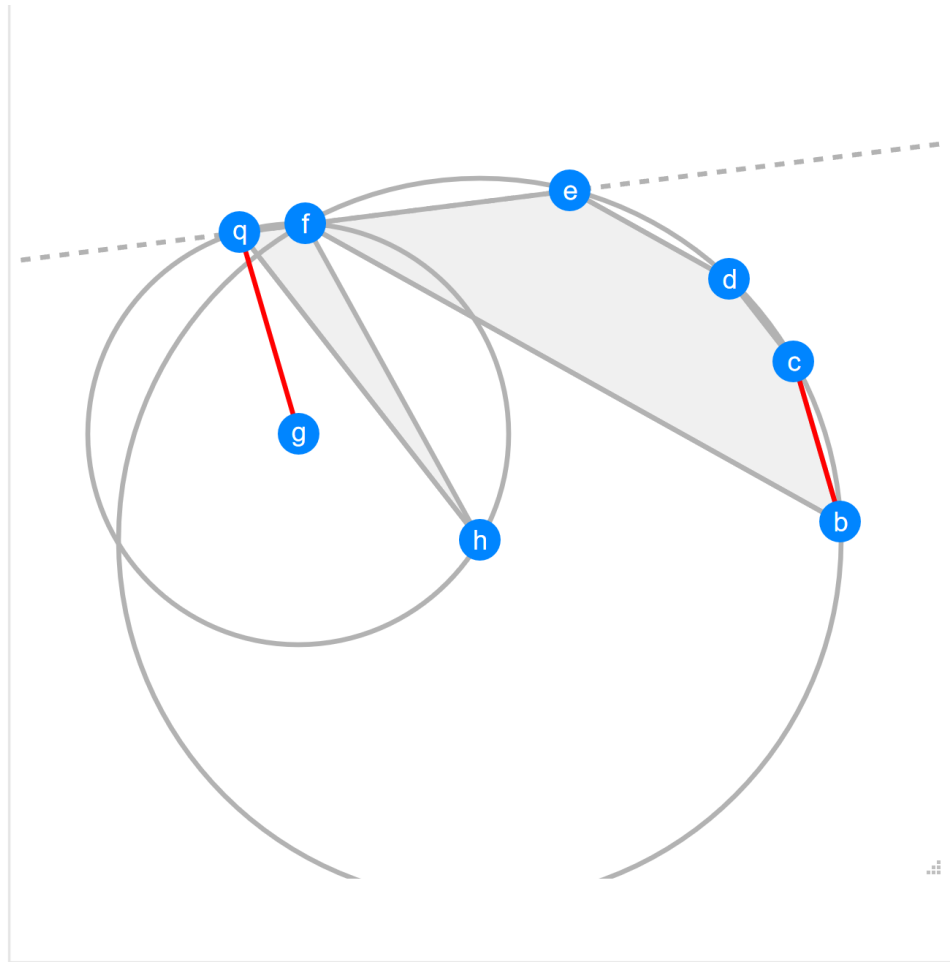
Let ecr be a triangle with circumcentre a . Let cgh be a triangle with circumcentre e . Let ar be parallel to hg . Let qrc be a triangle with circumcentre p . Let er be parallel to pq . Let chp be collinear. Let L_1 be the angle bisector of rc and cg . Determine the angle between $\{q, r\}$ and L_1 .



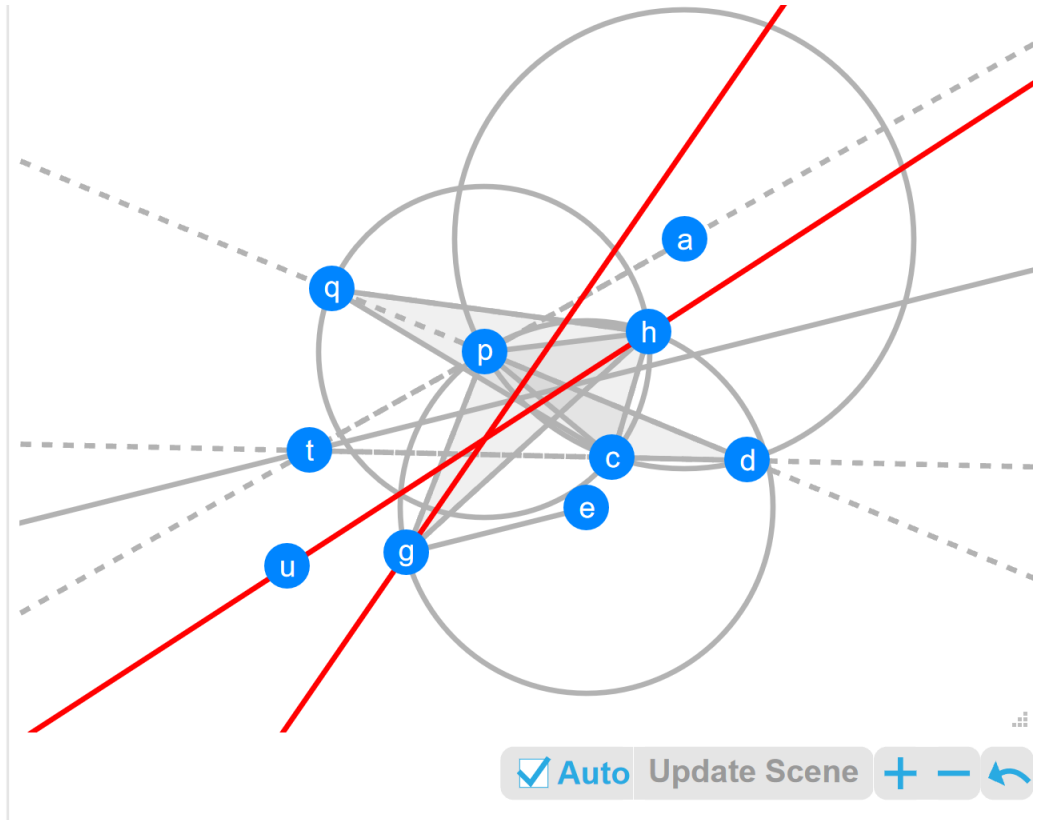
Let bhd be a triangle with circumcentre a . Let dgh be a triangle with circumcentre e . Let bh be parallel to dg . Let $L1$ be the angle bisector of bd and ah . Let $L2$ be the reflection of hg in $L1$. Prove $\{e, d\}$ is parallel to $L2$.



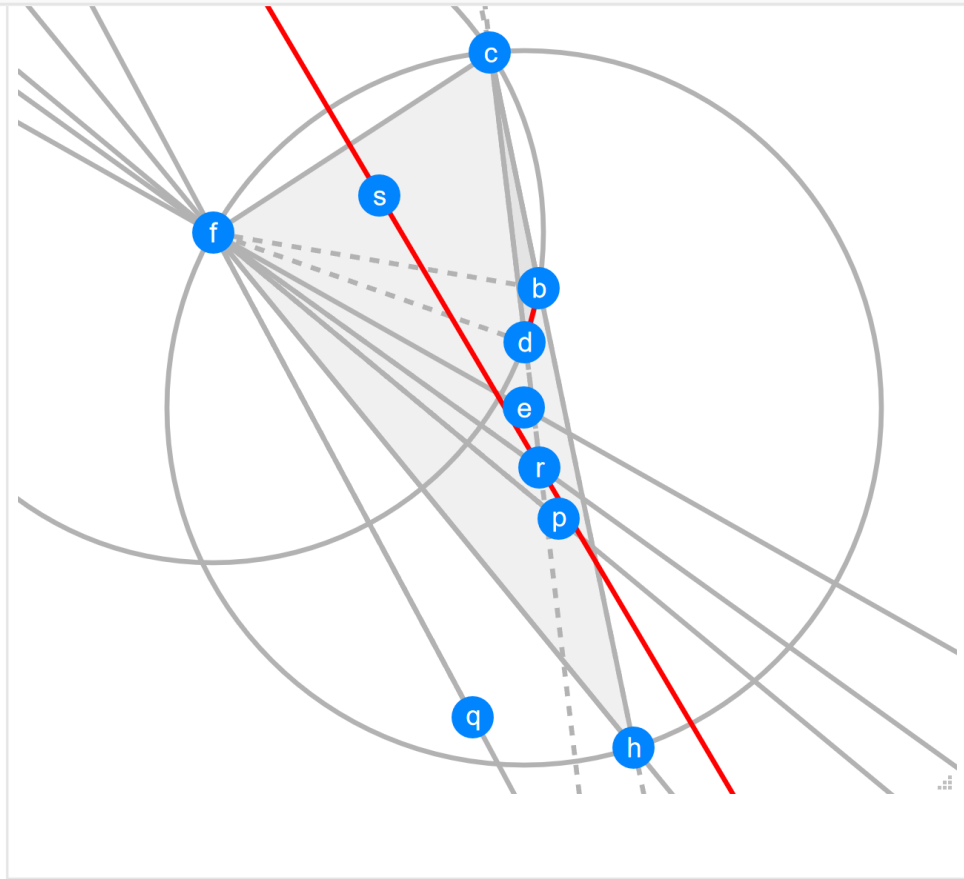
Let $gcde$ be a cyclic quadrilateral with centre a . Let gh be parallel to dc . Let ghc be a triangle with circumcentre f . Let L_1 be the angle bisector of hcg and ge be parallel to L_1 . Prove $\{f, h\}$ is perpendicular to $\{d, e\}$.



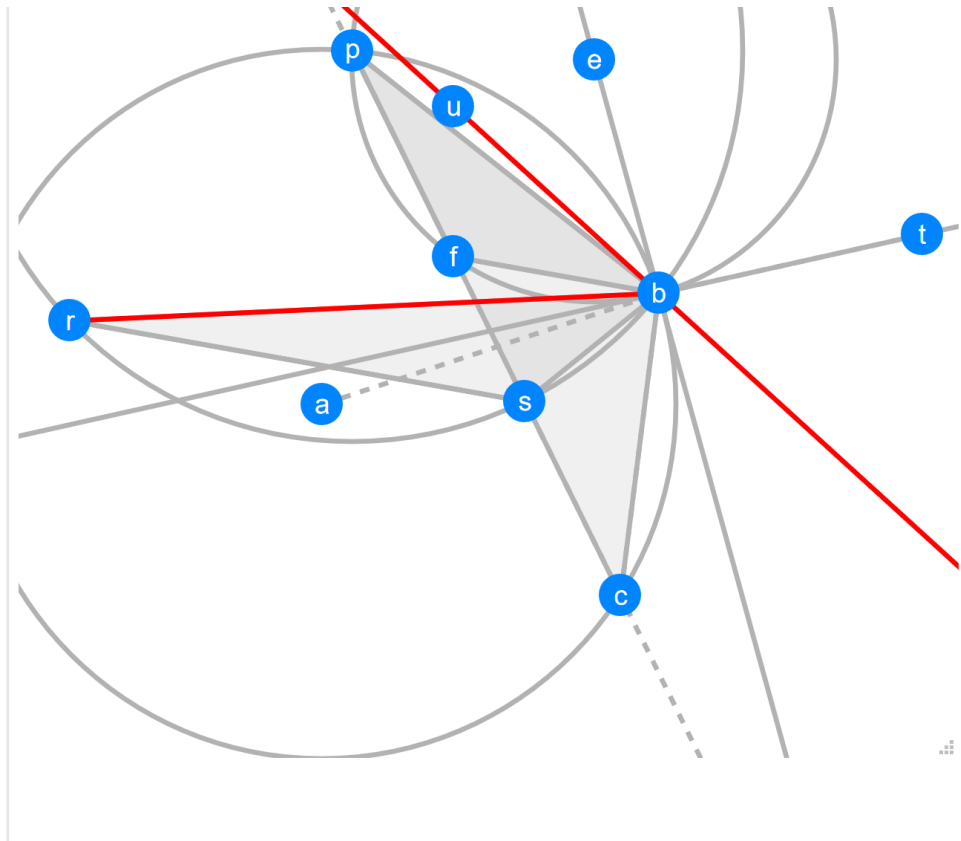
Let $bcdef$ be a cyclic pentagon with centre h . Let bf be parallel to de .
 Let hfq be a triangle with circumcentre g . Let dc be parallel to hq . Let feq be collinear. Prove $\{g, q\}$ is parallel to $\{b, c\}$.



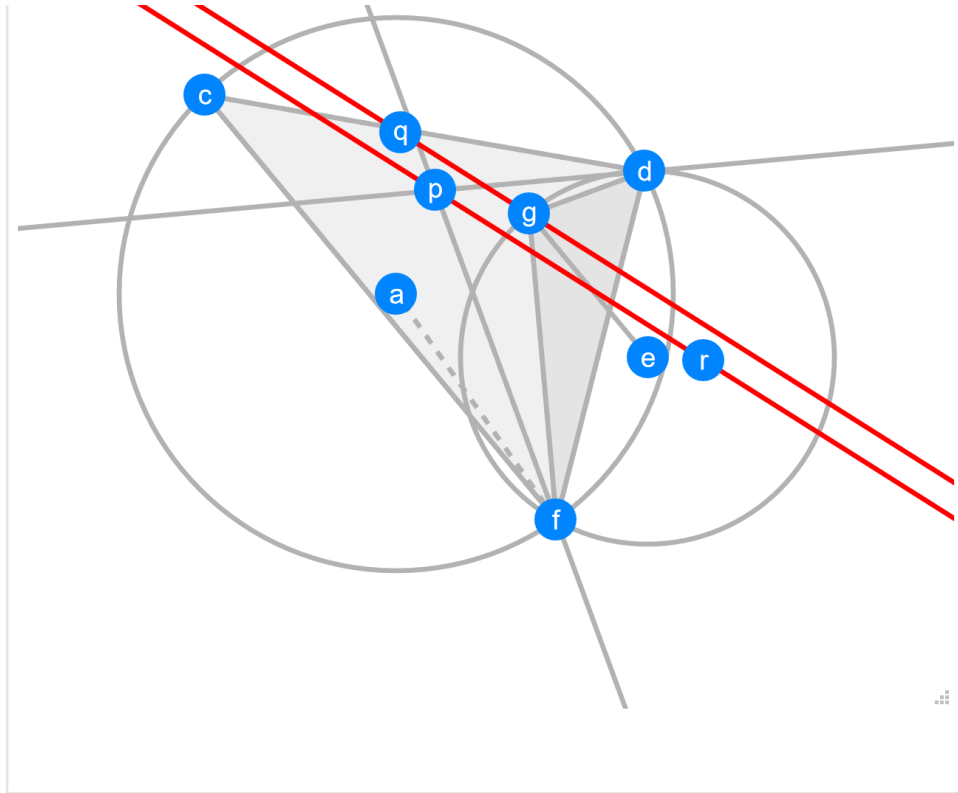
Let pcd be a triangle with circumcentre a . Let pgh be a triangle with circumcentre e . Let qhc be a triangle with circumcentre p . Let pdq be collinear. Let $L1$ be the angle bisector of ap and cd . Let eg be parallel to $L1$. Let $L2$ be the angle bisector of hc and qh . Let $L3$ be the angle bisector of pg and hg . Determine the angle between $L2$ and $L3$.



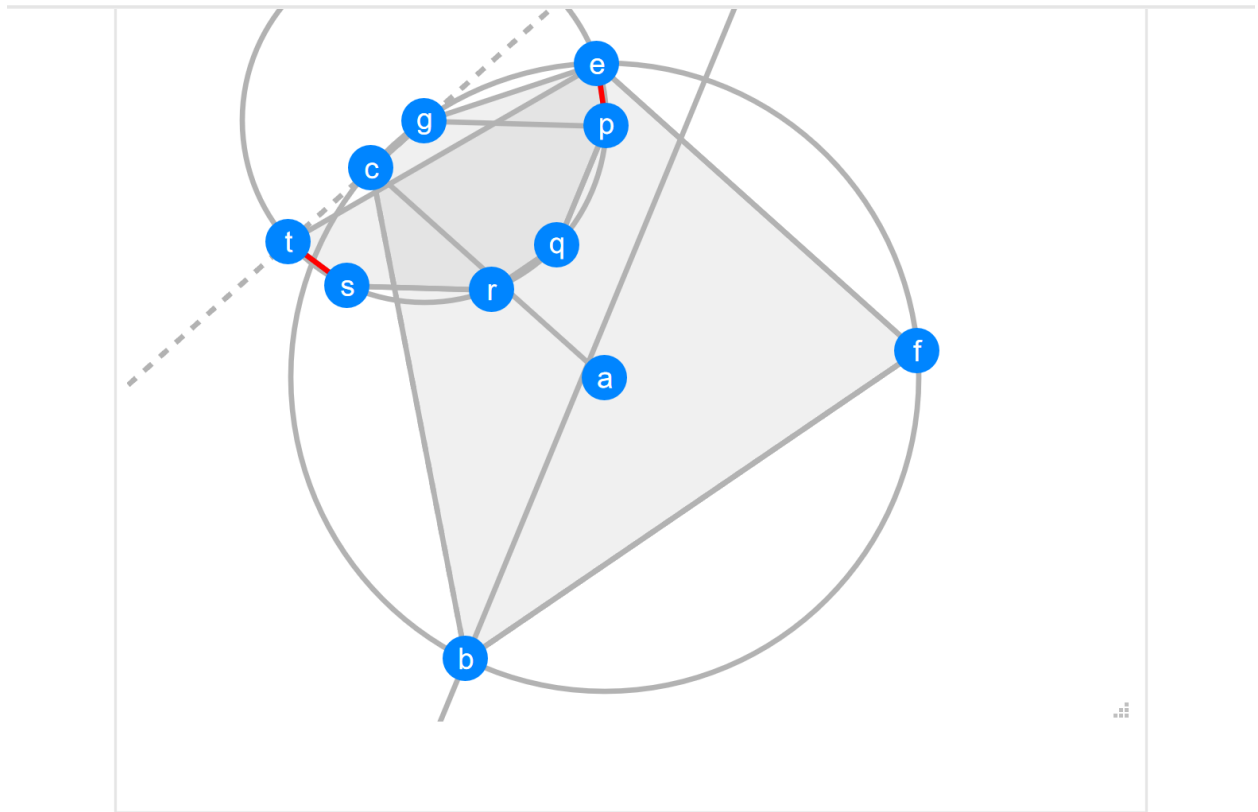
Let bcd be a triangle with circumcentre f . Let fch be a triangle with circumcentre e . Let cbh be collinear. Let L_1 be the reflection of fd in ef . Let L_2 be the reflection of L_1 in hf . Let L_3 be the angle bisector of L_2 and fb . Let L_4 be the angle bisector of L_3 and cd . Determine the angle between L_4 and $\{b, d\}$.



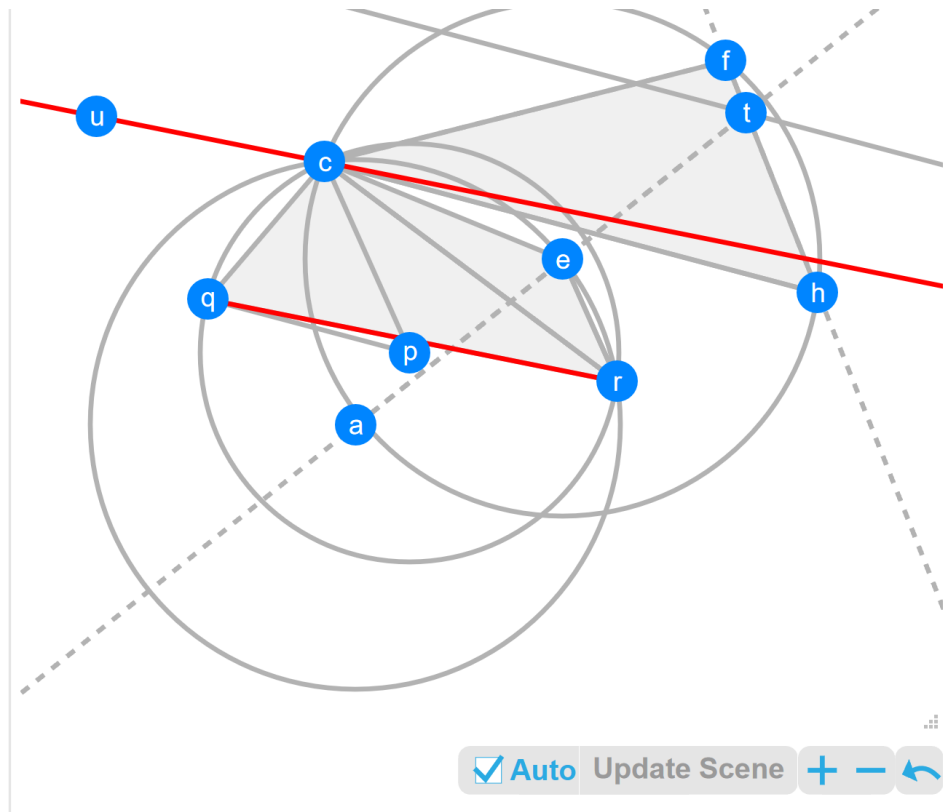
Let bcp be a triangle with circumcentre a . Let fbp be a triangle with circumcentre e . Let pcf be collinear. Let brs be a triangle with circumcentre p . Let fb be parallel to sr . Let pcs be collinear. Let $L1$ be the reflection of ab in eb . Let $L2$ be the angle bisector of bc and $L1$. Determine the angle between $L2$ and $\{b, r\}$.



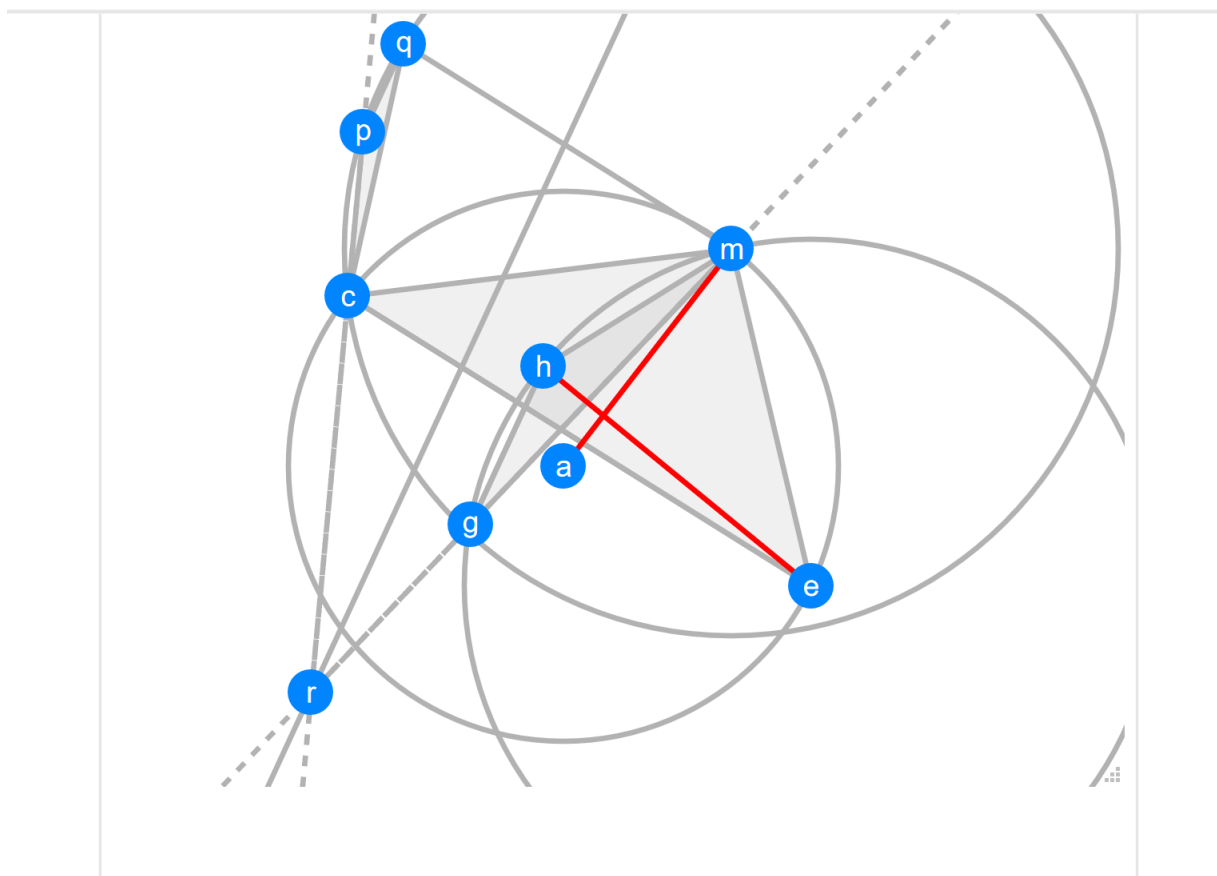
Let fcd be a triangle with circumcentre a . Let fgd be a triangle with circumcentre e . Let fc be parallel to eg . Let $L1$ be the angle bisector of dc and dg . Let $L2$ be the angle bisector of dg and fg . Let $L3$ be the angle bisector of fg and af . Let $L4$ be the angle bisector of $L3$ and $L1$. Determine the angle between $L2$ and $L4$.



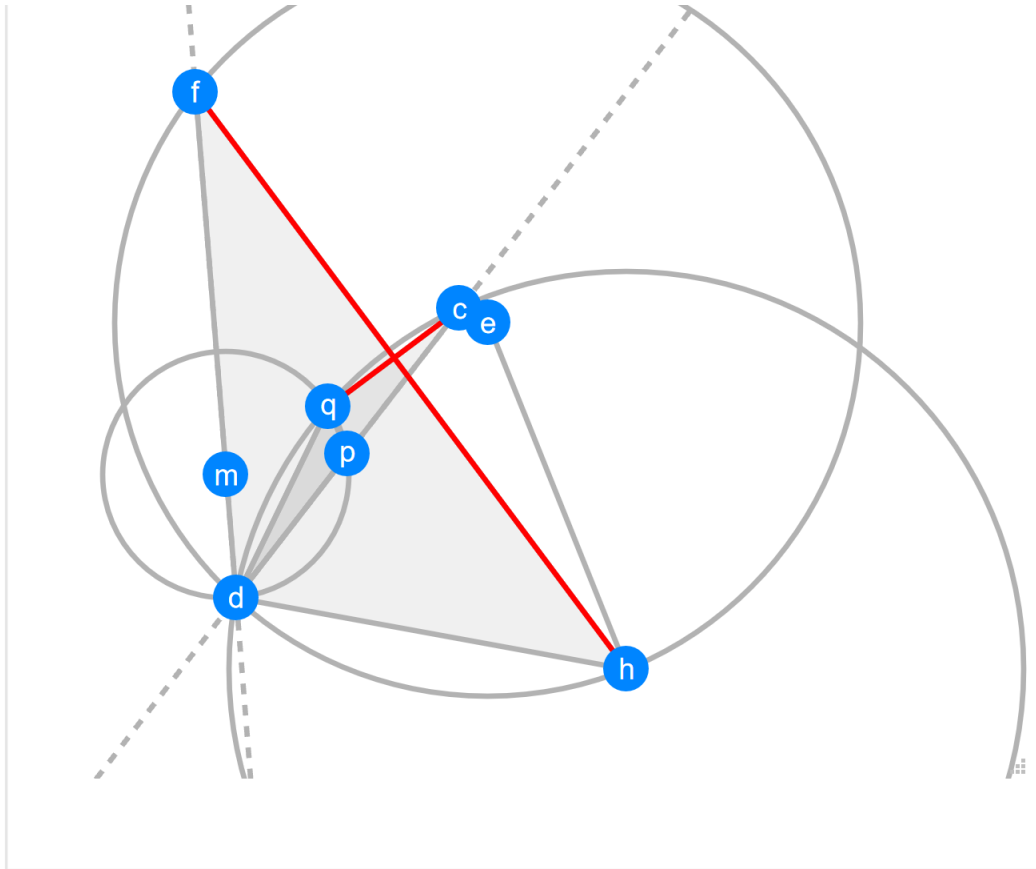
Let $bcgef$ be a cyclic pentagon with centre a . Let ac be parallel to fe . Let $epqrst$ be a cyclic hexagon with centre g . Let bf be parallel to qr . Let gp be parallel to sr . Let gct be collinear. Let L_1 be the angle bisector of bf and bc . Let pq be parallel to L_1 . Prove $\{e, p\}$ is 45 degrees to $\{s, t\}$.



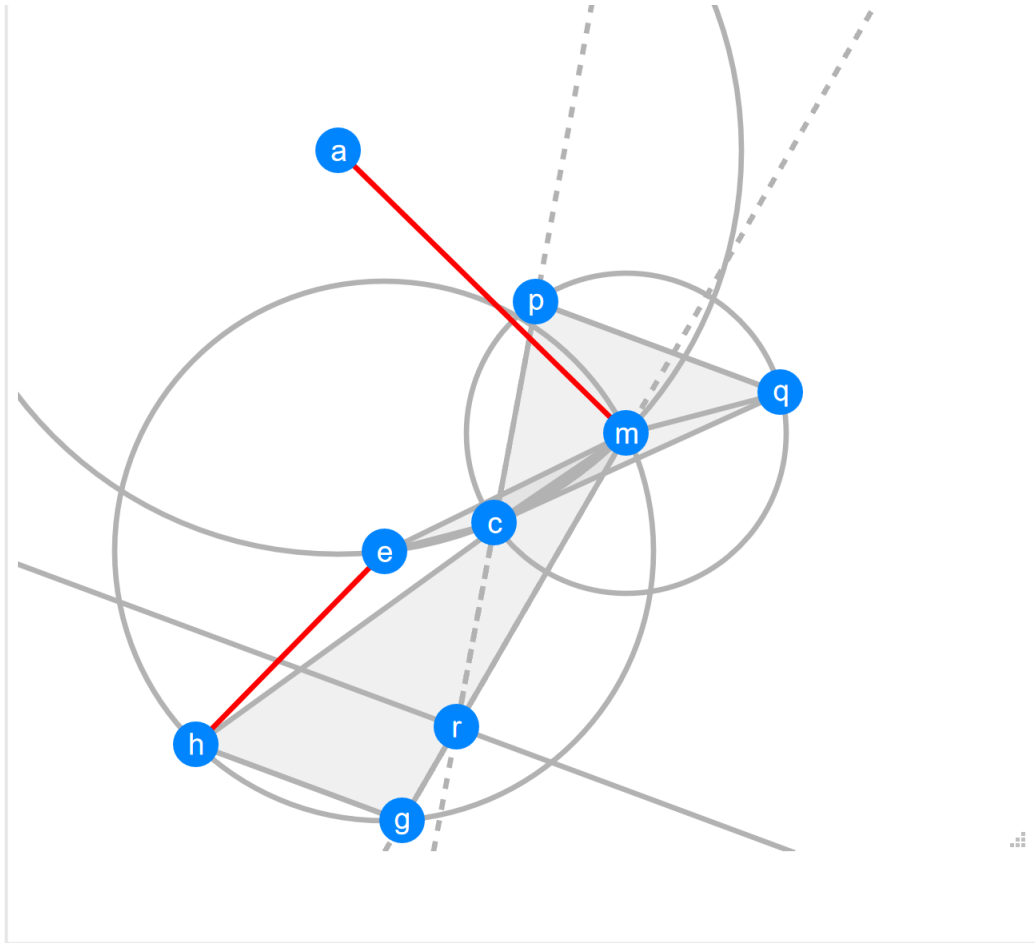
Let ecr be a triangle with circumcentre a . Let fch be a triangle with circumcentre e . Let qrc be a triangle with circumcentre p . Let hc be parallel to pq . Let re be parallel to pc . Let $L1$ be the angle bisector of ae and fh . Let hc be parallel to $L1$. Let $L2$ be the angle bisector of rc and fc . Determine the angle between $\{q, r\}$ and $L2$.



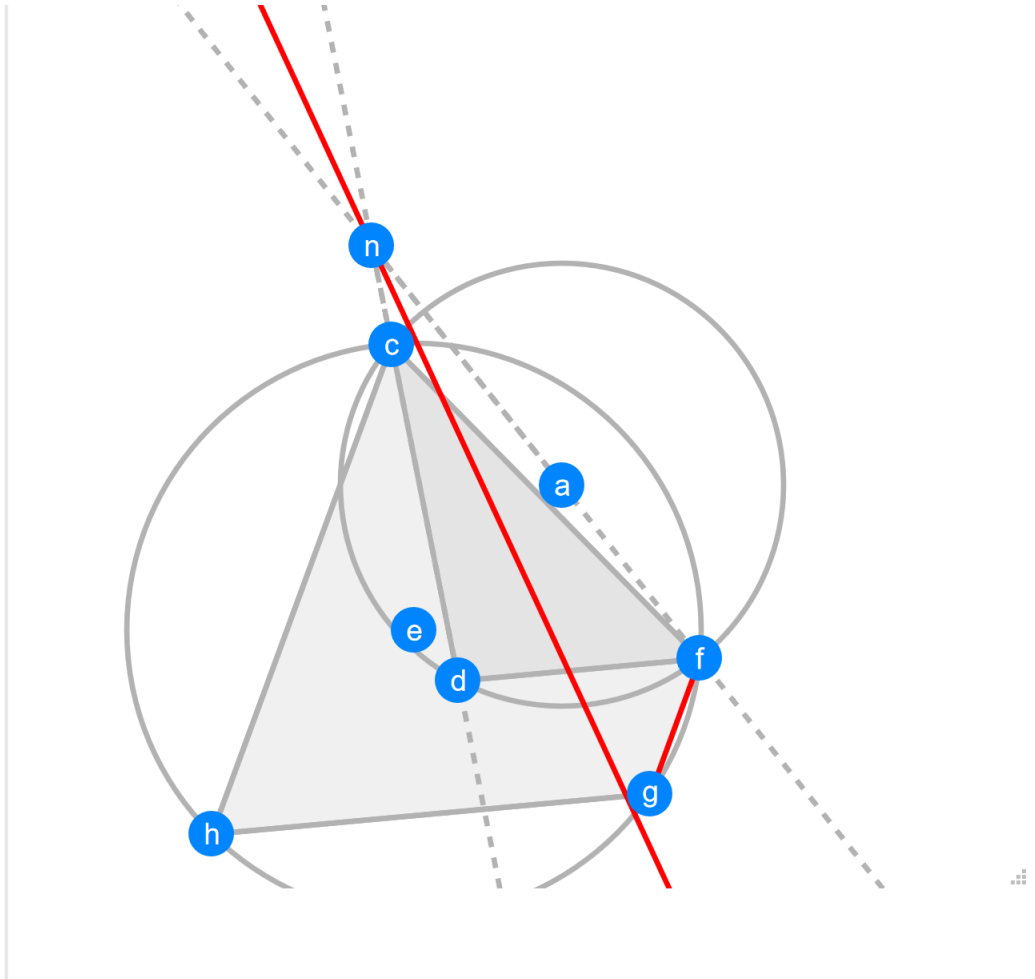
Let mce be a triangle with circumcentre a . Let mgh be a triangle with circumcentre e . Let cpq be a triangle with circumcentre m . Let hg be parallel to qp . Let ec be parallel to mq . Let $L1$ be the angle bisector of mg and cp . Let hg be parallel to $L1$. Prove $\{a, m\}$ is perpendicular to $\{e, h\}$.



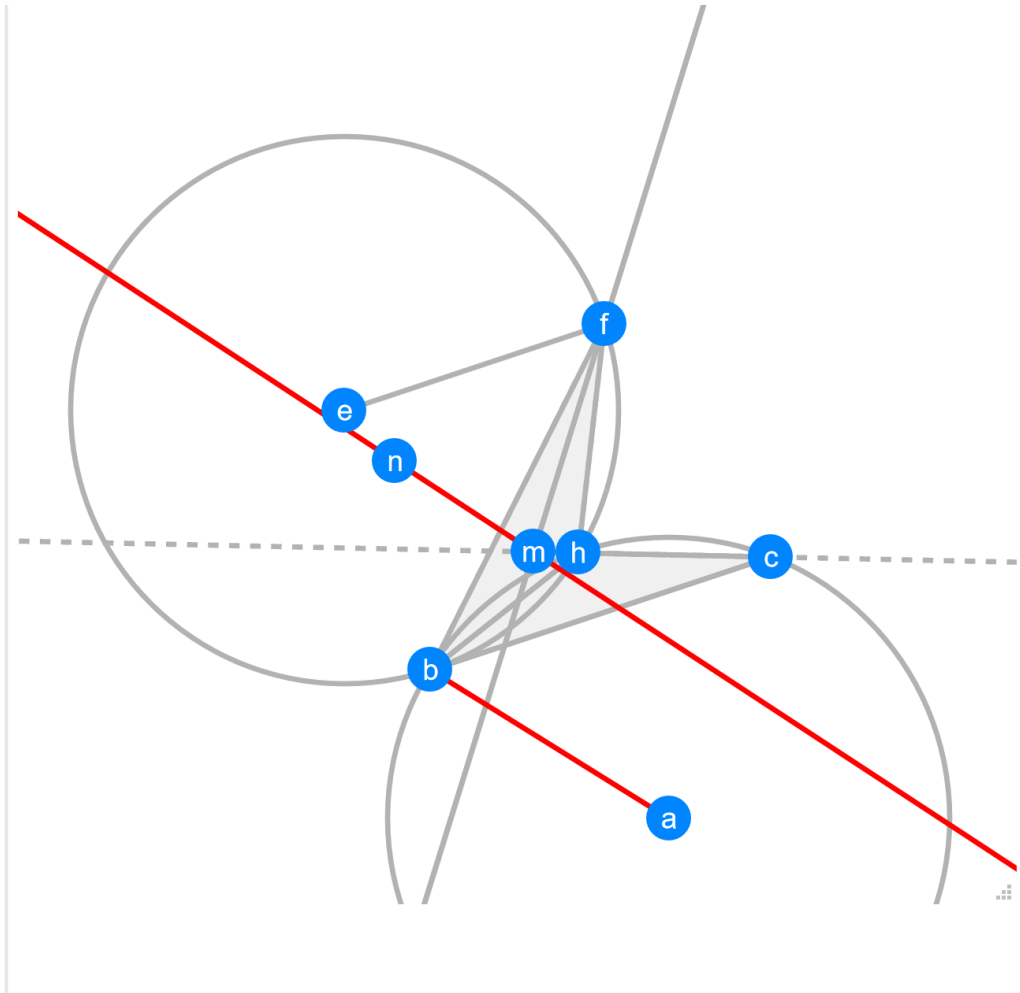
Let qcd be a triangle with circumcentre h . Let fdh be a triangle with circumcentre e . Let dpq be a triangle with circumcentre m . Let dcp be collinear. Let eh be parallel to qp . Let dfm be collinear. Prove $\{f, h\}$ is perpendicular to $\{q, c\}$.



"Let mce be a triangle with circumcentre a. Let mgh be a triangle with circumcentre e. Let cpq be a triangle with circumcentre m. Let hg be parallel to qp. Let ec be parallel to mq. Let L1 be the angle bisector of cp and mg. Let hg be parallel to L1. Determine the angle between {a, m} and {e, h}.



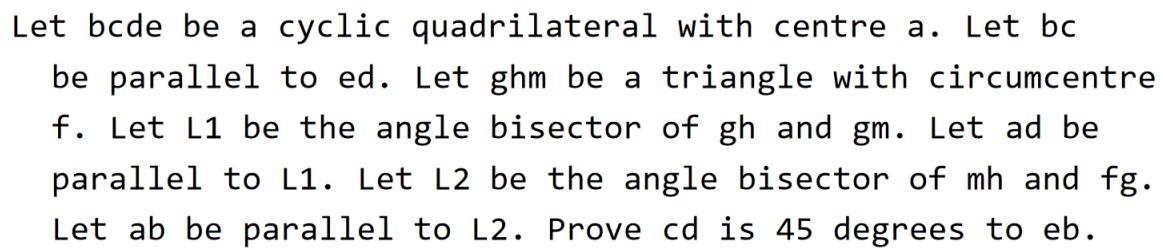
"Let fcd be a triangle with circumcentre a . Let $fghc$ be a cyclic quadrilateral with centre e . Let df be parallel to hg . Let fg be parallel to hc . Let $L1$ be the angle bisector of af and dc . Determine the angle between $\{f, g\}$ and $L1$. "



"Let bch be a triangle with circumcentre a . Let fbh be a triangle with circumcentre e . Let bc be parallel to ef . Let $L1$ be the angle bisector of hf and fb . Let $L2$ be the reflection of hc in $L1$. Prove $\{a, b\}$ is parallel to $L2$. "

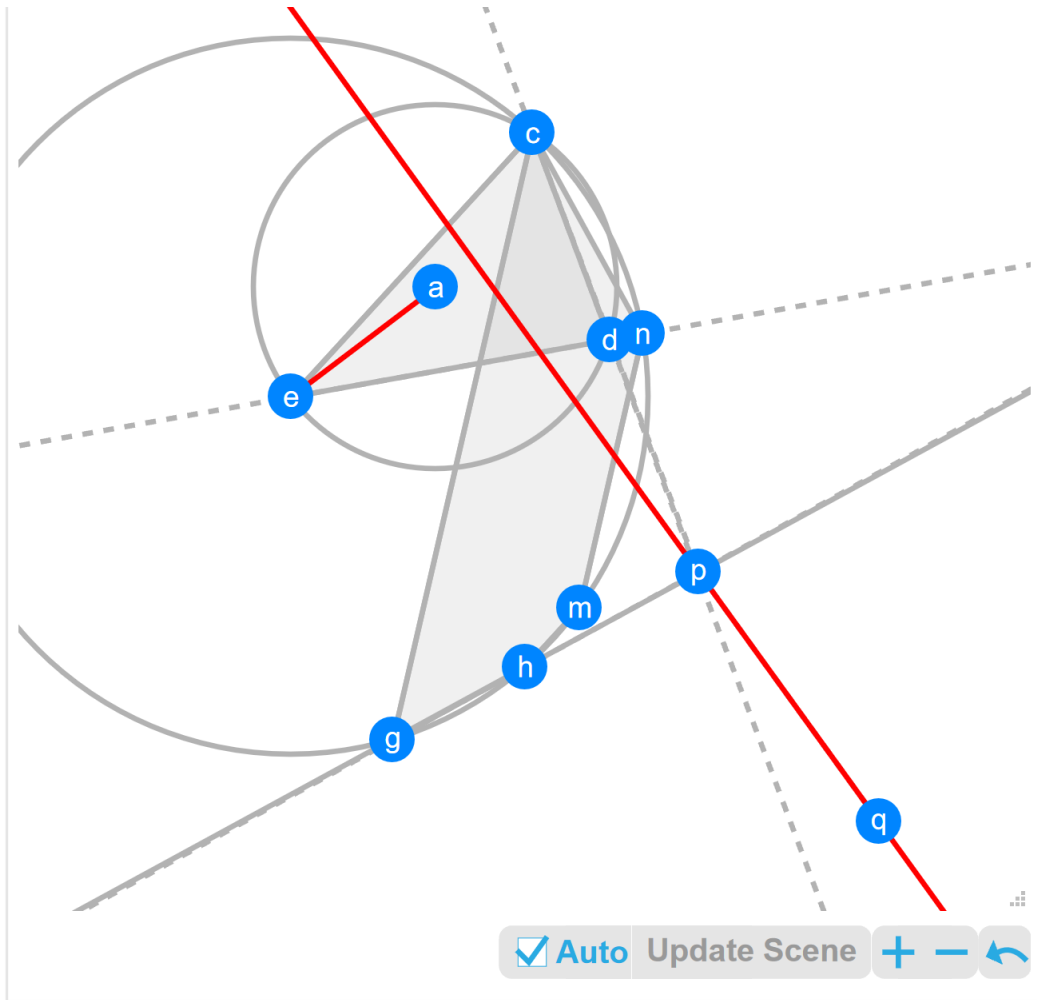


Let $fcde$ be a cyclic quadrilateral with centre a . Let fc be parallel to ed . Let $gemnp$ be a cyclic pentagon with centre f . Let ge be parallel to pn . Let dc be parallel to fp . Let L_1 be the angle bisector of fg and fm . Let dc be parallel to L_1 . Prove fc is parallel to mn .

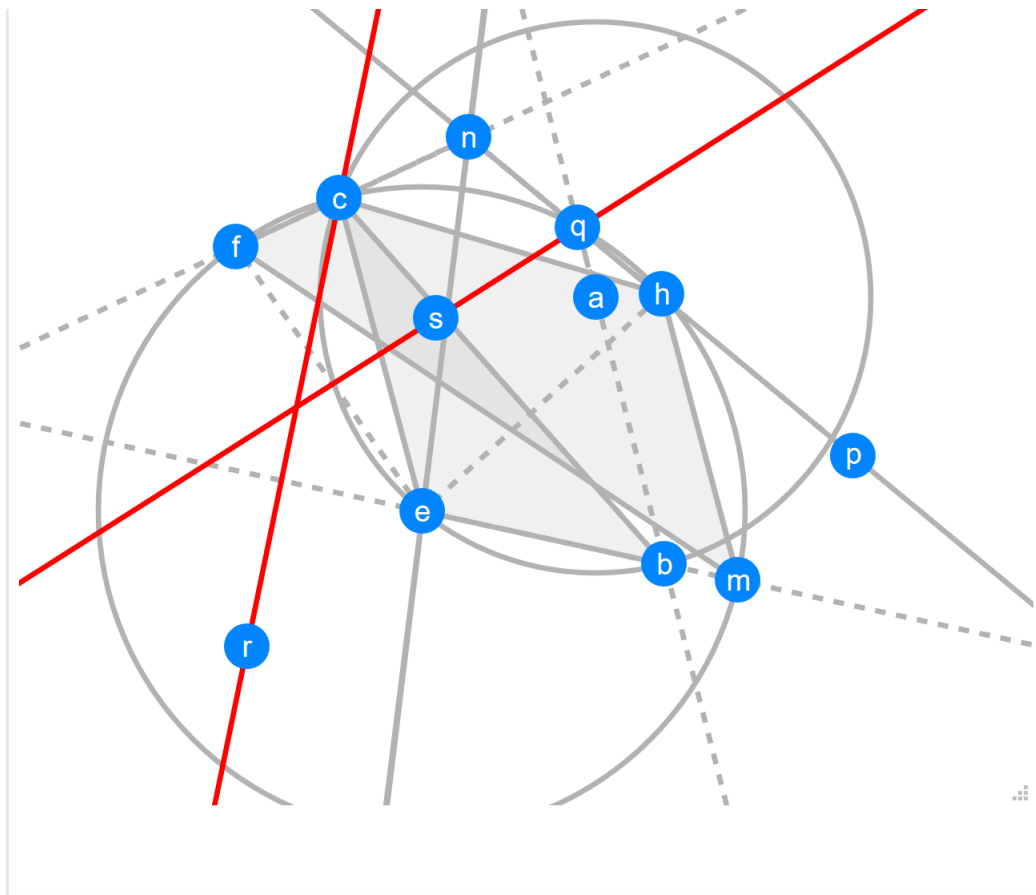




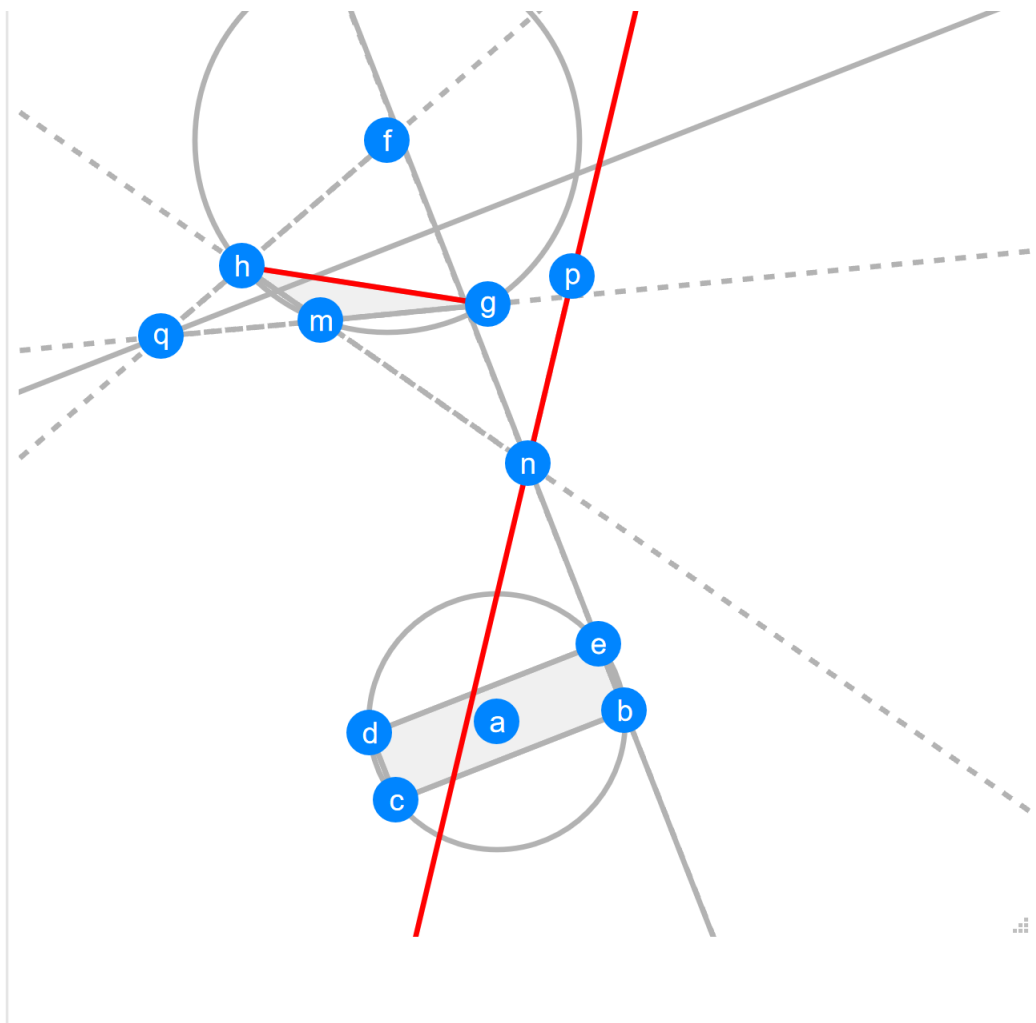
Let bch be a triangle with circumcentre a . Let cgh be a triangle with circumcentre e . Let cbe be collinear. Let L_1 be the angle bisector of bh and hg . Let L_2 be the reflection of cg in L_1 . Prove ah is parallel to L_2 .



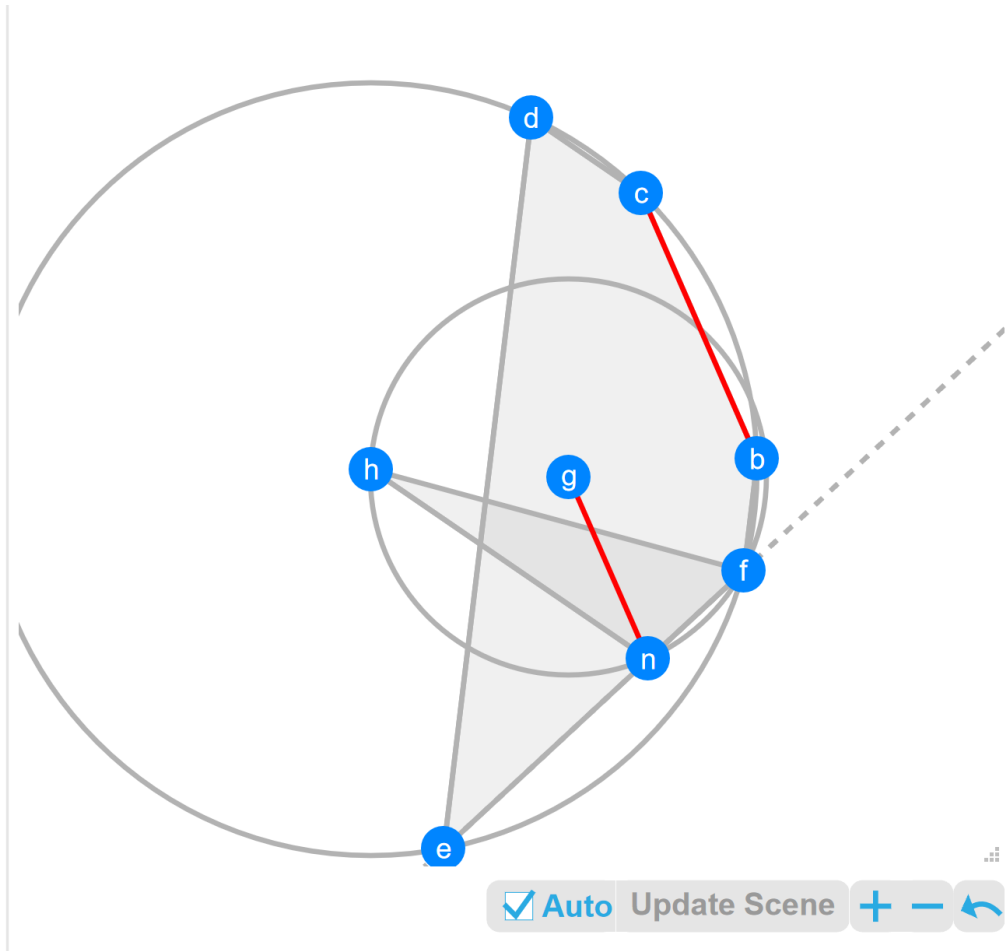
Let ecd be a triangle with circumcentre a . Let $cghmn$ be a cyclic pentagon with centre e . Let ec be parallel to mh . Let cg be parallel to nm . Let edn be collinear. Let L_1 be the reflection of cd in gh . Prove ae is perpendicular to L_1 .



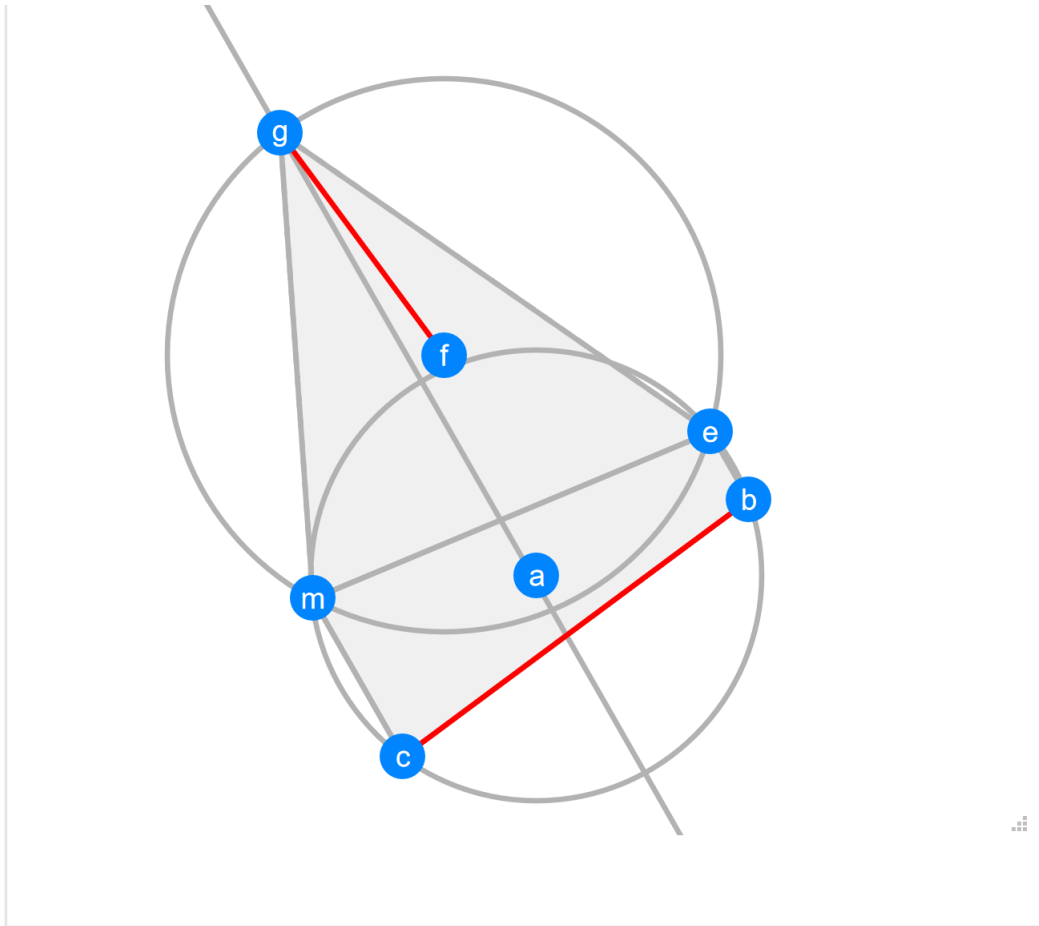
Let bce be a triangle with circumcentre a . Let $fchm$ be a cyclic quadrilateral with centre e . Let ec be parallel to hm . Let ebm be collinear. Let $L1$ be the angle bisector of bc and fc . Let $L2$ be the angle bisector of eh and ef . Let $L3$ be the reflection of fc in $L2$. Let $L4$ be the angle bisector of $L3$ and ab . Determine the angle between $L1$ and $L4$.



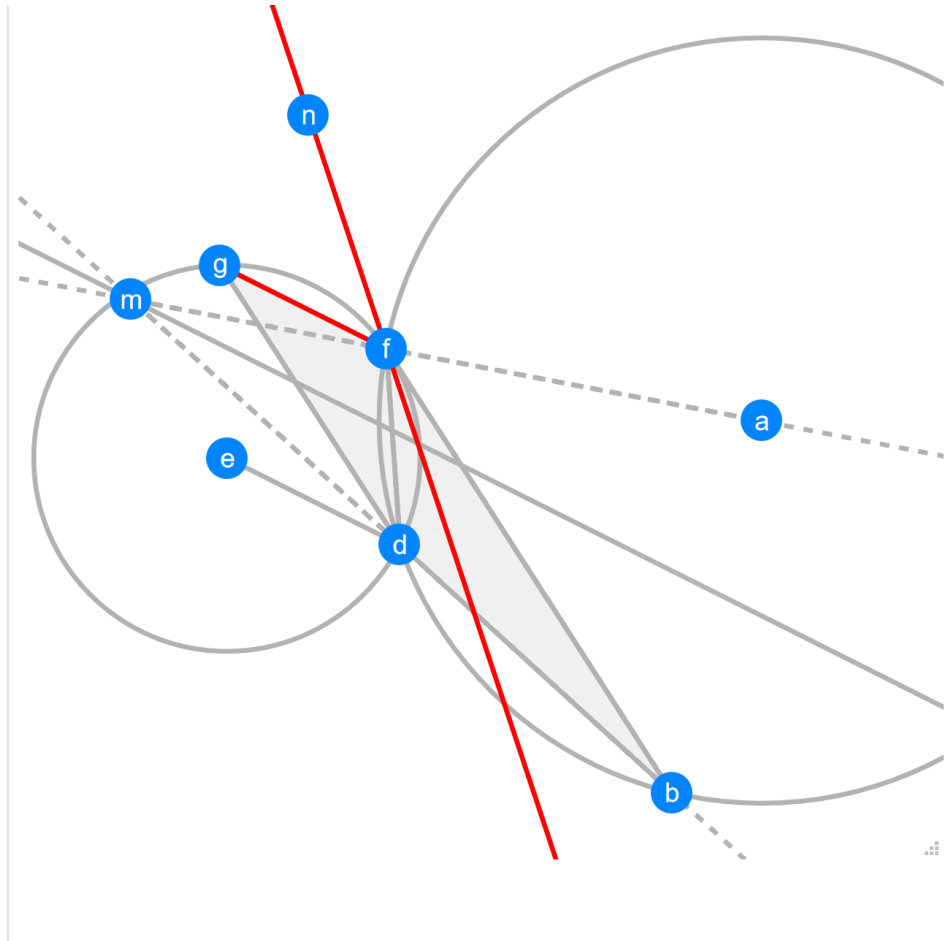
Let $bcde$ be a cyclic quadrilateral with centre a . Let be be parallel to dc . Let bc be parallel to ed . Let ghm be a triangle with circumcentre f . Let $L1$ be the reflection of mh in be . Let $L2$ be the angle bisector of fh and gm .



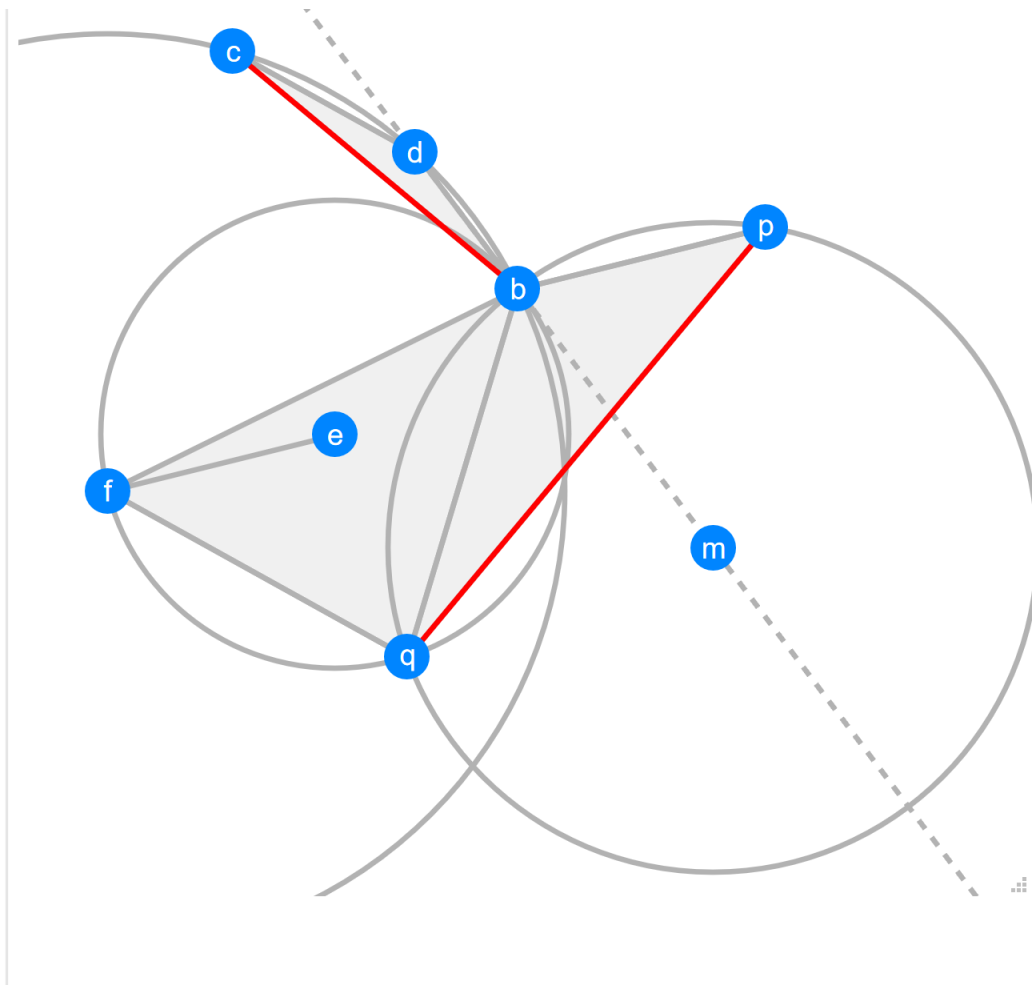
Let $bcdef$ be a cyclic pentagon with centre h . Let bf be parallel to de . Let hfn be a triangle with circumcentre g . Let dc be parallel to hn . Let fen be collinear. Prove gn is parallel to bc .



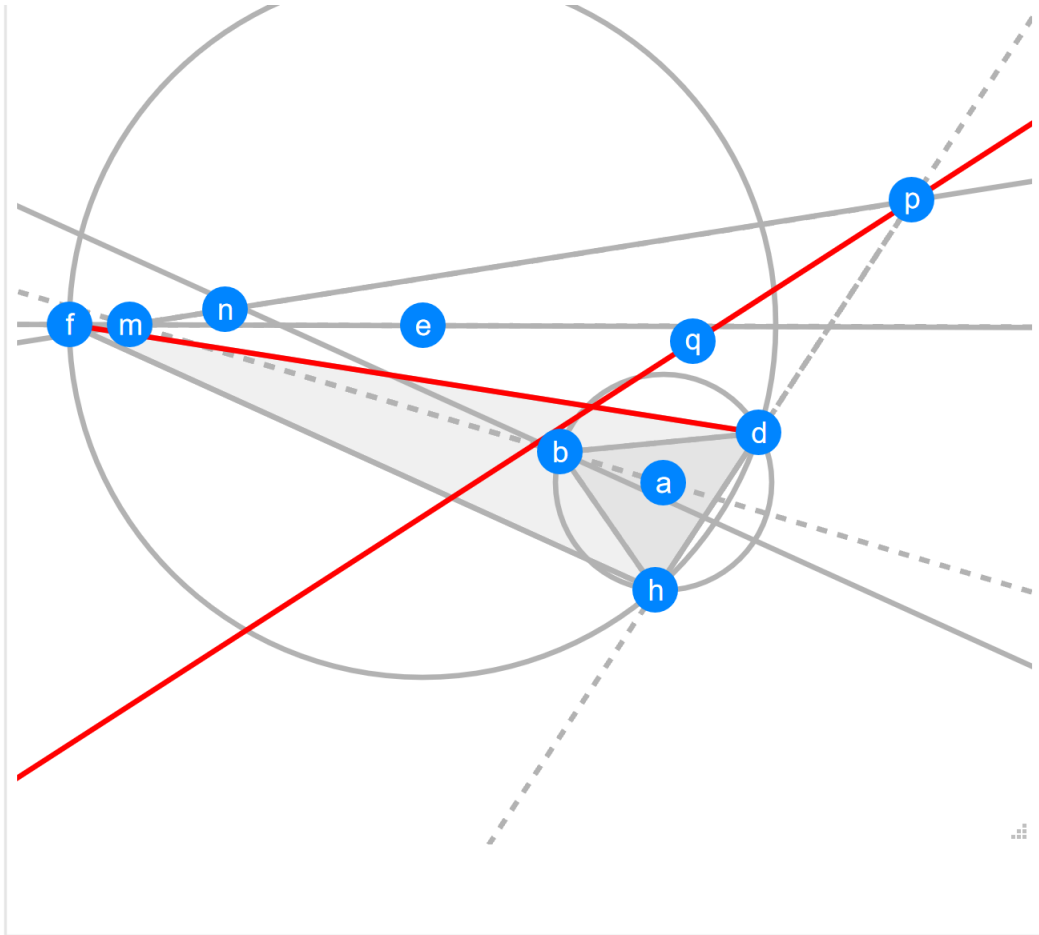
Let $bcme$ be a cyclic quadrilateral with centre a . Let be be parallel to mc . Let gem be a triangle with circumcentre f . Let L_1 be the angle bisector of mg and ge . Let bc be parallel to L_1 . Prove fg is perpendicular to bc .



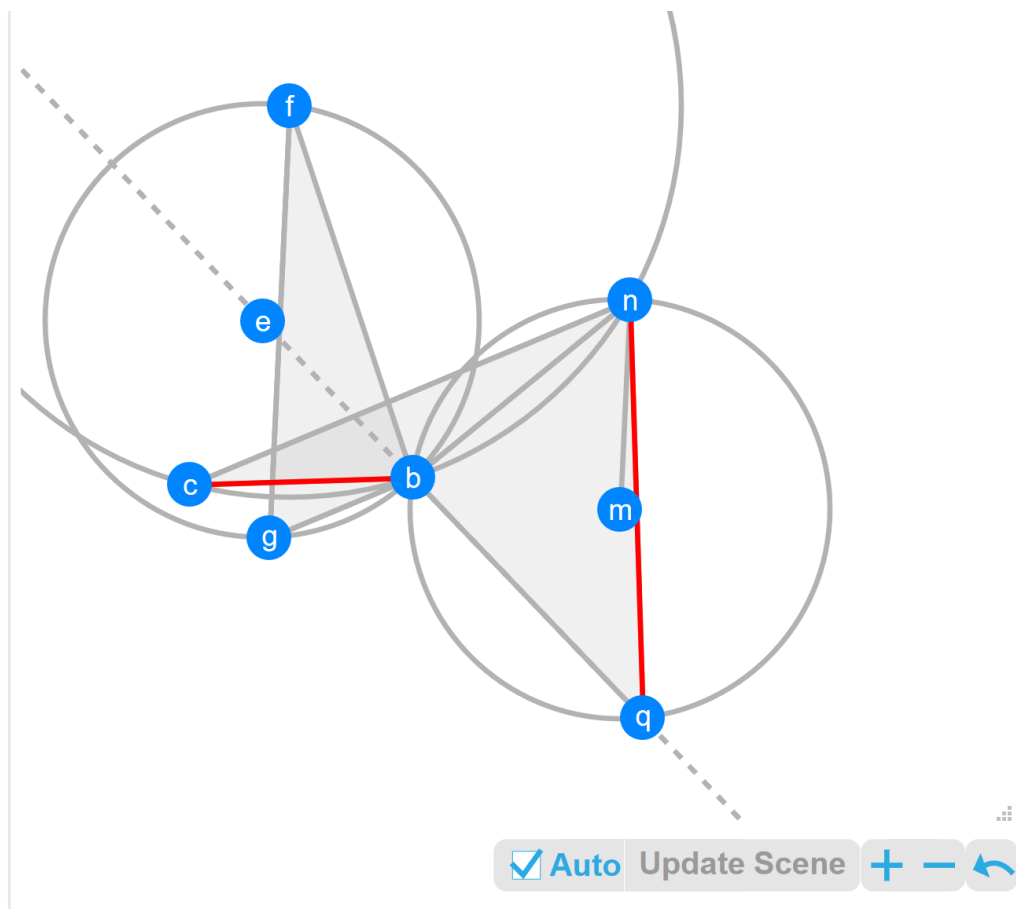
Let bfd be a triangle with circumcentre a . Let fgd be a triangle with circumcentre e . Let bf be parallel to dg . Let L_1 be the angle bisector of bd and af . Let ed be parallel to L_1 . Let L_2 be the angle bisector of fd and bf . Determine the angle between $\{f, g\}$ and L_2 .



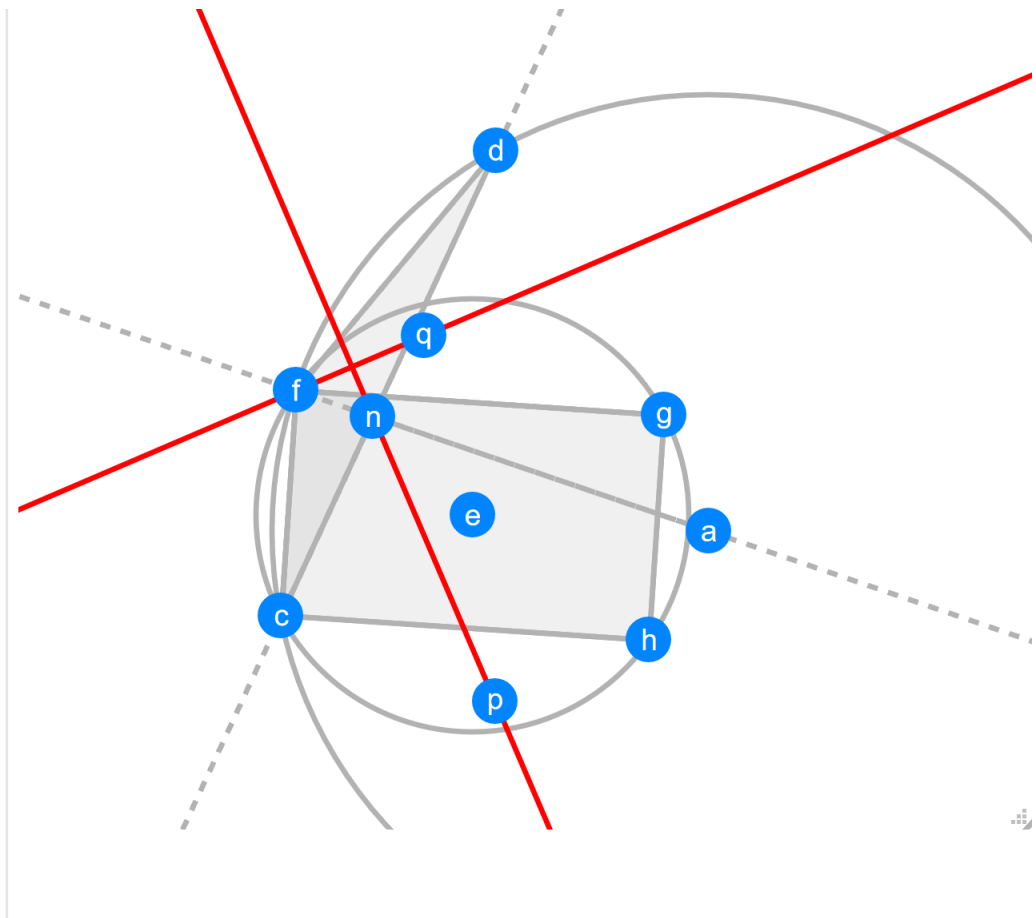
Let bcd be a triangle with circumcentre f . Let fbq be a triangle with circumcentre e . Let dc be parallel to qf . Let bpq be a triangle with circumcentre m . Let ef be parallel to bp . Let bdm be collinear. Prove bc is perpendicular to qp .



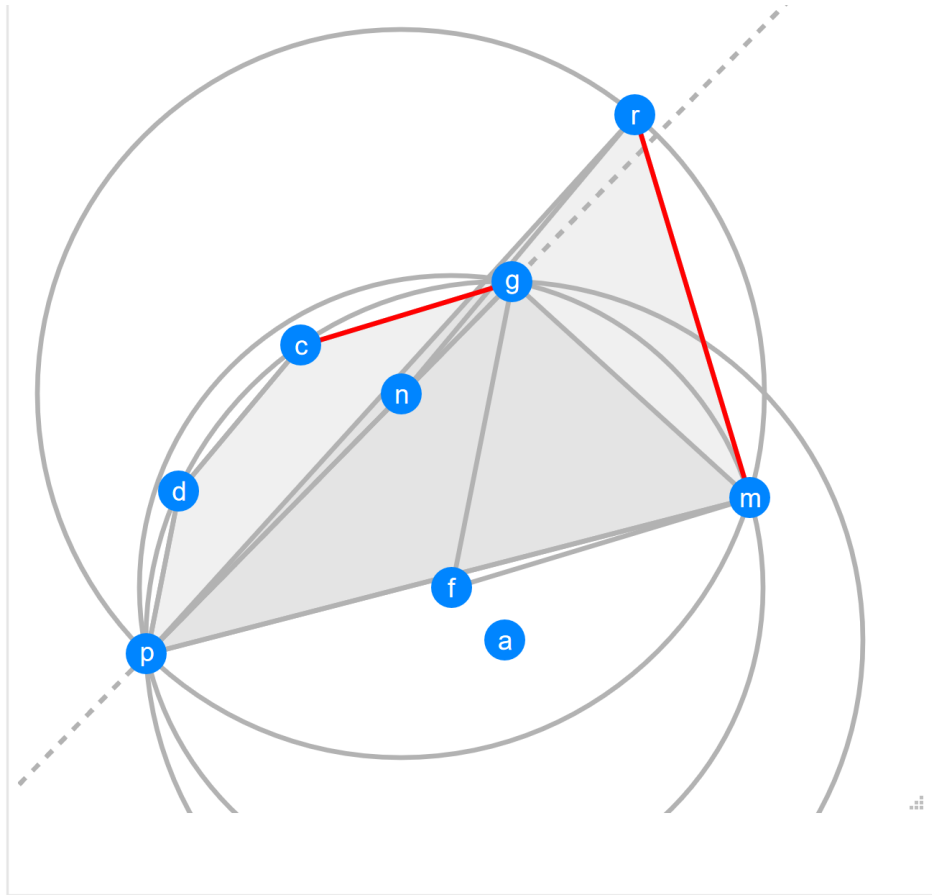
Let bhd be a triangle with circumcentre a . Let fdh be a triangle with circumcentre e . Let $L1$ be the angle bisector of hb and bd . Let fh be parallel to $L1$. Let $L2$ be the reflection of ab in ef . Let $L3$ be the angle bisector of $L2$ and hd . Determine the angle between $\{f, d\}$ and $L3$.



Let bcn be a triangle with circumcentre f . Let fgb be a triangle with circumcentre e . Let nc be parallel to bg . Let nbq be a triangle with circumcentre m . Let beq be collinear. Let fg be parallel to mn . Prove bc is perpendicular to qn .



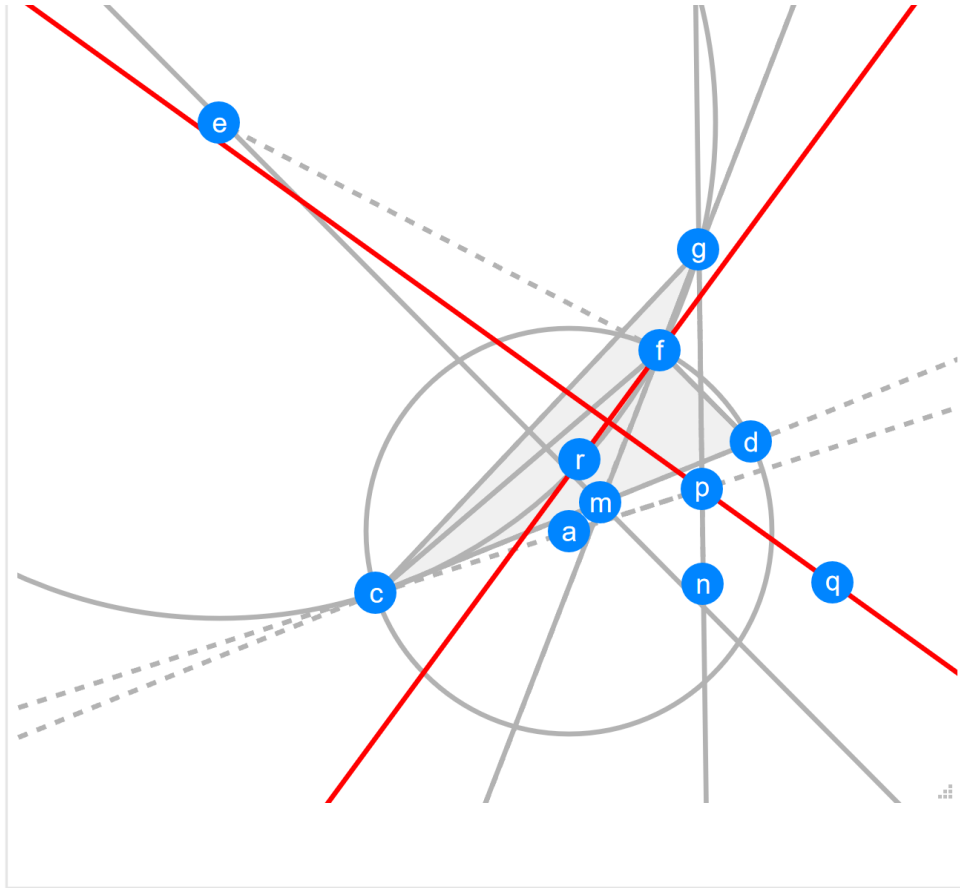
Let fcd be a triangle with circumcentre a . Let $fghc$ be a cyclic quadrilateral with centre e . Let fc be parallel to hg . Let fg be parallel to ch . Let $L1$ be the angle bisector of fg and fd . Let $L2$ be the angle bisector of dc and af . Determine the angle between $L2$ and $L1$.



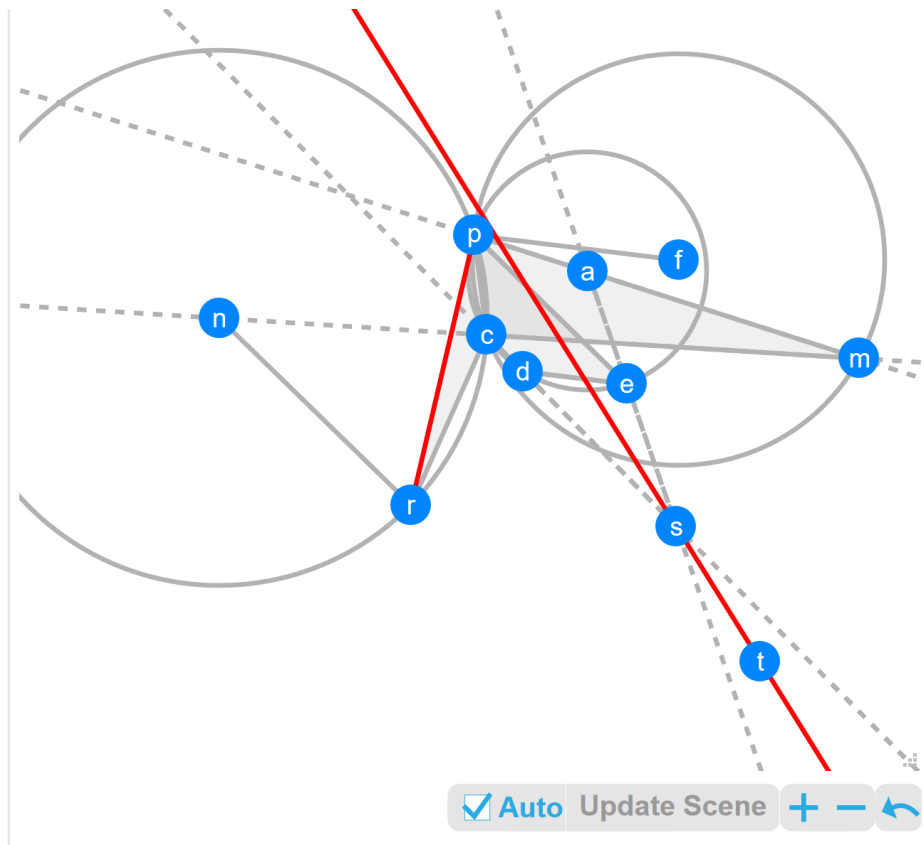
Let $gcdp$ be a cyclic quadrilateral with centre a . Let gpm be a triangle with circumcentre f . Let dp be parallel to fg . Let gc be parallel to fm . Let pmr be a triangle with circumcentre n . Let pgn be collinear. Let dc be parallel to nr . Prove gc is perpendicular to mr .



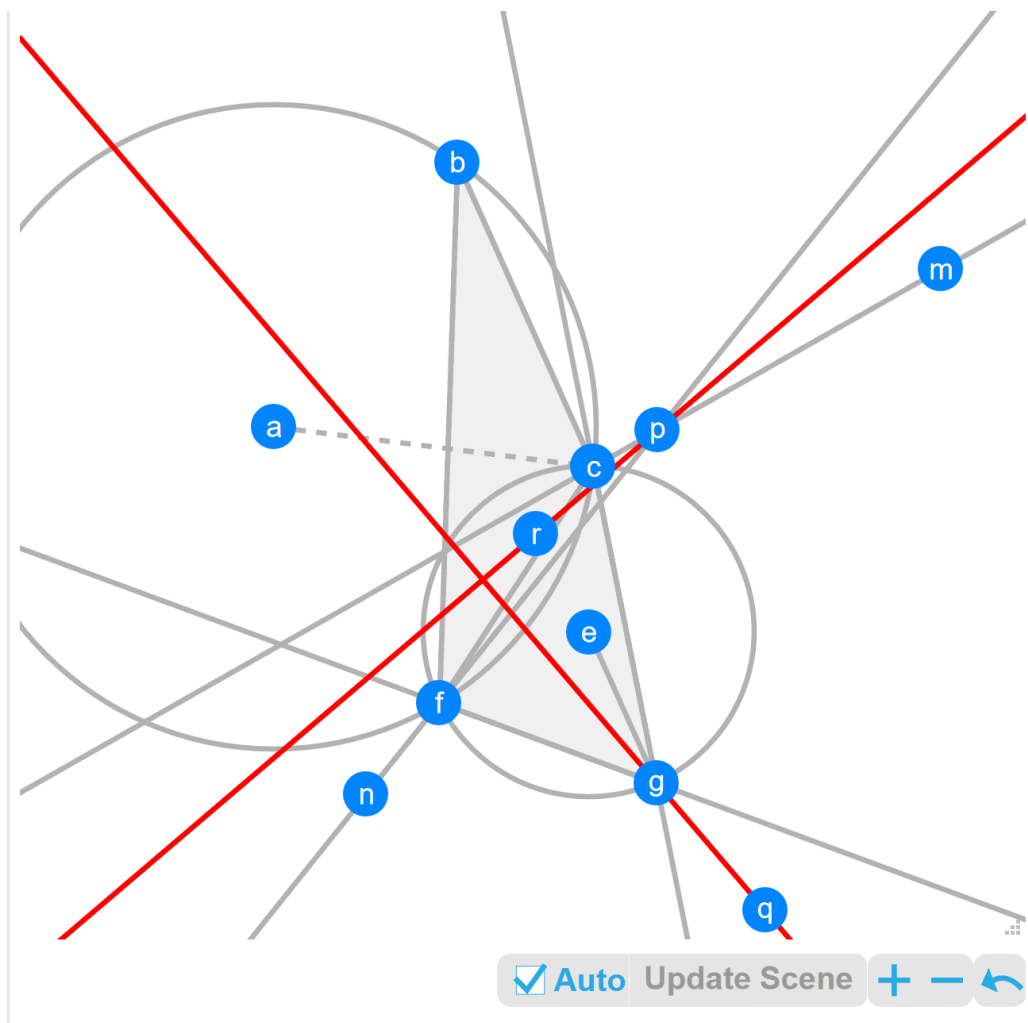
Let $bcde$ be a cyclic quadrilateral with centre a . Let be be parallel to dc . Let bc be parallel to ed . Let ghm be a triangle with circumcentre f . Let $L1$ be the reflection of gm in be . Let $L2$ be the angle bisector of mh and fg . Let bc be parallel to $L2$. Prove $L1$ is perpendicular to gh .



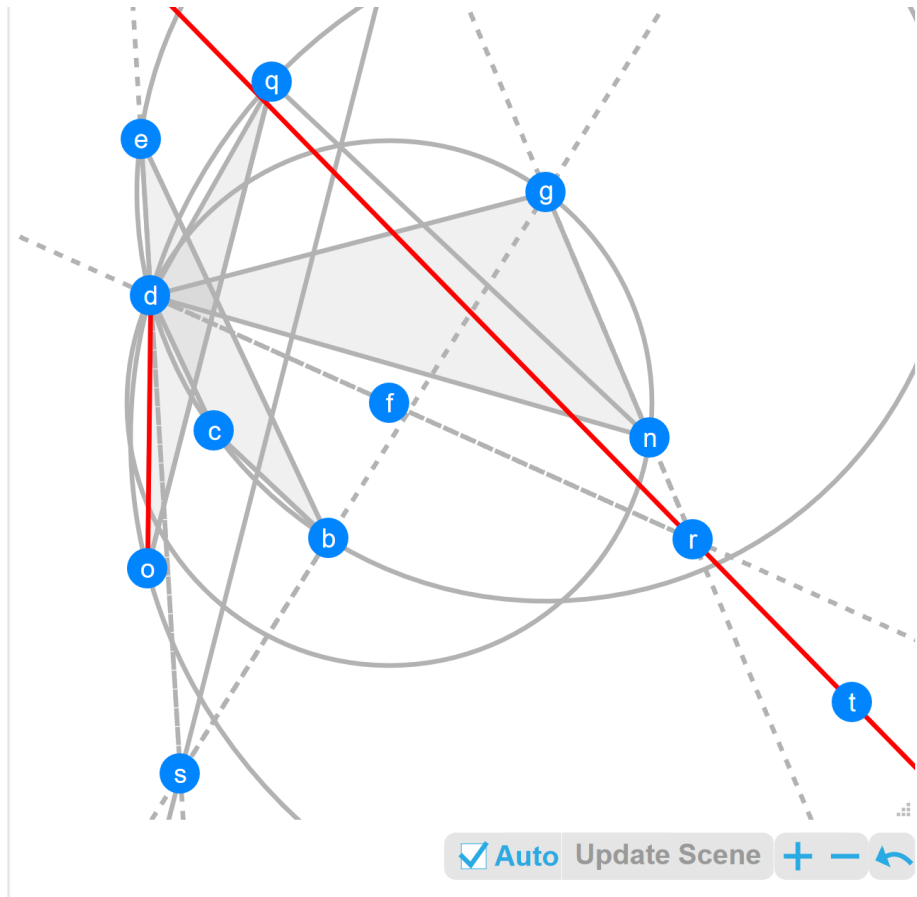
Let fcd be a triangle with circumcentre a . Let fgc be a triangle with circumcentre e . Let $L1$ be the angle bisector of fd and ef . Let $L2$ be the angle bisector of gf and dc . Let fd be parallel to $L2$. Let $L3$ be the reflection of gc in gf . Let $L4$ be the angle bisector of ac and $L3$. Determine the angle between $L4$ and $L1$.



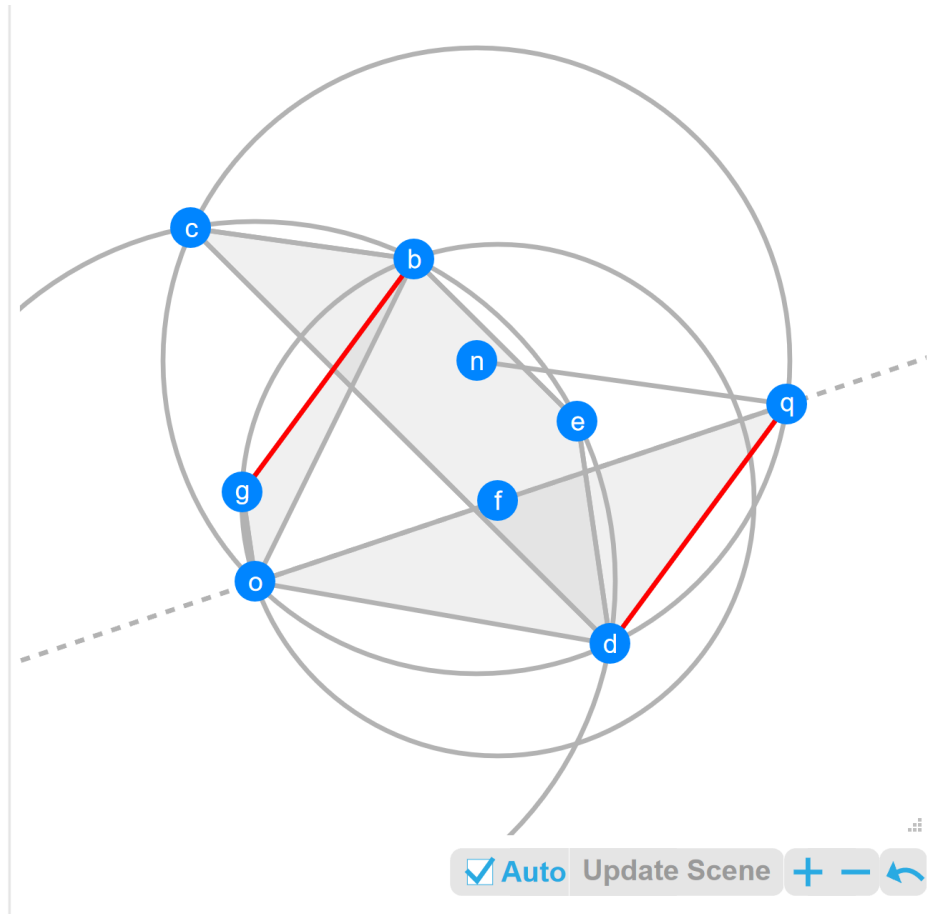
Let $pcde$ be a cyclic quadrilateral with centre a . Let pcm be a triangle with circumcentre f . Let pam be collinear. Let de be parallel to fp . Let pcr be a triangle with circumcentre n . Let cmn be collinear. Let ep be parallel to nr . Let $L1$ be the angle bisector of ae and dc . Determine the angle between $\{p, r\}$ and $L1$.



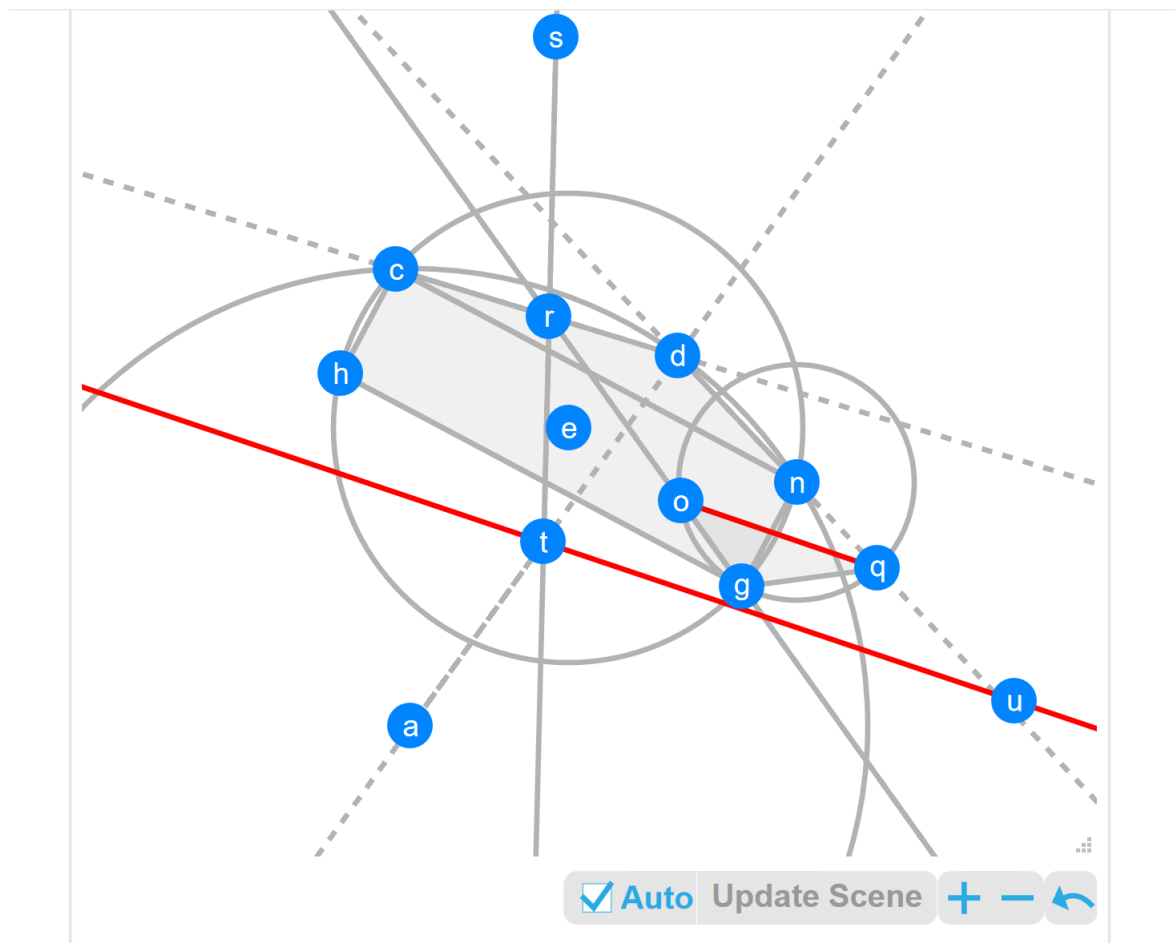
Let bcf be a triangle with circumcentre a . Let fgc be a triangle with circumcentre e . Let bc be parallel to eg . Let $L1$ be the reflection of ac in cg . Let $L2$ be the angle bisector of cg and fg . Let $L3$ be the reflection of bf in fg . Let $L4$ be the angle bisector of $L3$ and $L1$. Determine the angle between $L2$ and $L4$.



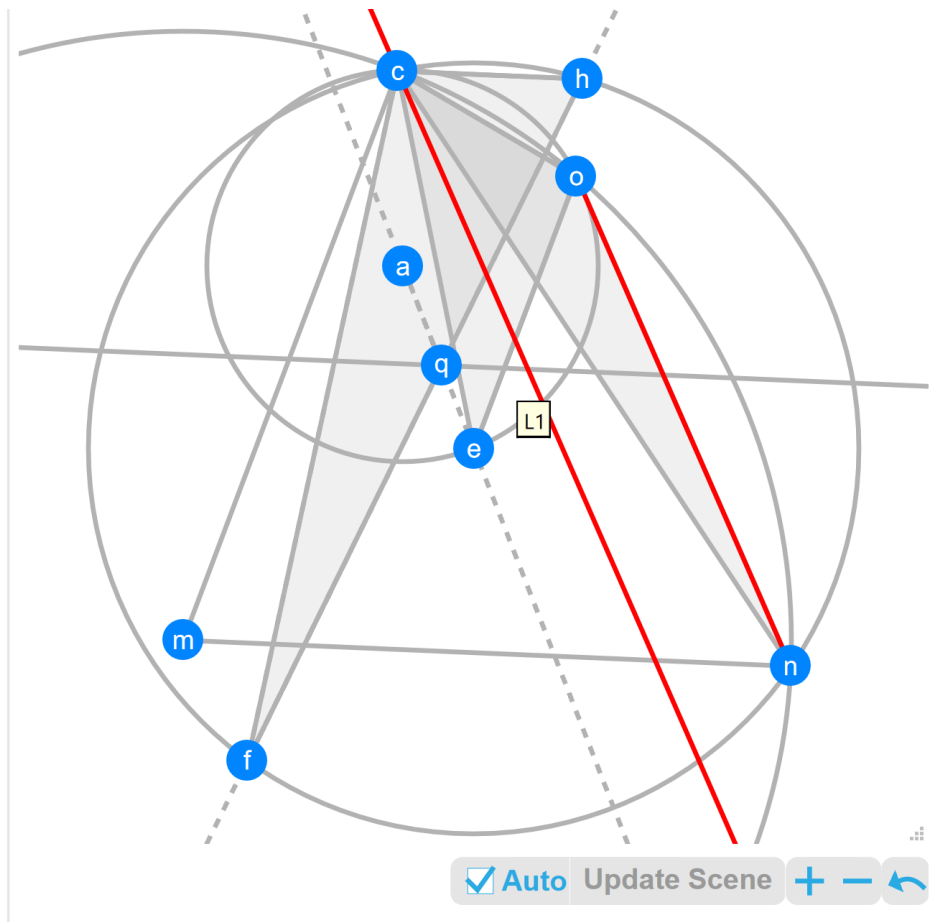
Let $bcde$ be a cyclic quadrilateral with centre g . Let eb be parallel to dc . Let gdn be a triangle with circumcentre f . Let odq be a triangle with circumcentre n . Let bc be parallel to nq . Let $L1$ be the angle bisector of fd and gn . Let $L2$ be the angle bisector of gb and ed . Let oq be parallel to $L2$. Determine the angle between $L1$ and $\{o, d\}$.



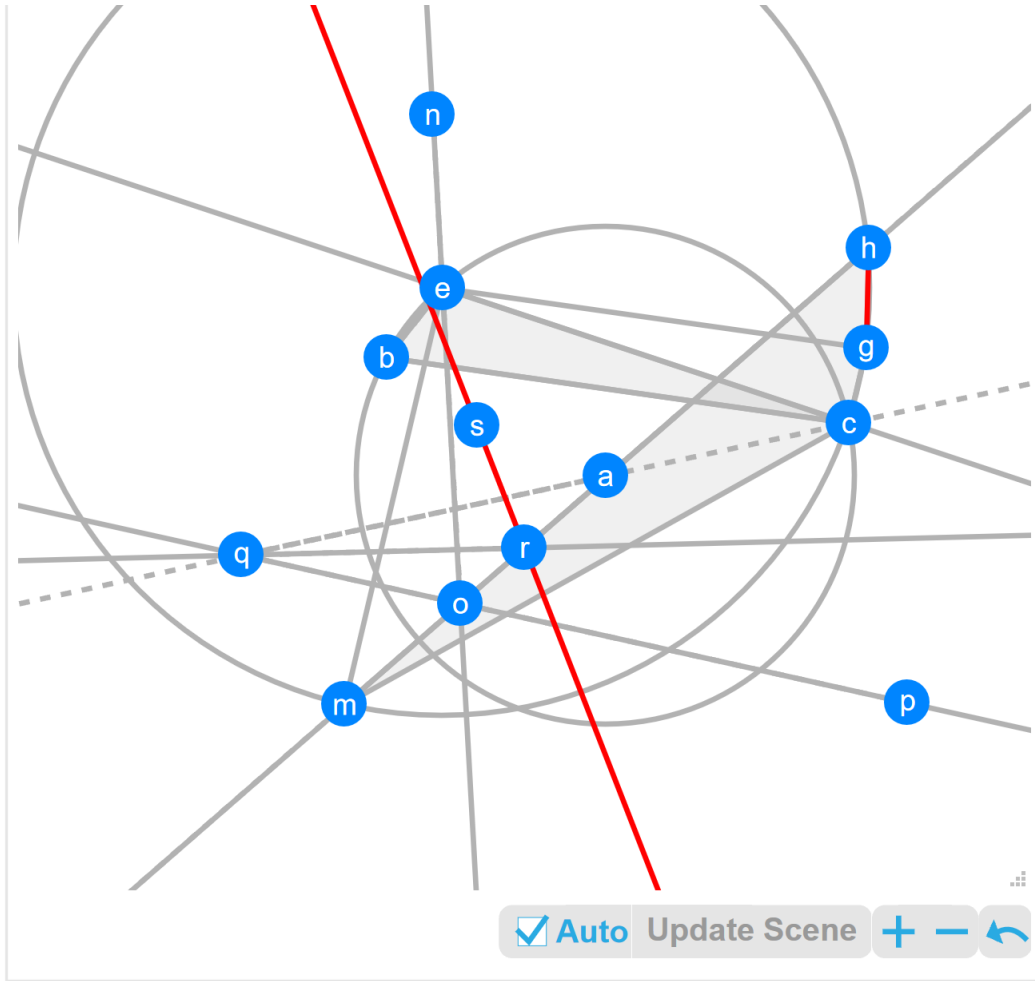
Let $bcde$ be a cyclic quadrilateral with centre o . Let eb be parallel to cd . Let gbo be a triangle with circumcentre f . Let ed be parallel to go . Let odq be a triangle with circumcentre n . Let ofq be collinear. Let bc be parallel to nq . Prove qd is parallel to gb .



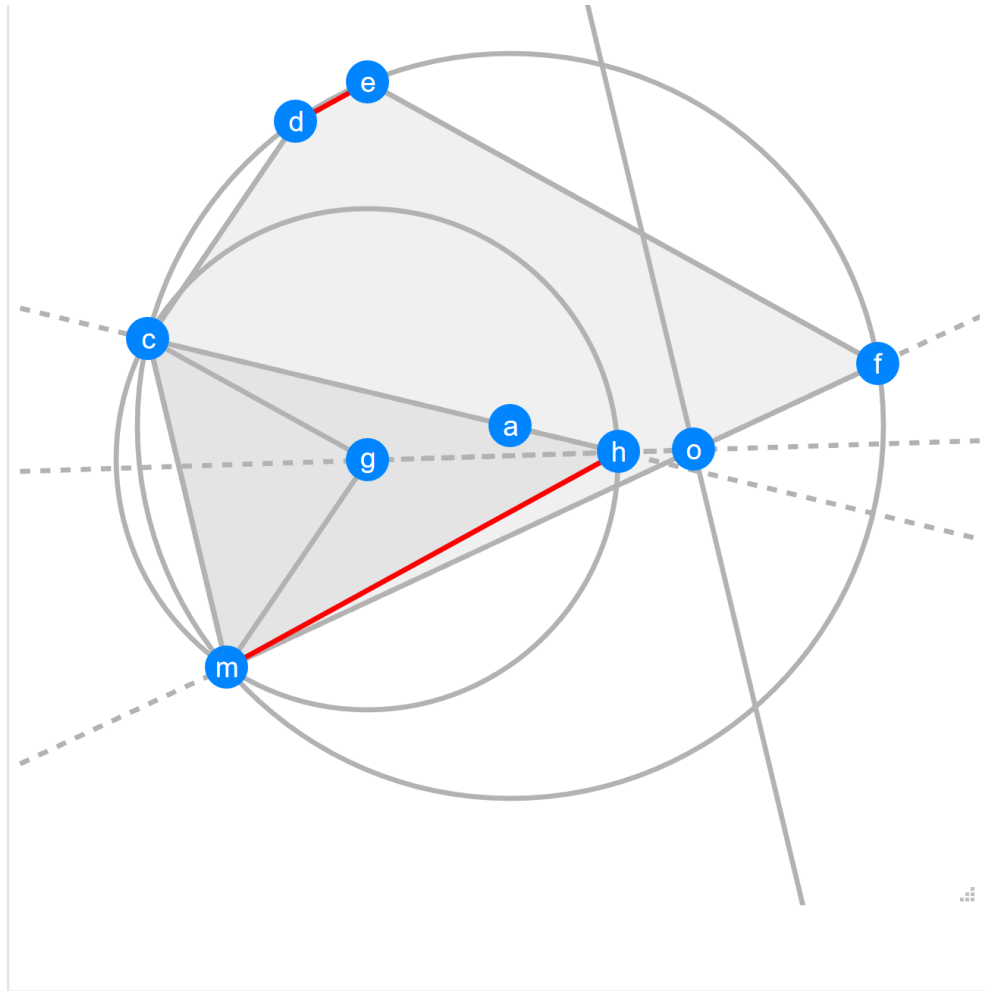
Let ncd be a triangle with circumcentre a . Let $nghc$ be a cyclic quadrilateral with centre e . Let nc be parallel to hg . Let ng be parallel to ch . Let ogq be a triangle with circumcentre n . Let ndq be collinear. Let $L1$ be the reflection of dc in og . Let $L2$ be the angle bisector of $L1$ and ad . Determine the angle between $L2$ and $\{o, q\}$.



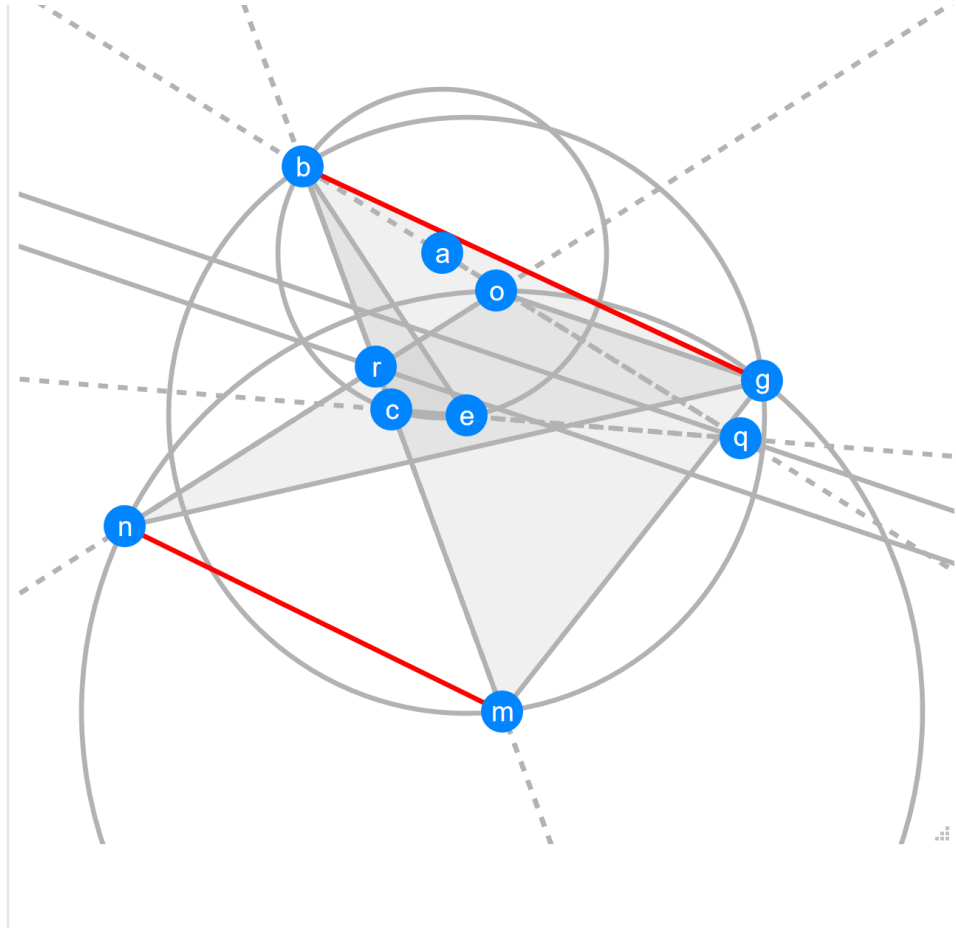
Let eco be a triangle with circumcentre a . Let fch be a triangle with circumcentre e . Let noc be a triangle with circumcentre m . Let hc be parallel to mn . Let oe be parallel to mc . Let $L1$ be the angle bisector of ae and fh . Let hc be parallel to $L1$. Let $L2$ be the angle bisector of oc and fc . Determine the angle between $\{n, o\}$ and $L2$.



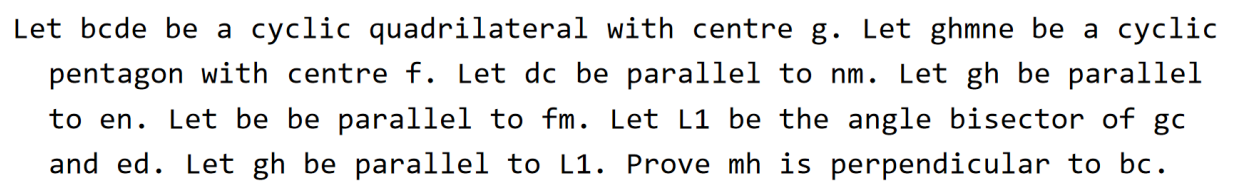
Let bce be a triangle with circumcentre a . Let $cghm$ be a cyclic quadrilateral with centre e . Let em be parallel to cg . Let bc be parallel to eg . Let $L1$ be the reflection of be in ec . Let $L2$ be the reflection of $L1$ in mh . Let $L3$ be the angle bisector of ac and $L2$. Let $L4$ be the angle bisector of mh and $L3$. Determine the angle between $L4$ and $\{g, h\}$.

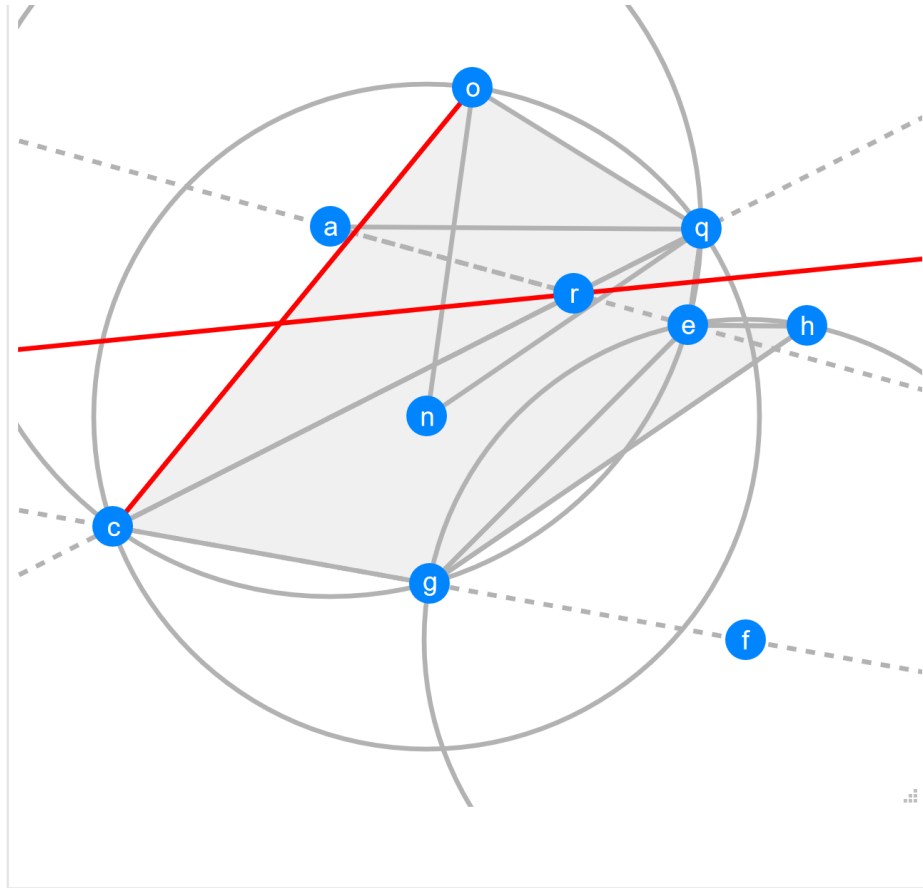


Let $mcdfe$ be a cyclic pentagon with centre a . Let hmc be a triangle with circumcentre g . Let cah be collinear. Let cd be parallel to gm . Let ef be parallel to gc . Let L_1 be the angle bisector of mf and gh . Let mc be parallel to L_1 . Prove hm is parallel to ed .

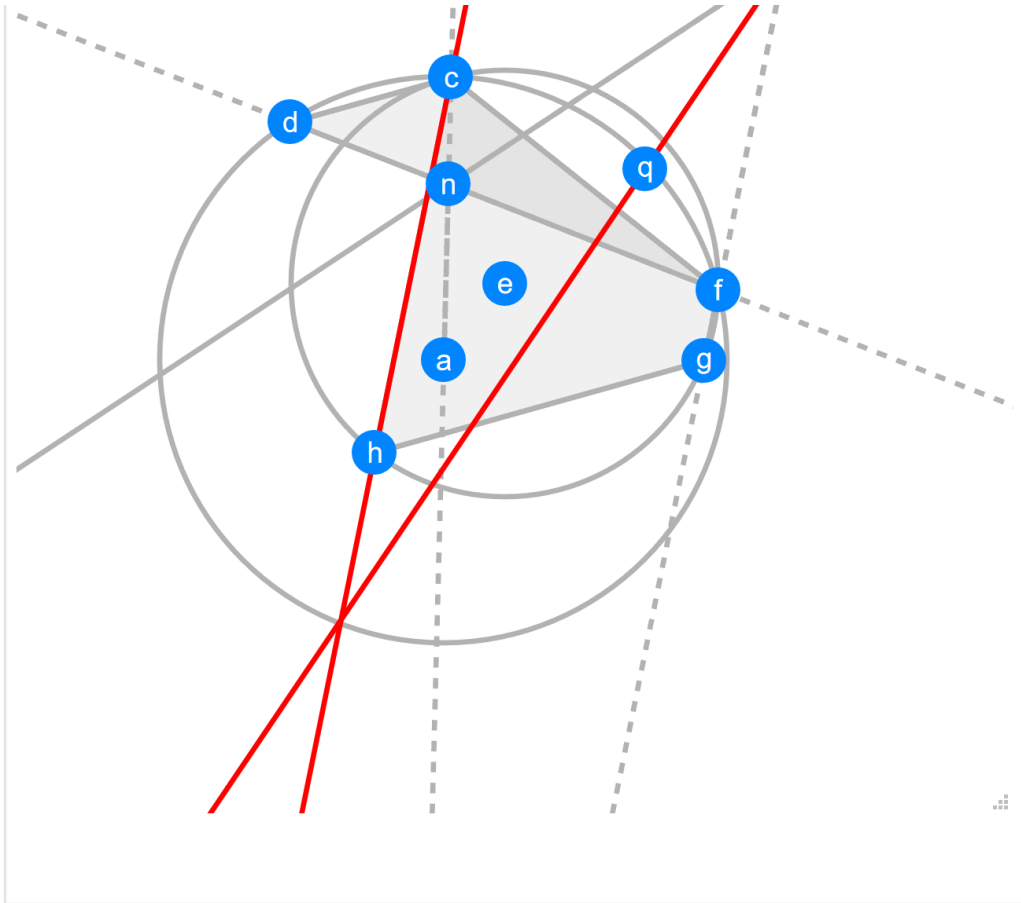


Let bce be a triangle with circumcentre a . Let bgm be a triangle with circumcentre e . Let bcm be collinear. Let nog be a triangle with circumcentre m . Let L_1 be the angle bisector of ab and ce . Let og be parallel to L_1 . Let L_2 be the angle bisector of bc and no . Let og be parallel to L_2 . Prove mn is parallel to bg .

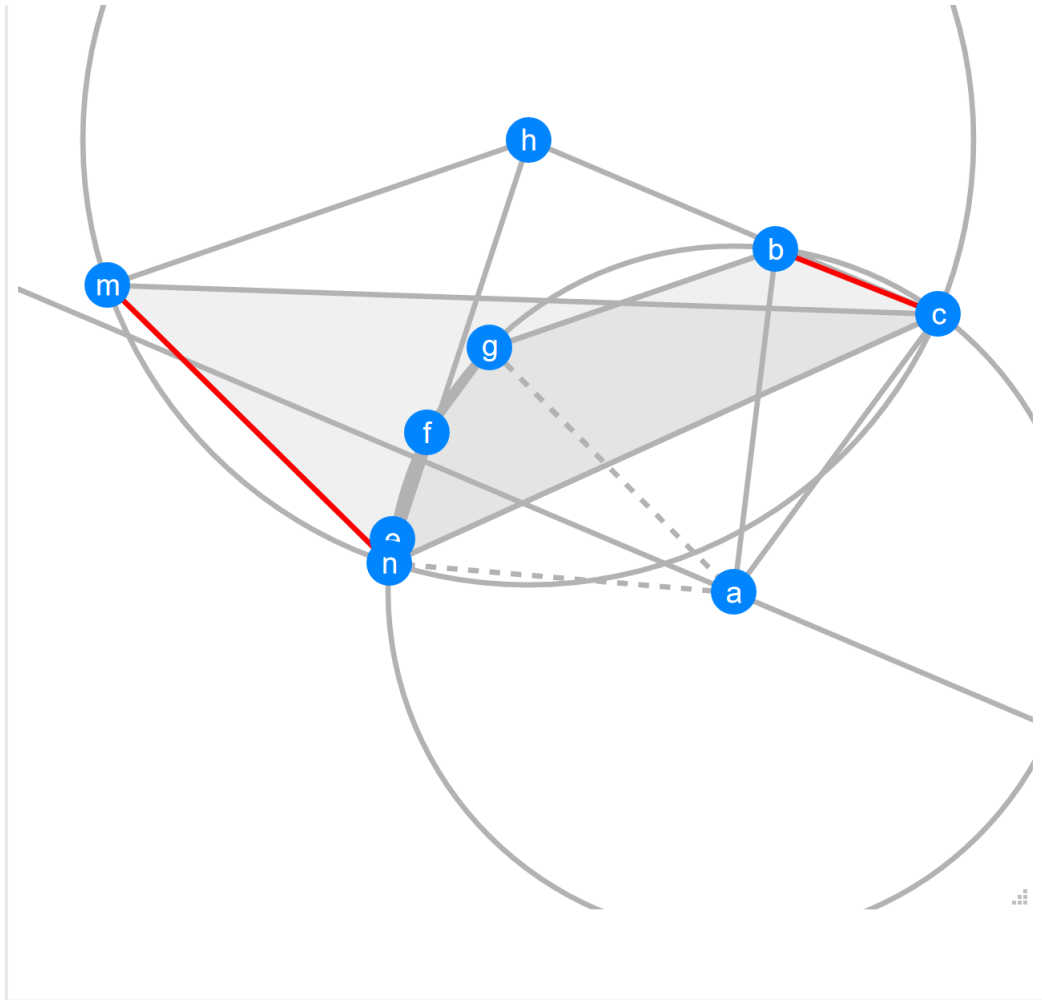




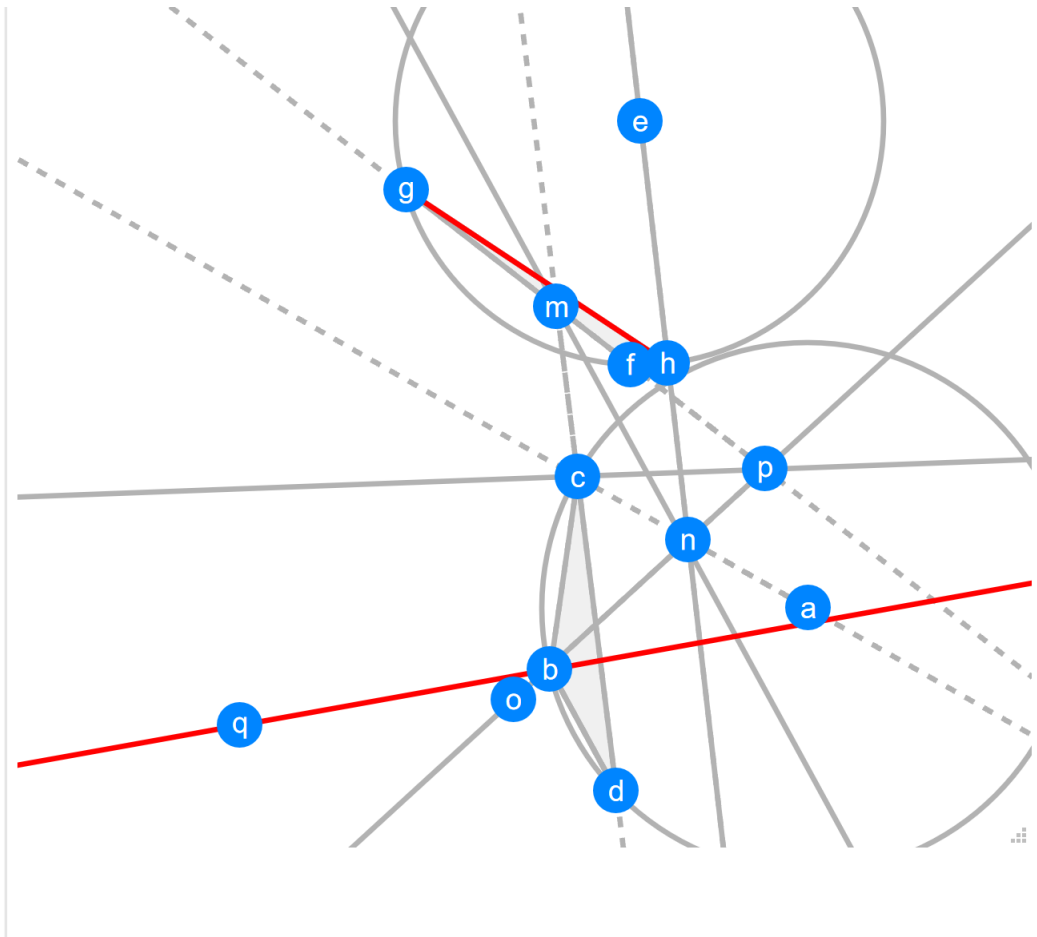
Let $qcge$ be a cyclic quadrilateral with centre a . Let ghe be a triangle with circumcentre f . Let aq be parallel to eh . Let gc be collinear with f . Let ocq be a triangle with circumcentre n . Let eq be parallel to no . Let gh be parallel to nq . Let $L1$ be the angle bisector of qc and ae . Determine the angle between $\{o, c\}$ and $L1$.



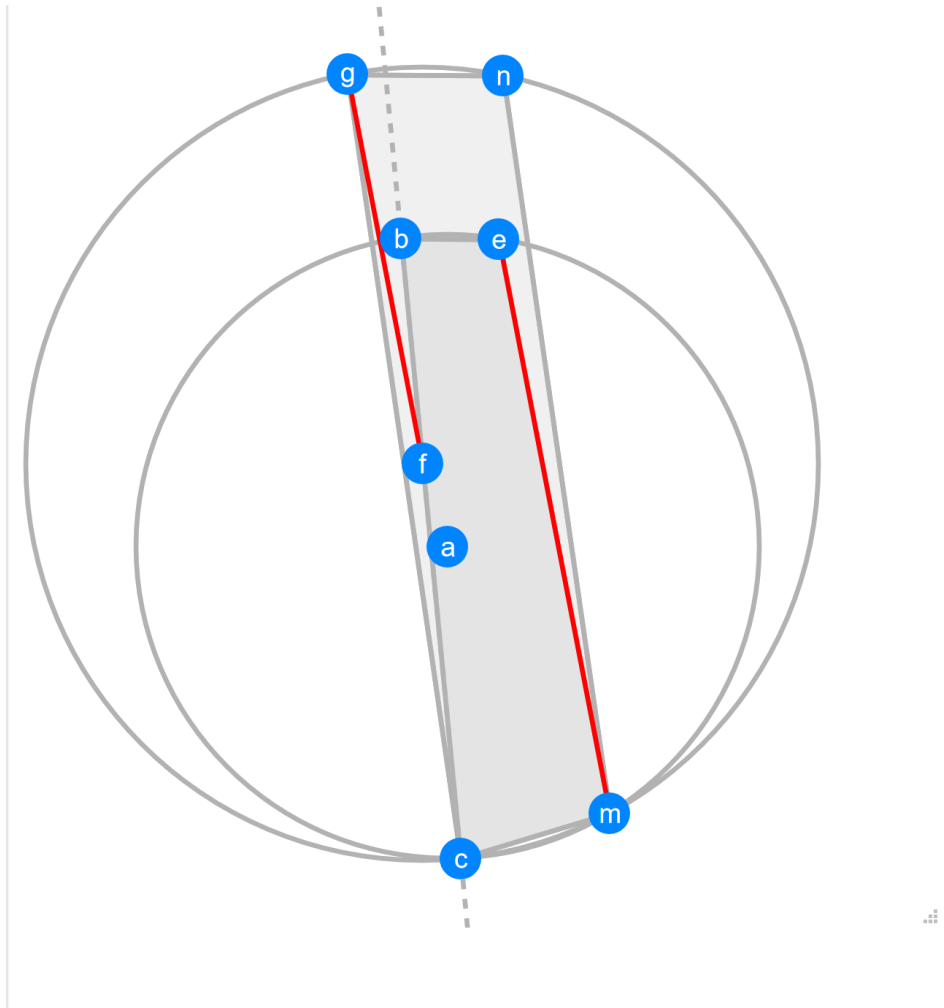
Let fcd be a triangle with circumcentre a . Let $fghc$ be a cyclic quadrilateral with centre e . Let dc be parallel to hg . Let fg be parallel to ch . Let $L1$ be the angle bisector of dc and fc . Let $L2$ be the angle bisector of ac and fd . Let $L3$ be the angle bisector of $L2$ and fg . Determine the angle between $L1$ and $L3$.



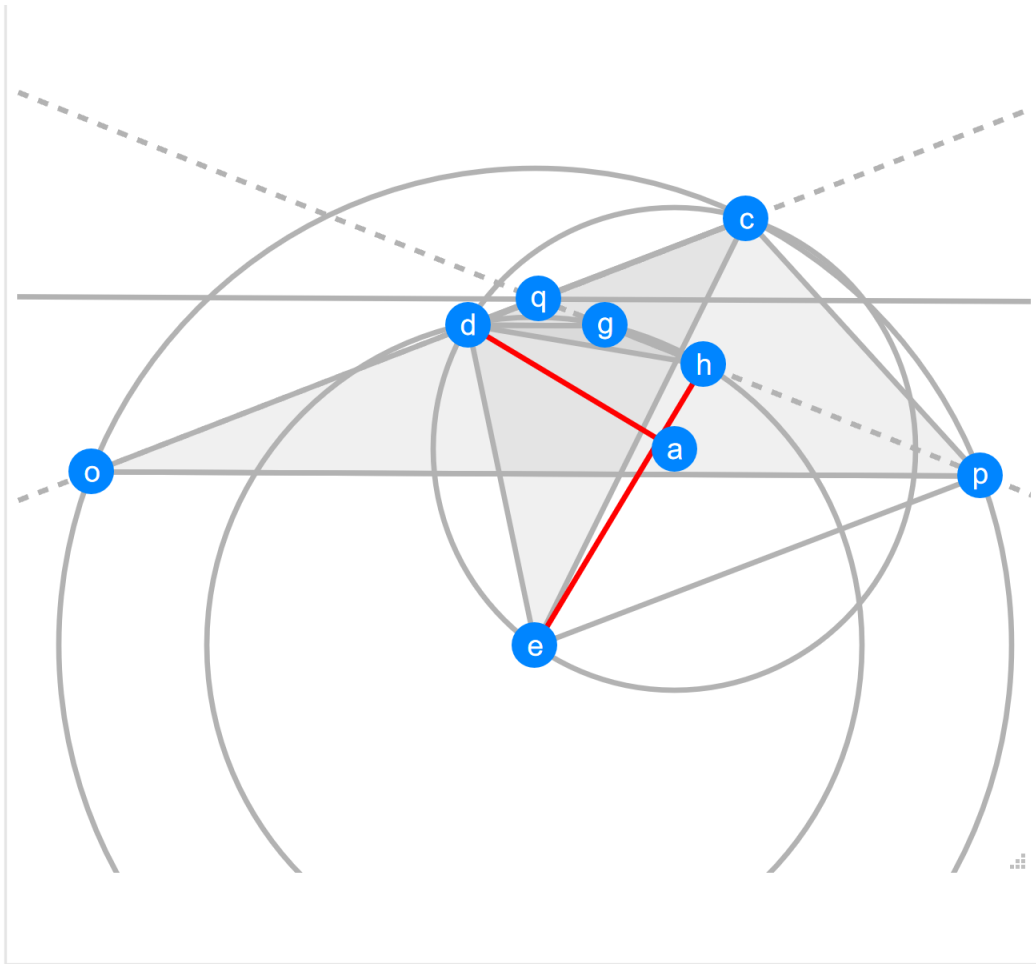
Let $bcnfhg$ be a cyclic hexagon with centre a . Let ab be parallel to en . Let ac be parallel to gf . Let mnc be a triangle with circumcentre h . Let bg be parallel to hm . Let fe be parallel to hn . Let $L1$ be the angle bisector of ag and an . Let hc be parallel to $L1$. Determine the angle between cb and mn . (22.0343)



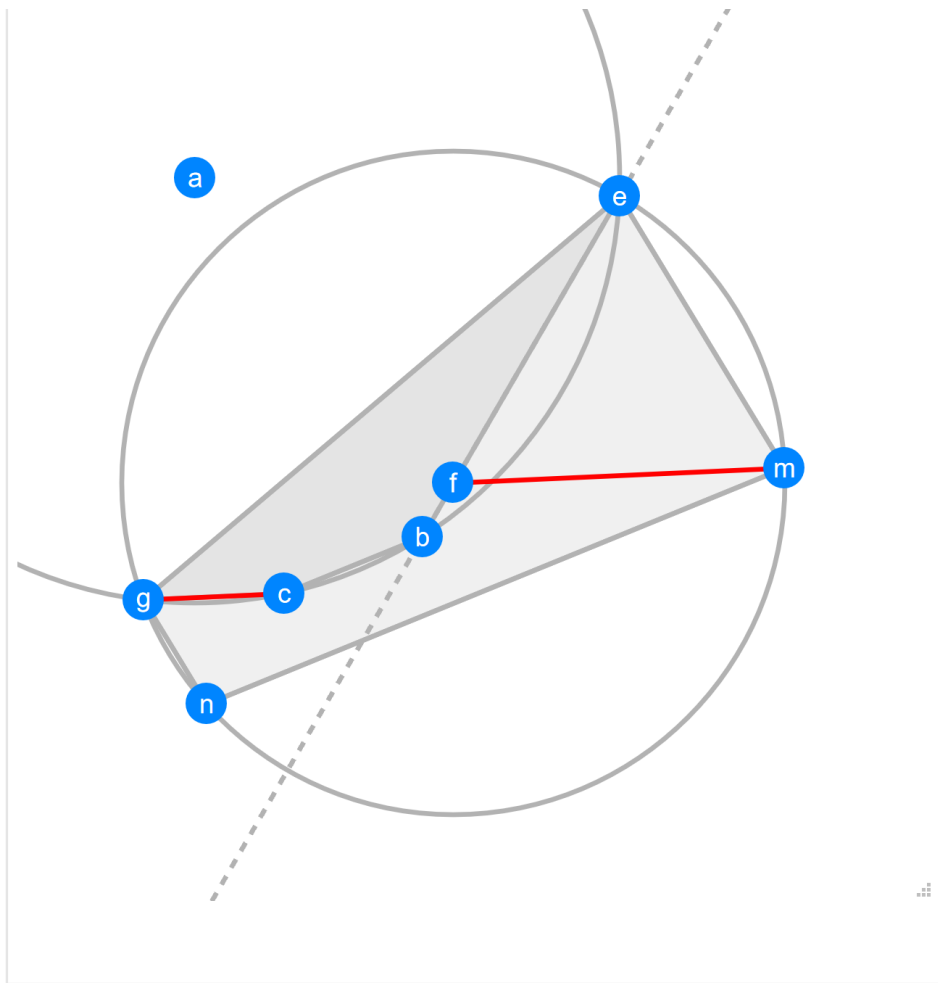
Let bcd be a triangle with circumcentre a . Let fgh be a triangle with circumcentre e . Let $L1$ be the angle bisector of bc and bd . Let $L2$ be the angle bisector of cd and fg . Let bd be parallel to $L2$. Let $L3$ be the reflection of ac in eh . Let $L4$ be the angle bisector of $L3$ and fg . Let fh be parallel to $L4$. Determine the angle between $L1$ and $\{h, g\}$.



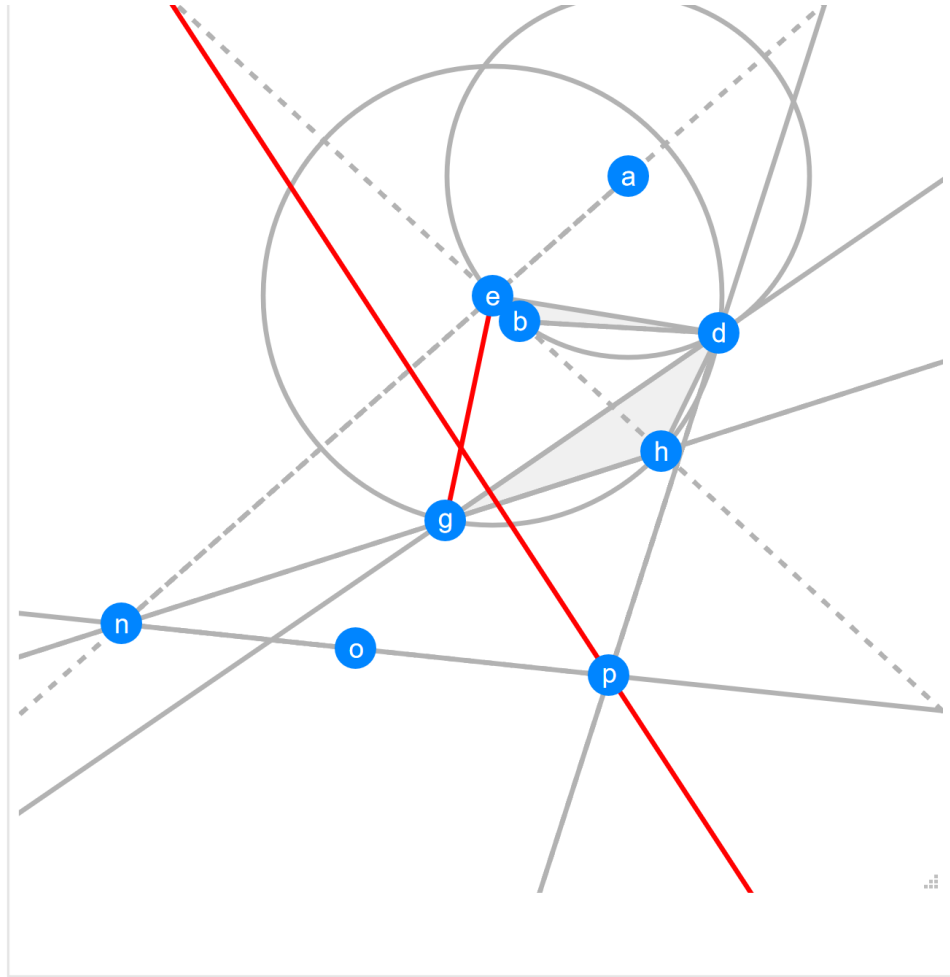
Let $bcme$ be a cyclic quadrilateral with centre a . Let $gcmn$ be a cyclic quadrilateral with centre f . Let be be parallel to ng . Let gc be parallel to nm . Let cbf be collinear. Prove fg is parallel to me .



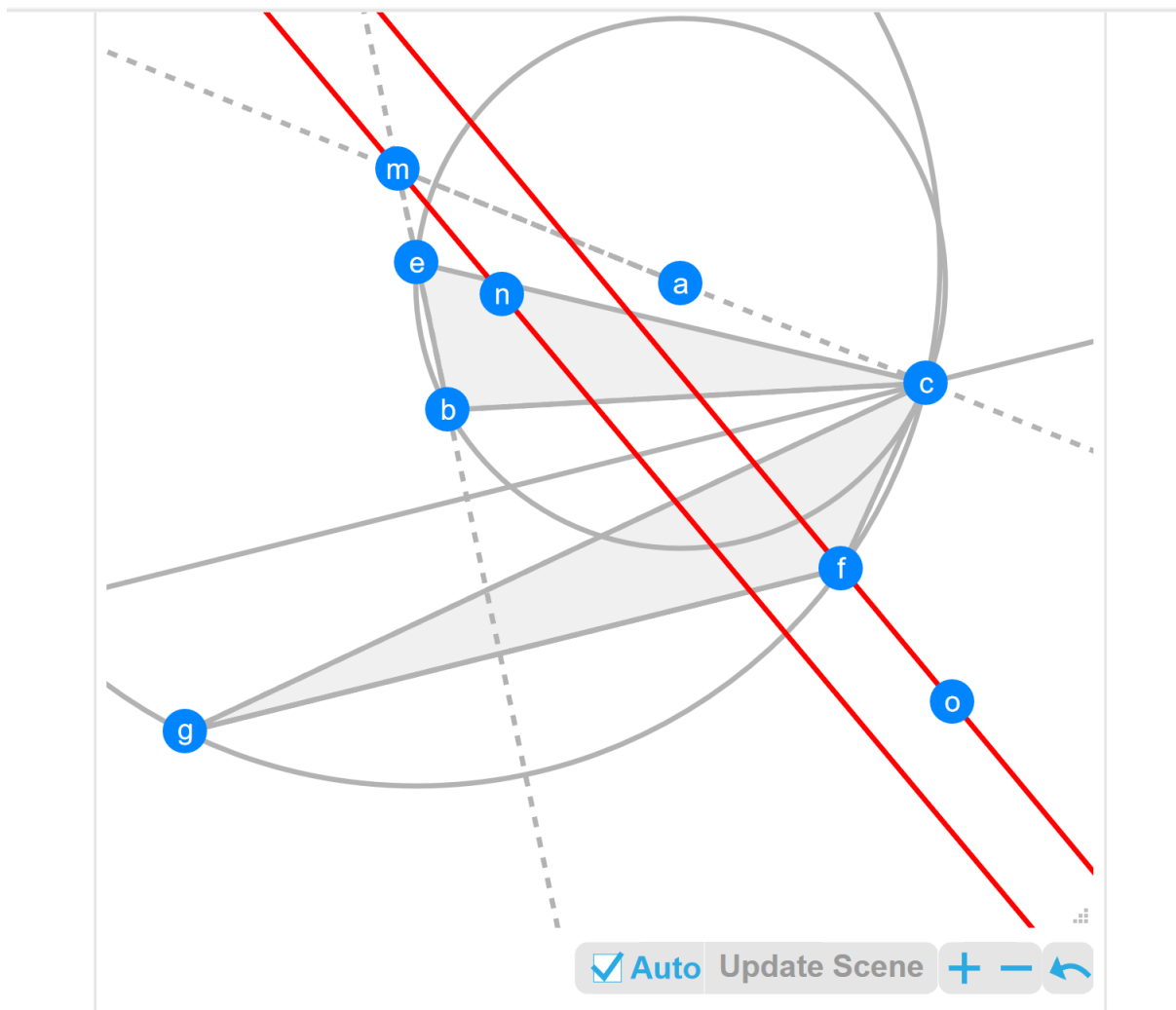
Let ecd be a triangle with circumcentre a . Let dgh be a triangle with circumcentre e . Let cop be a triangle with circumcentre e . Let dg be parallel to po . Let dc be parallel to ep . Let $L1$ be the angle bisector of hg and co . Let dg be parallel to $L1$. Prove ad is perpendicular to eh .



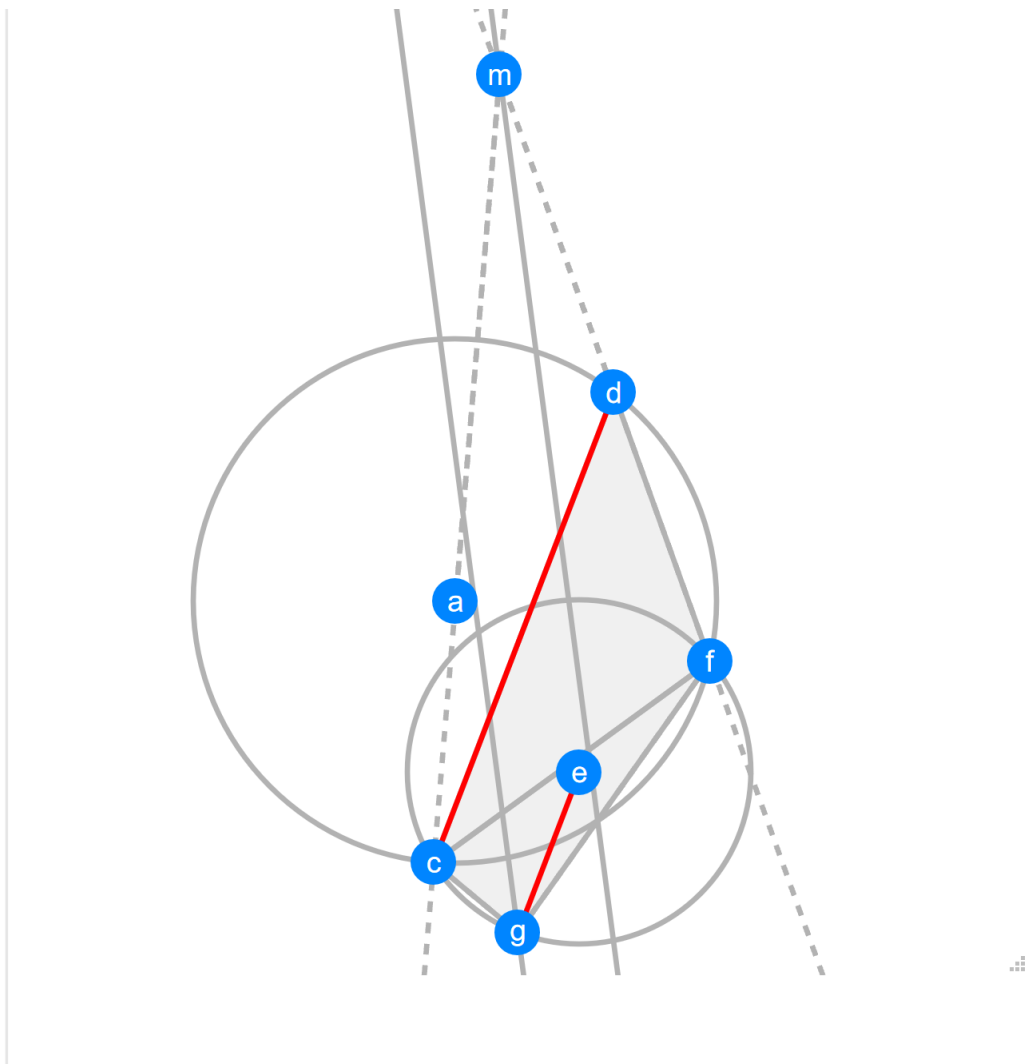
Let $bcge$ be a cyclic quadrilateral with centre a . Let $gemn$ be a cyclic quadrilateral with centre f . Let gn be parallel to em . Let bc be parallel to nm . Let ebf be collinear. Prove fm is parallel to gc .



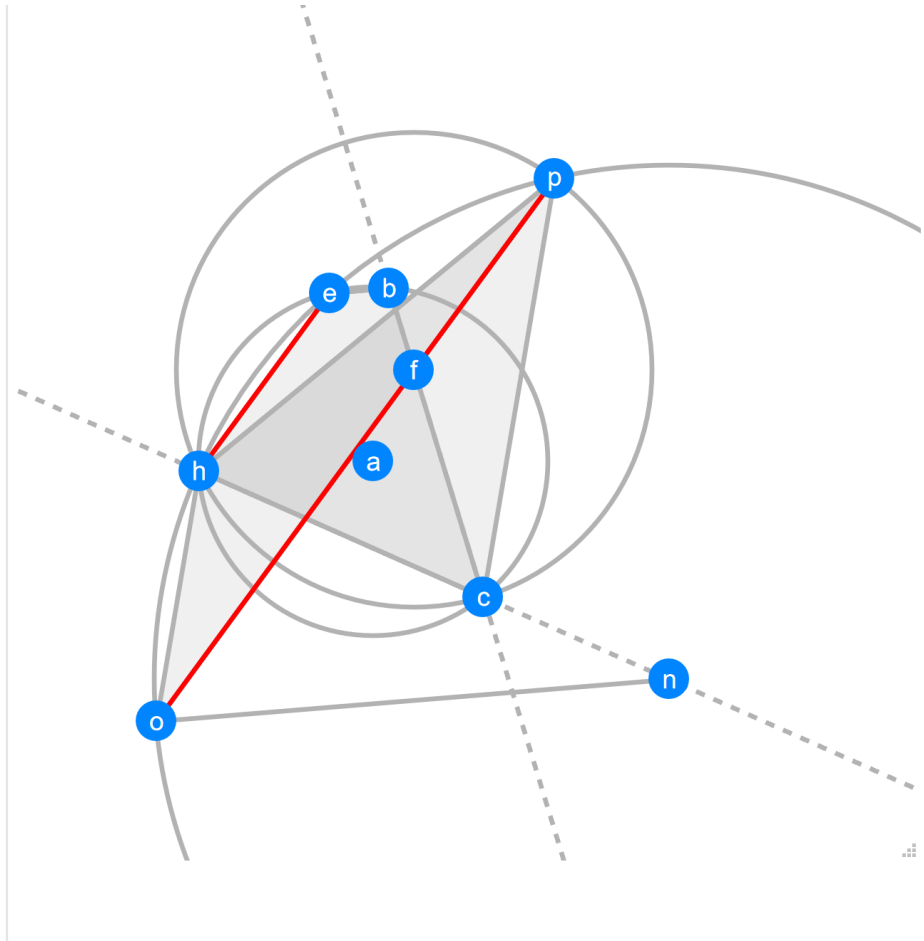
Let bed be a triangle with circumcentre a . Let dgh be a triangle with circumcentre e . Let ebh be collinear. Let $L1$ be the reflection of bd in dg . Let $L2$ be the reflection of ae in gh . Let $L3$ be the angle bisector of $L1$ and $L2$. Determine the angle between $\{e, g\}$ and $L3$.



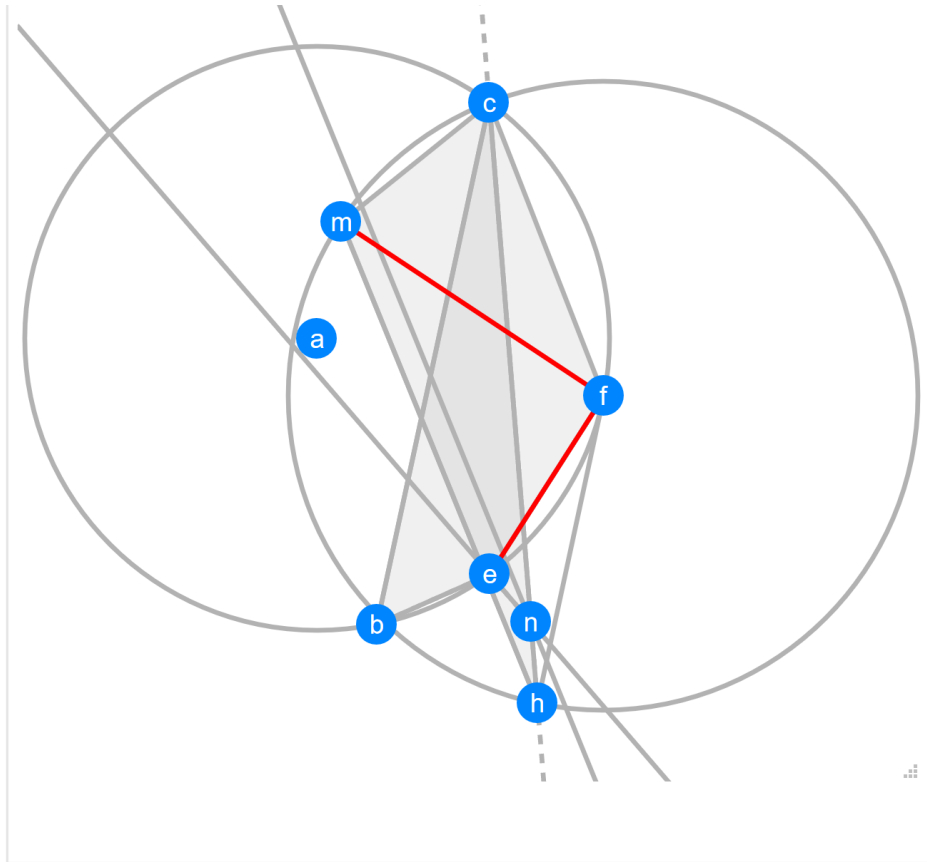
Let bce be a triangle with circumcentre a . Let fgc be a triangle with circumcentre e . Let L_1 be the angle bisector of cg and bc . Let fg be parallel to L_1 . Let L_2 be the angle bisector of ac and be . Let L_3 be the angle bisector of fg and fc . Determine the angle between L_2 and L_3 .



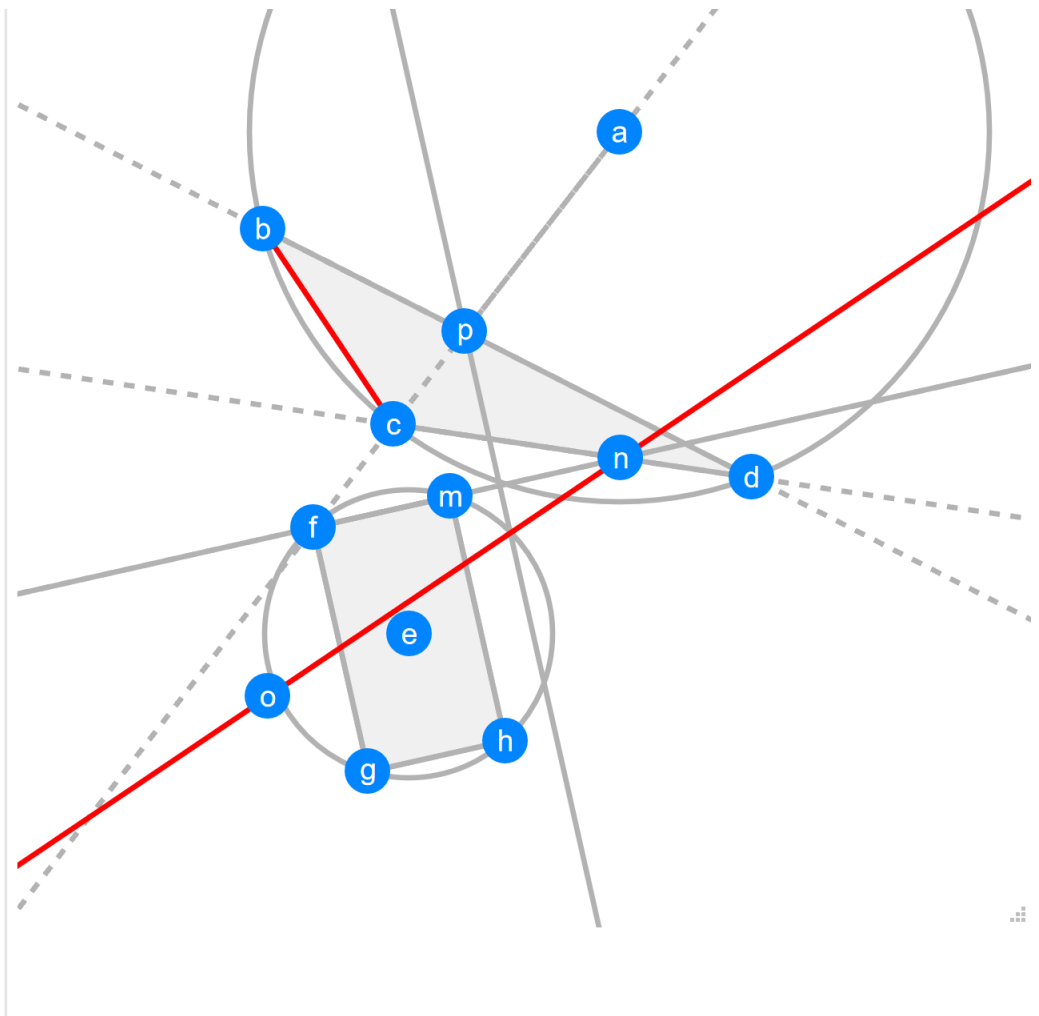
Let fcd be a triangle with circumcentre a . Let fgc be a triangle with circumcentre e . Let $L1$ be the angle bisector of fd and ac . Let $L2$ be the angle bisector of gc and fg . Let $L1$ be parallel to $L2$. Prove eg is parallel to cd .



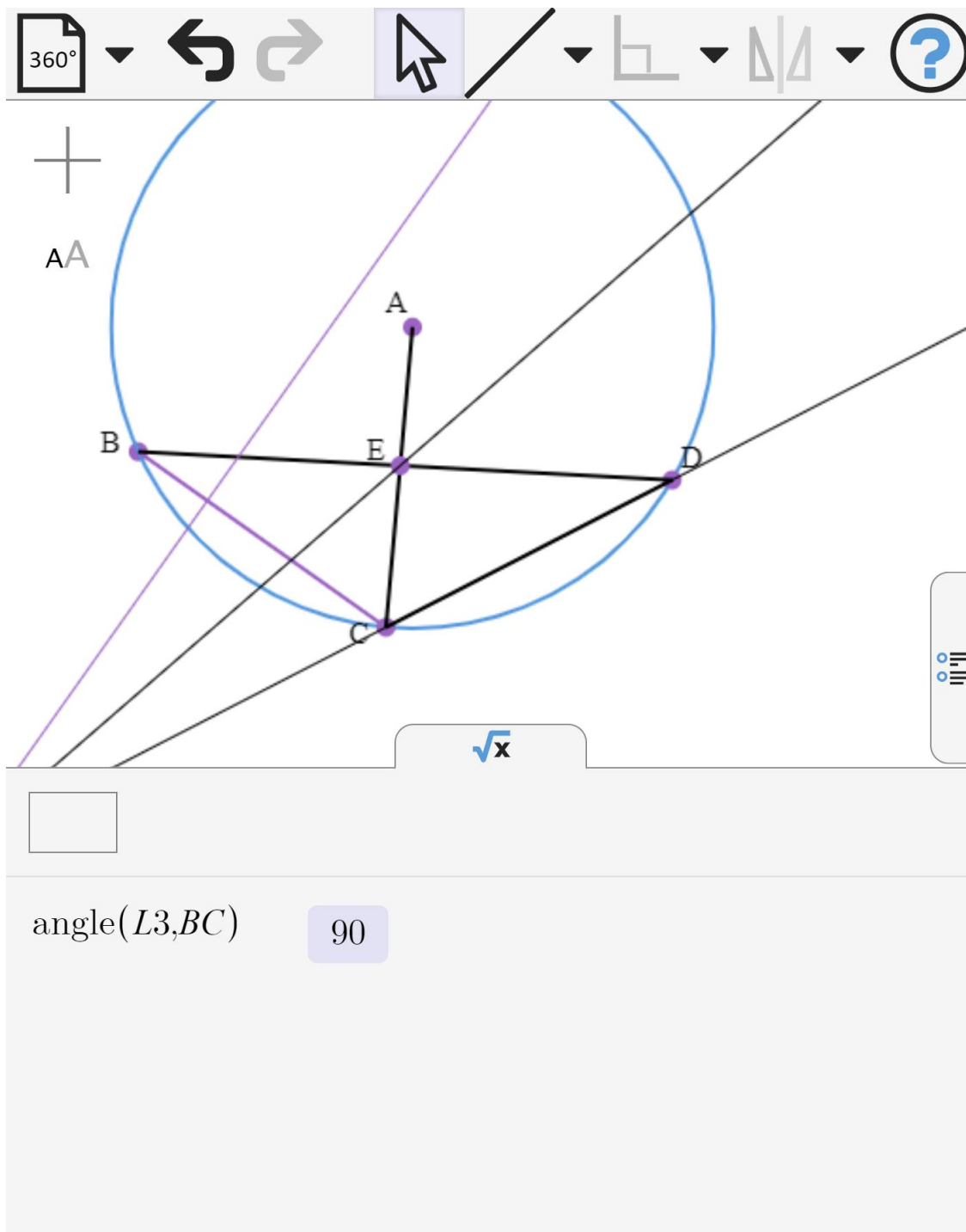
Let $bche$ be a cyclic quadrilateral with centre a . Let phc be a triangle with circumcentre f . Let he be parallel to fp . Let cbf be collinear. Let oph be a triangle with circumcentre n . Let be be parallel to no . Let hcn be collinear. Prove he is parallel to op .

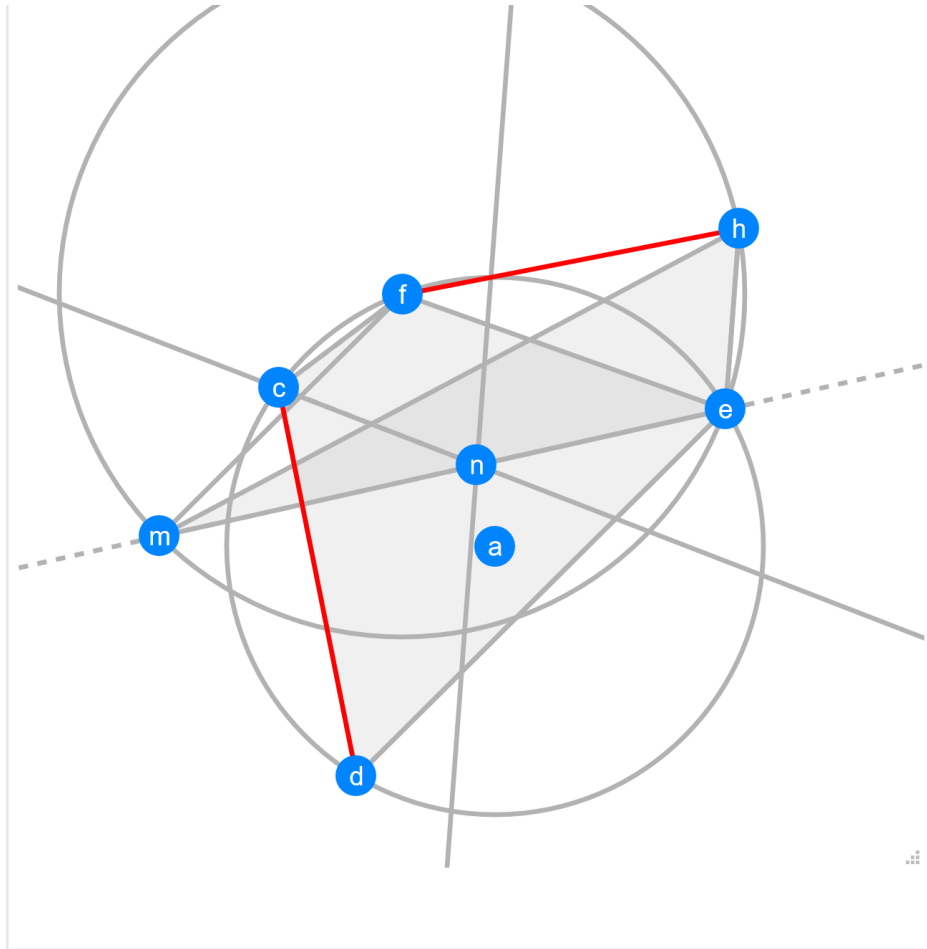


Let $bcfe$ be a cyclic quadrilateral with centre a . Let chm be a triangle with circumcentre f . Let bc be parallel to fh . Let L_1 be the angle bisector of be and fe . Let L_2 be the angle bisector of L_1 and ch . Let mh be parallel to L_2 . Prove fe is perpendicular to fm .

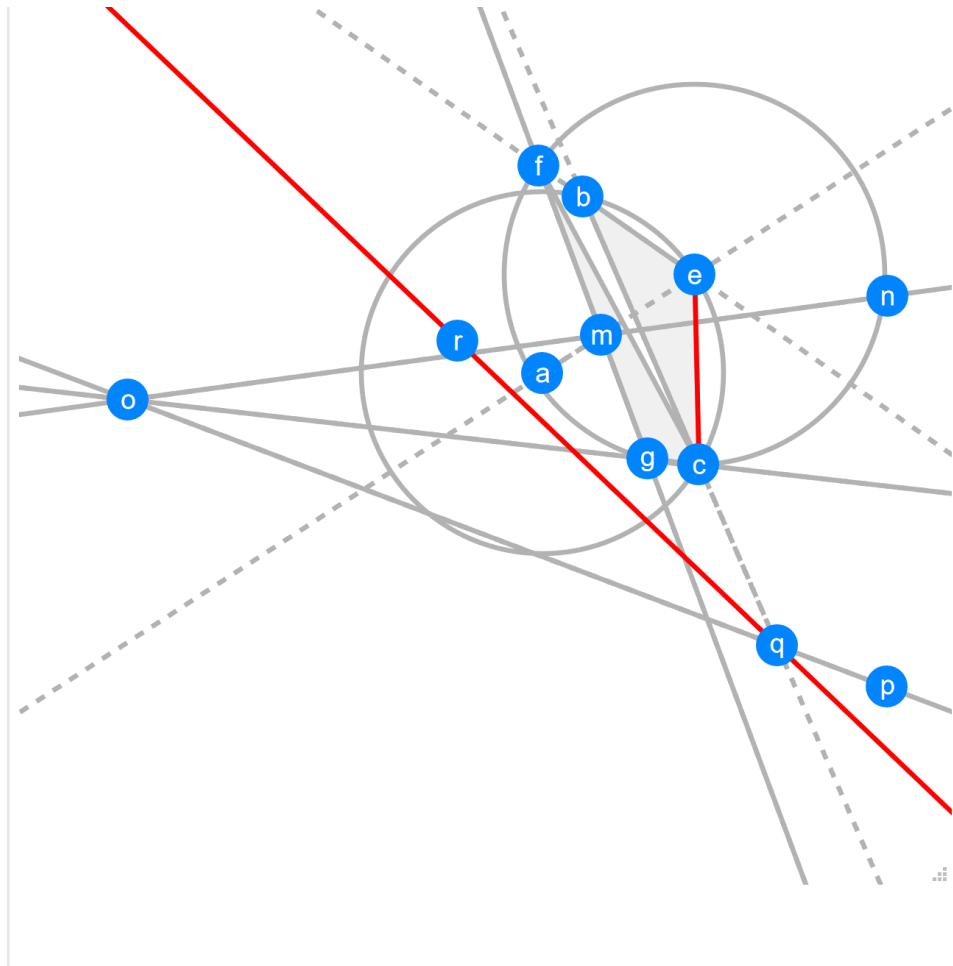


Let bcd be a triangle with circumcentre a . Let $fghm$ be a cyclic quadrilateral with centre e . Let fm be parallel to hg . Let fg be parallel to mh . Let $L1$ be the reflection of dc in fm . Let $L2$ be the angle bisector of ac and bd . Let fg be parallel to $L2$. Prove $L1$ is perpendicular to bc .

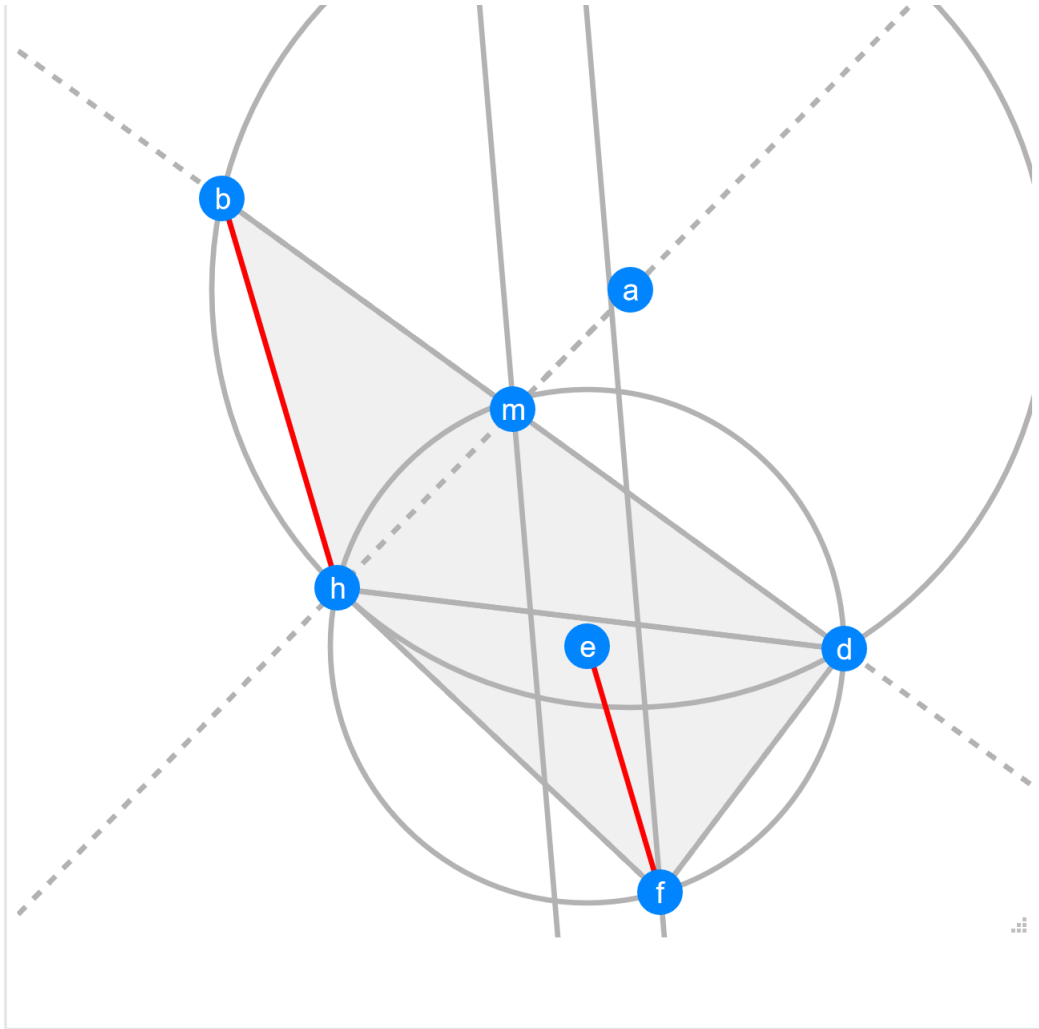




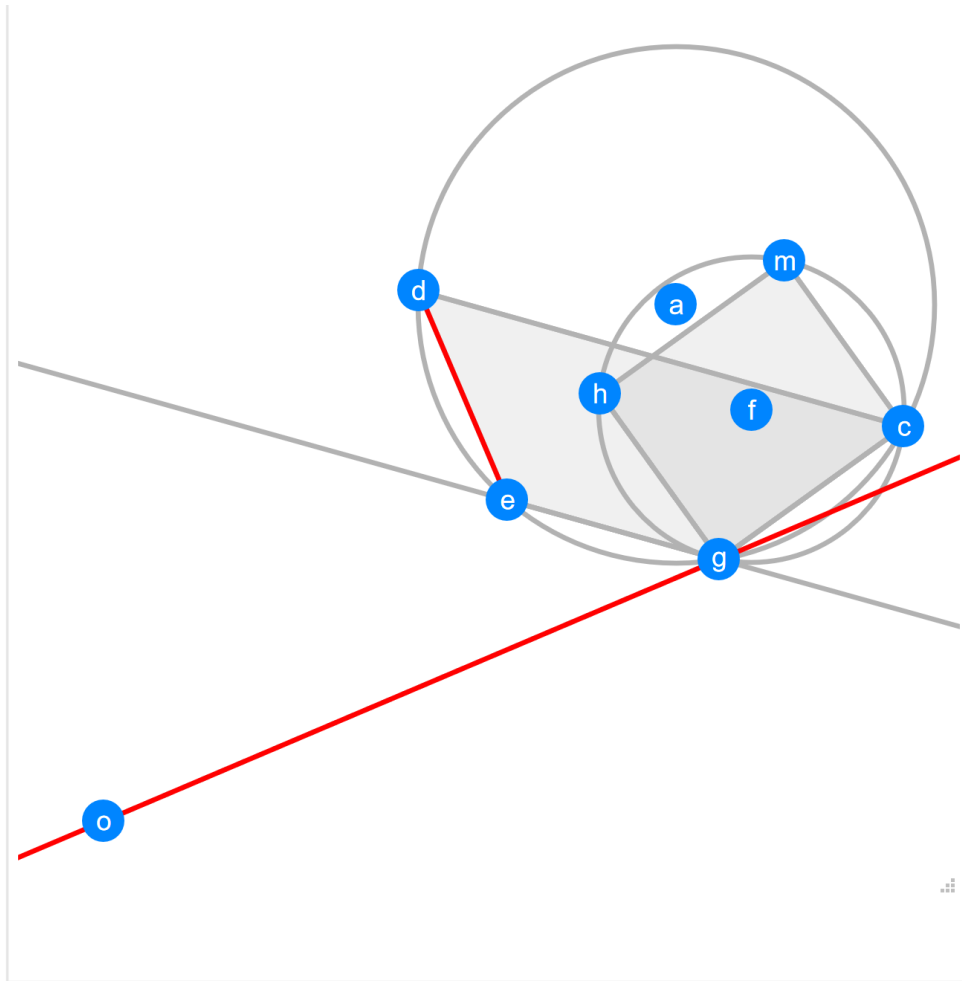
Let $fcde$ be a cyclic quadrilateral with centre a . Let ehm be a triangle with circumcentre f . Let de be parallel to fm . Let $L1$ be the angle bisector of fc and dc . Let $L2$ be the angle bisector of me and $L1$. Let eh be parallel to $L2$. Prove dc is perpendicular to fh .



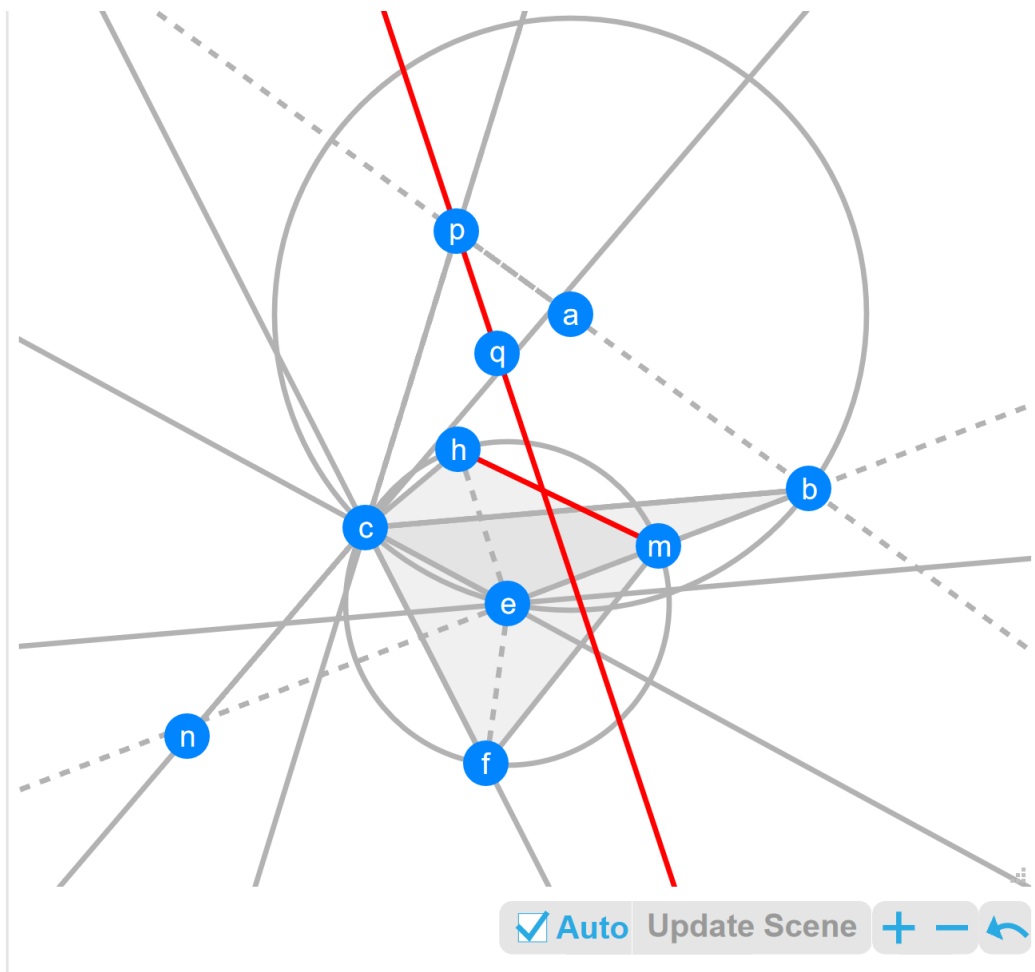
Let bce be a triangle with circumcentre a . Let fgc be a triangle with circumcentre e . Let ebf be collinear. Let $L1$ be the reflection of ae in fg . Let $L2$ be the reflection of $L1$ in gc . Let $L3$ be the angle bisector of $L2$ and bc . Determine the angle between $\{e, c\}$ and $L3$.



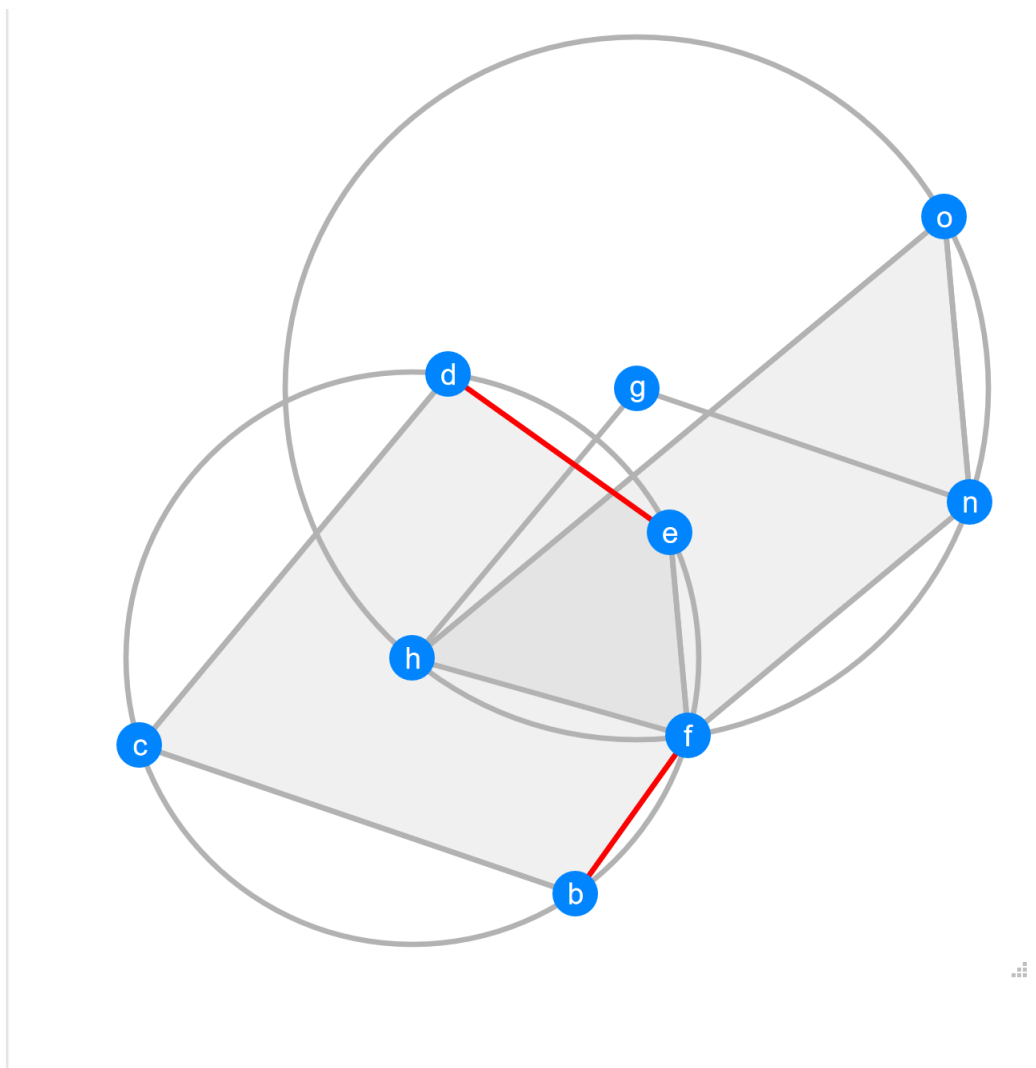
Let bhd be a triangle with circumcentre a . Let fdh be a triangle with circumcentre e . Let $L1$ be the angle bisector of bd and ah . Let $L2$ be the angle bisector of hf and fd . Let $L1$ be parallel to $L2$. Prove ef is parallel to bh .



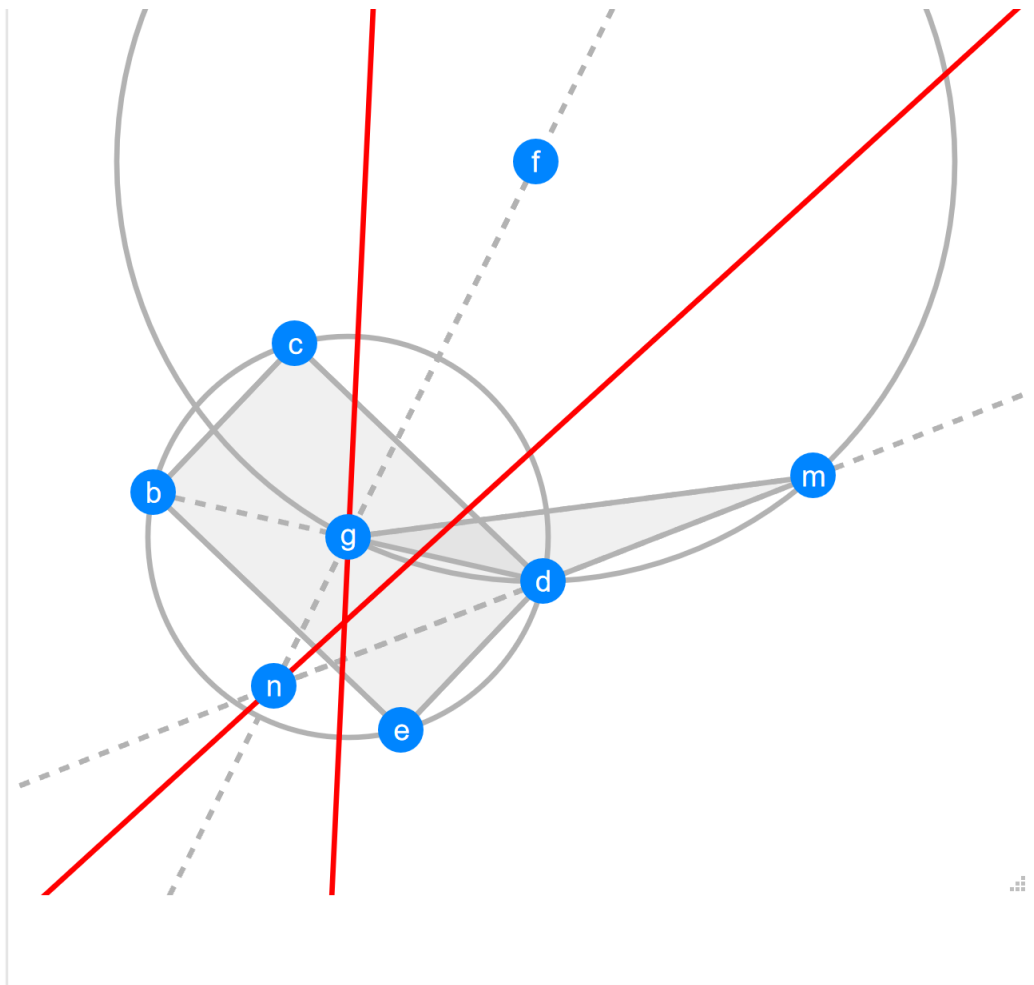
Let $gcde$ be a cyclic quadrilateral with centre a . Let ge be parallel to dc . Let $ghmc$ be a cyclic quadrilateral with centre f . Let gc be parallel to mh . Let gh be parallel to cm . Let L_1 be the reflection of gh in ge . Prove L_1 is perpendicular to ed .



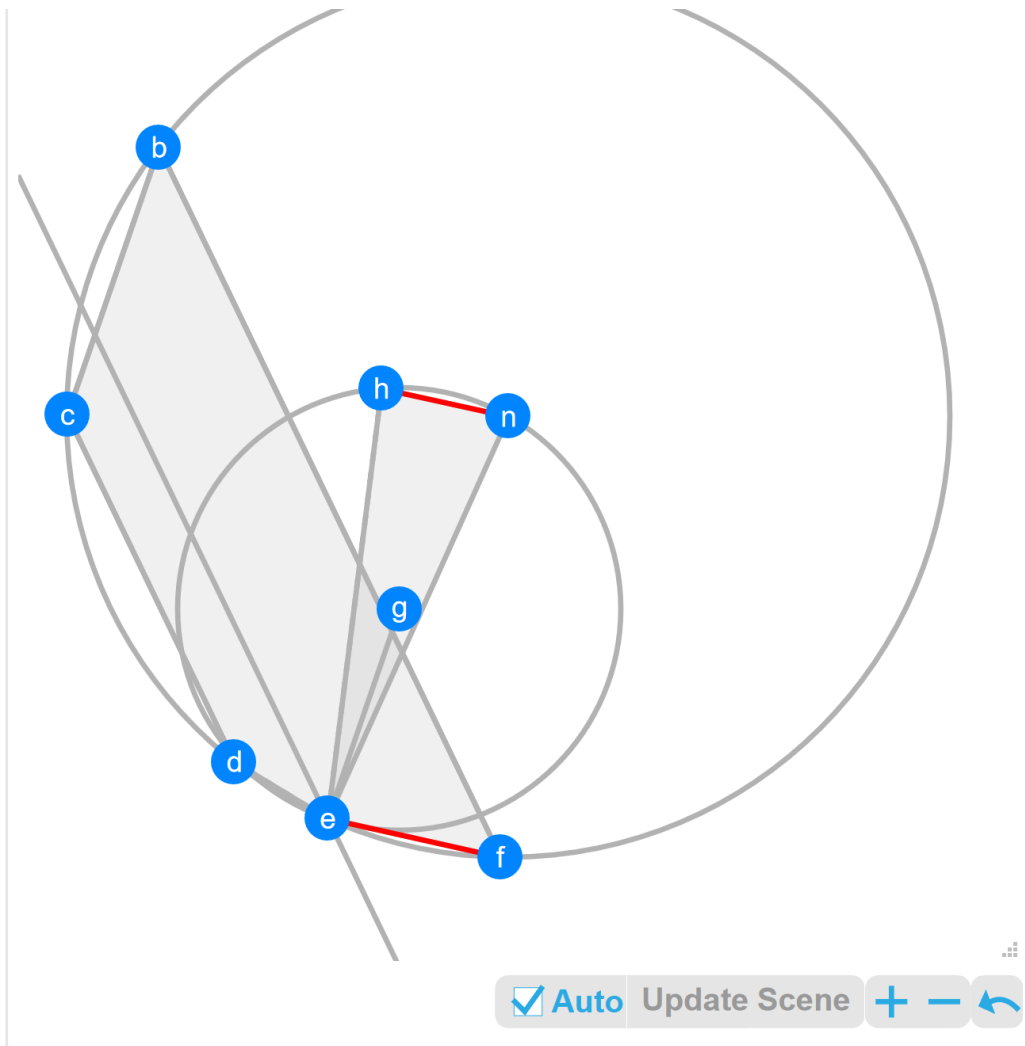
Let bce be a triangle with circumcentre a . Let $fchm$ be a cyclic quadrilateral with centre e . Let ebm be collinear. Let L_1 be the angle bisector of eh and ef . Let bc be parallel to L_1 . Let L_2 be the reflection of bc in fc . Let L_3 be the reflection of L_2 in ec . Let L_4 be the angle bisector of L_3 and ab . Determine the angle between L_4 and $\{h, m\}$.



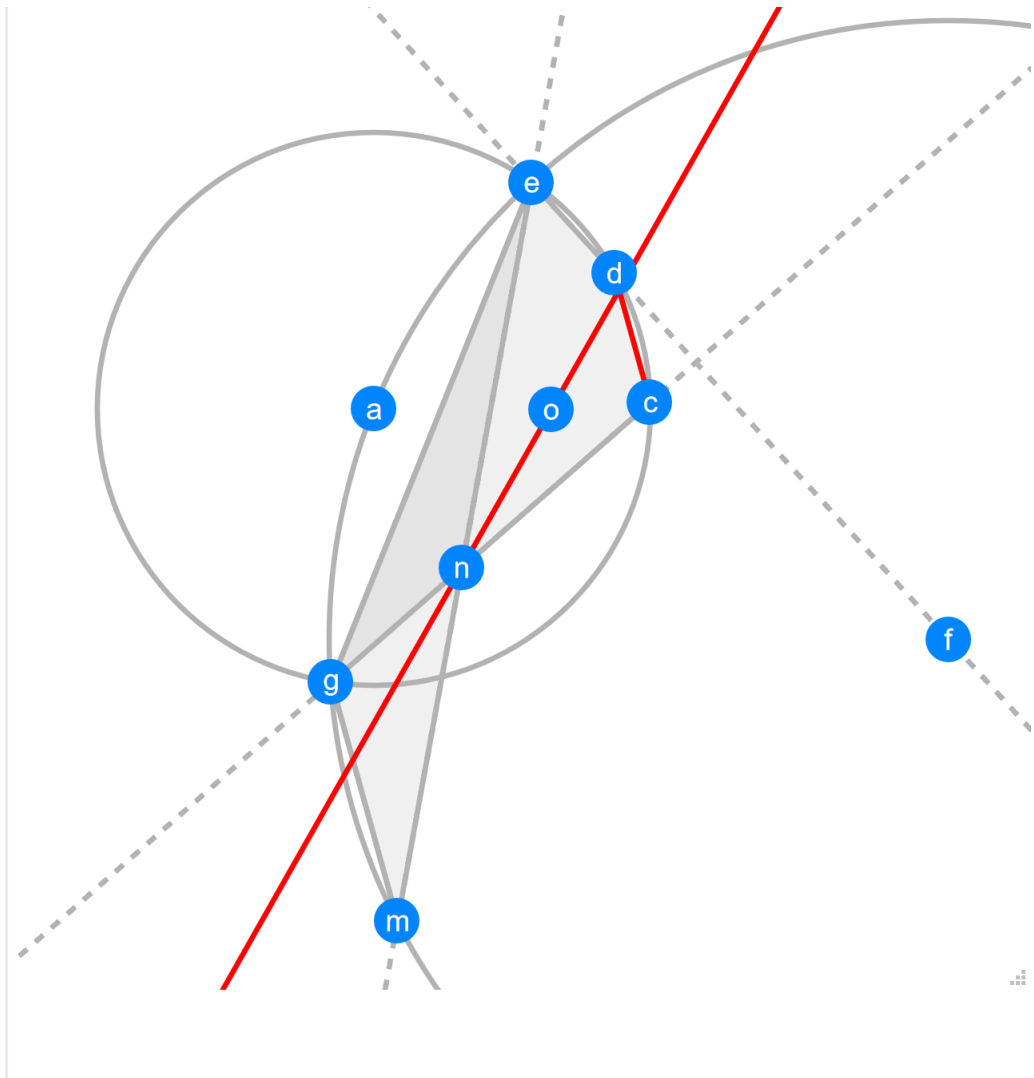
Let $bcdef$ be a cyclic pentagon with centre h . Let $hfno$ be a cyclic quadrilateral with centre g . Let oh be parallel to nf . Let fe be parallel to on . Let dc be parallel to gh . Let bc be parallel to gn . Prove bf is perpendicular to de .



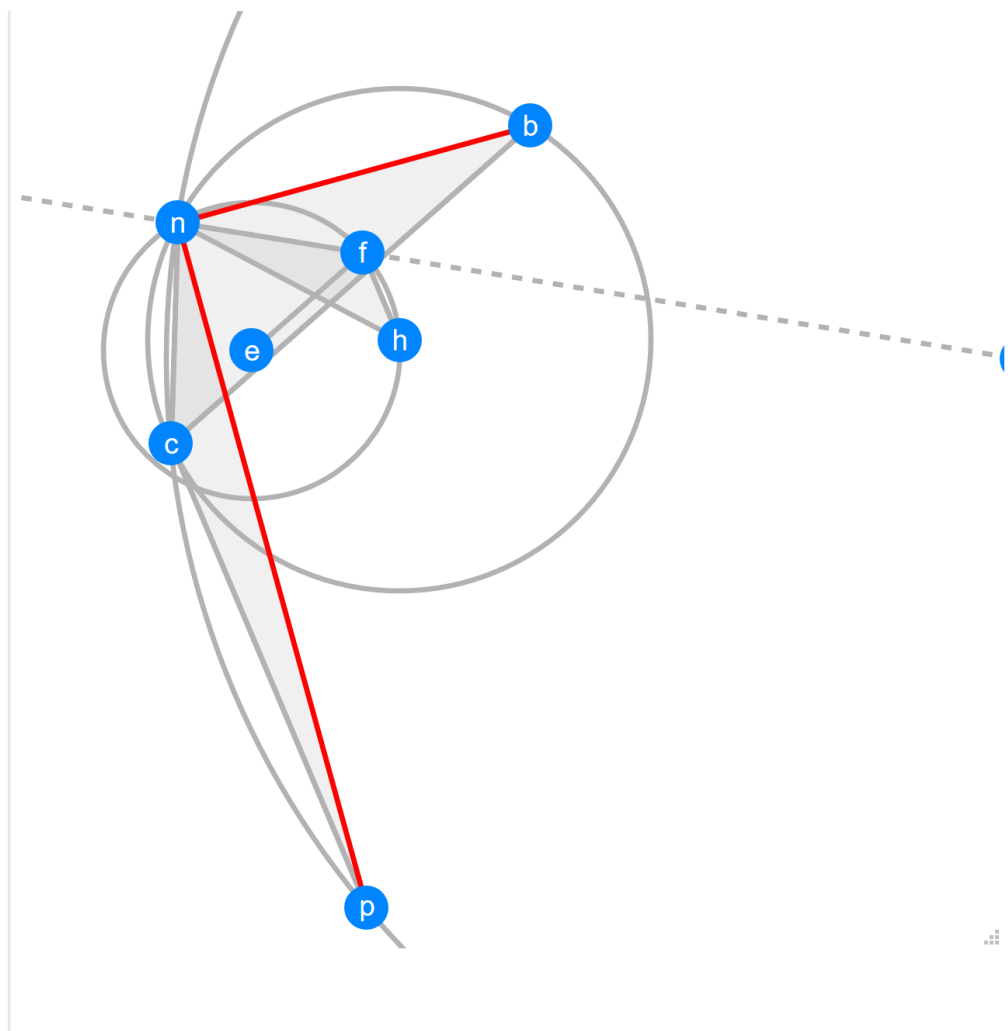
Let $bcde$ be a cyclic quadrilateral with centre g .
 Let eb be parallel to cd . Let bc be parallel to ed . Let
 gdm be a triangle with circumcentre f . Let $L1$ be the
 angle bisector of md and fg . Let $L2$ be the angle bisector
 of gb and gm . Determine the angle between $L1$ and $L2$.



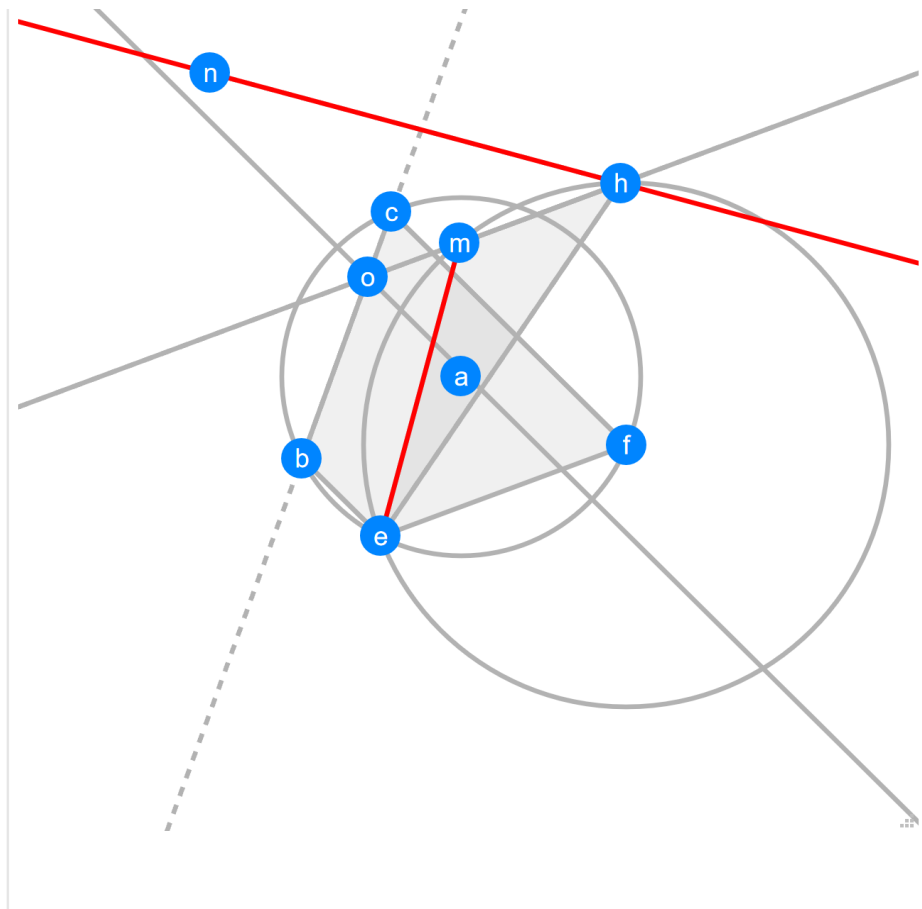
Let $bcdef$ be a cyclic pentagon with centre n . Let bf be parallel to dc . Let hen be a triangle with circumcentre g . Let bc be parallel to ge . Let L_1 be the angle bisector of he and ed . Let bf be parallel to L_1 . Prove hn is parallel to fe .



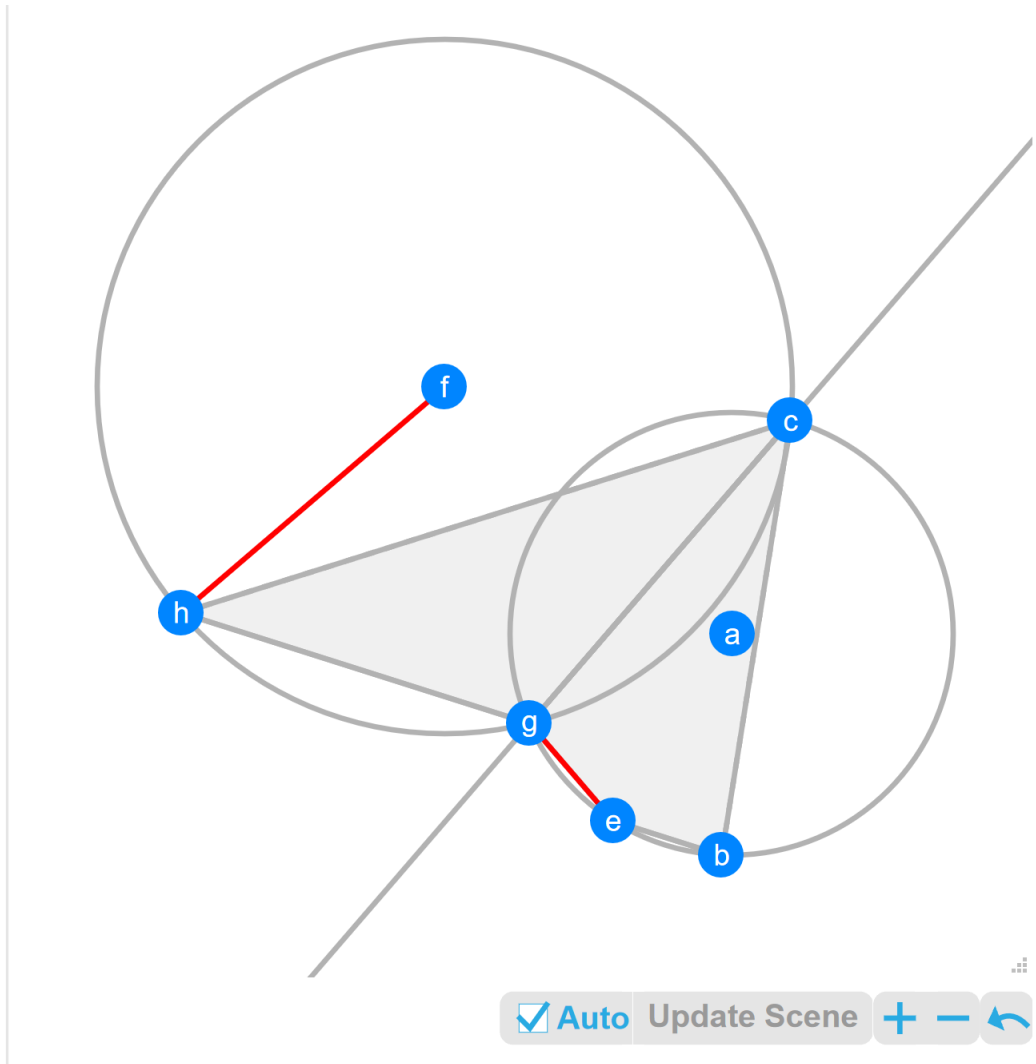
Let $gcde$ be a cyclic quadrilateral with centre a . Let gem be a triangle with circumcentre f . Let dc be parallel to gm . Let edf be collinear. Let $L1$ be the angle bisector of em and gc . Determine the angle between $\{d, c\}$ and $L1$.



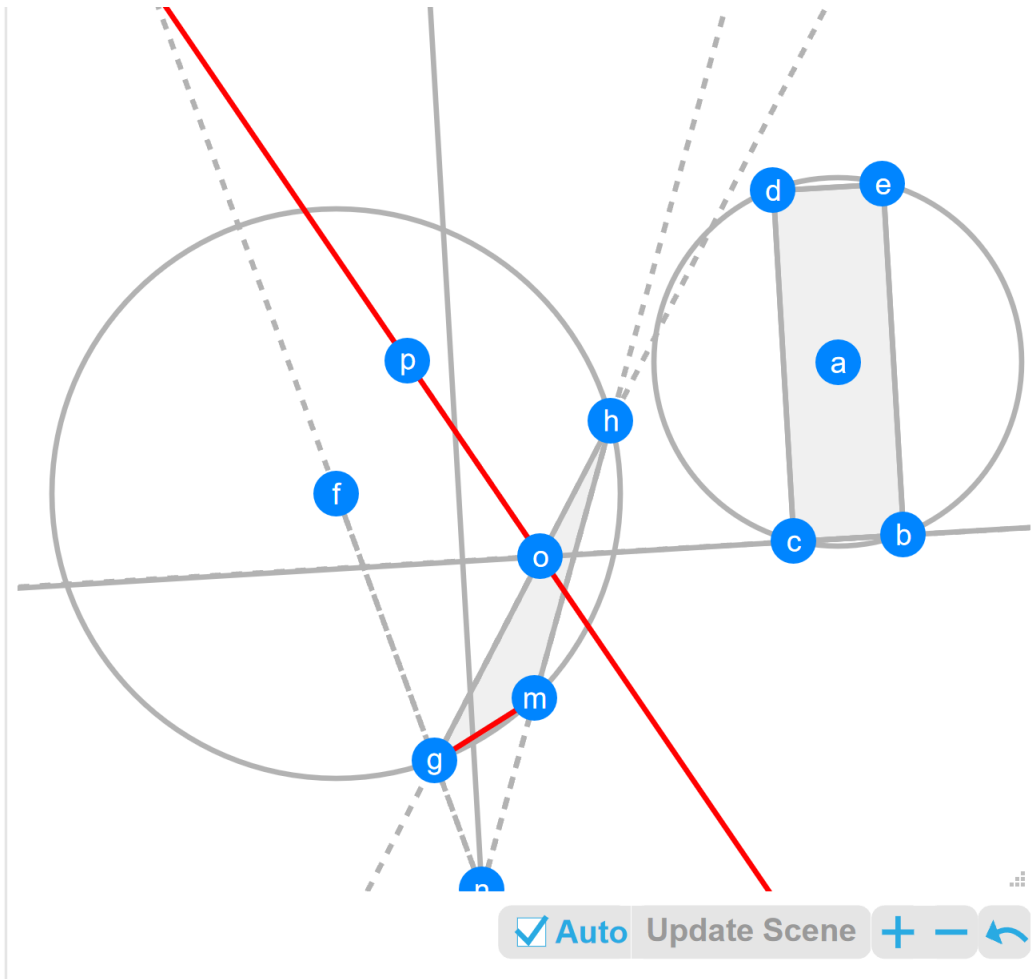
Let bcn be a triangle with circumcentre h . Let fnh be a triangle with circumcentre e . Let bc be parallel to ef . Let ncp be a triangle with circumcentre m . Let hf be parallel to pc . Let nfm be collinear. Determine the angle between bn and pn . (139.566)



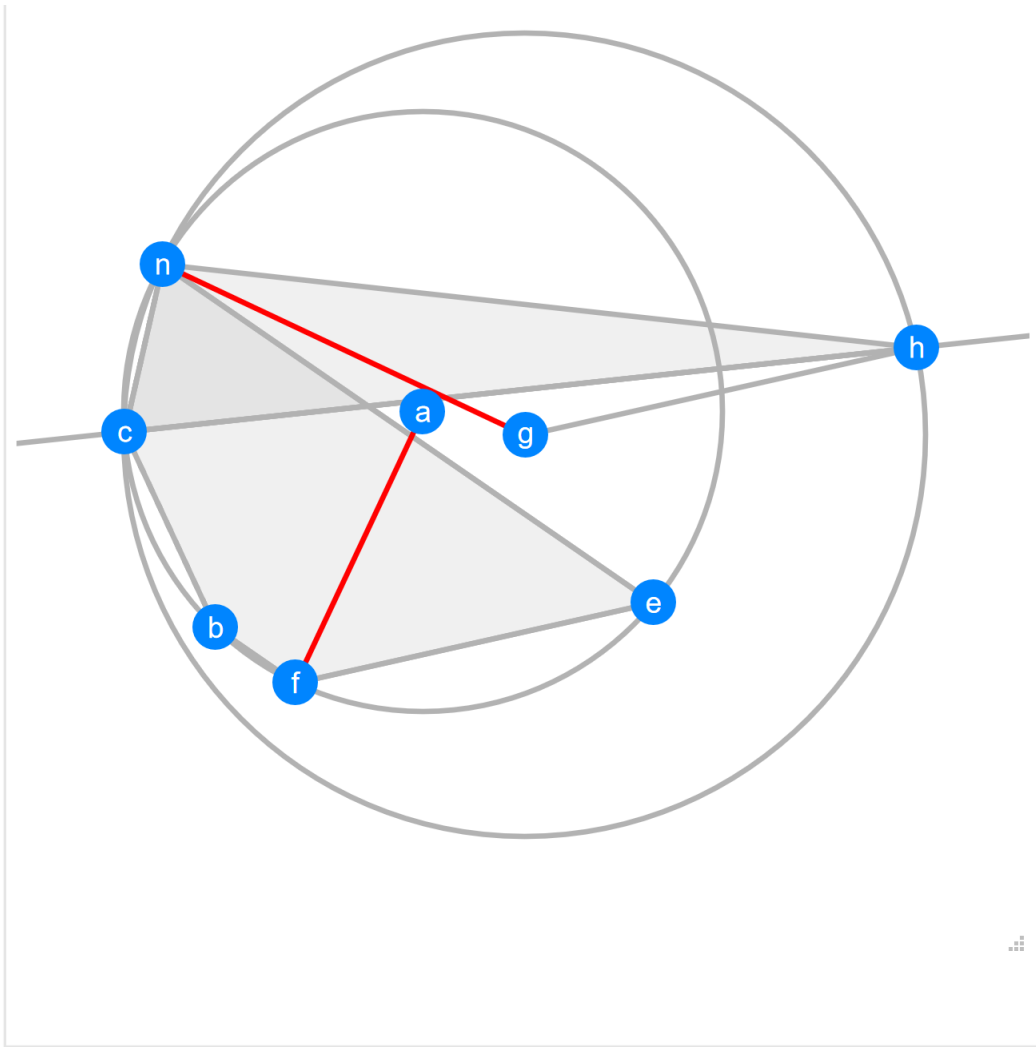
Let $bcfe$ be a cyclic quadrilateral with centre a . Let be be parallel to fc . Let ehm be a triangle with circumcentre f . Let $L1$ be the reflection of eh in hm . Let $L2$ be the angle bisector of hm and bc . Let be be parallel to $L2$. Prove $L1$ is perpendicular to me .



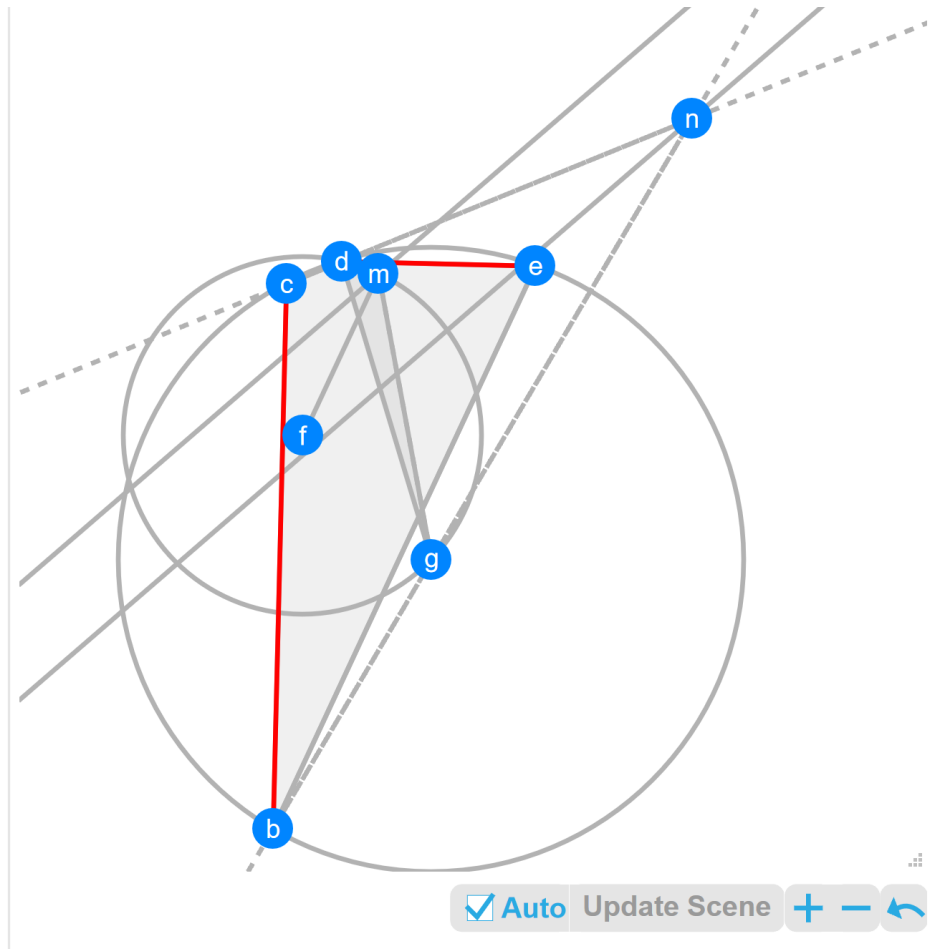
Let $bcge$ be a cyclic quadrilateral with centre a . Let ghc be a triangle with circumcentre f . Let bc be parallel to gh . Let L_1 be the angle bisector of hc and bc . Let ge be parallel to L_1 . Prove fh is perpendicular to ge .



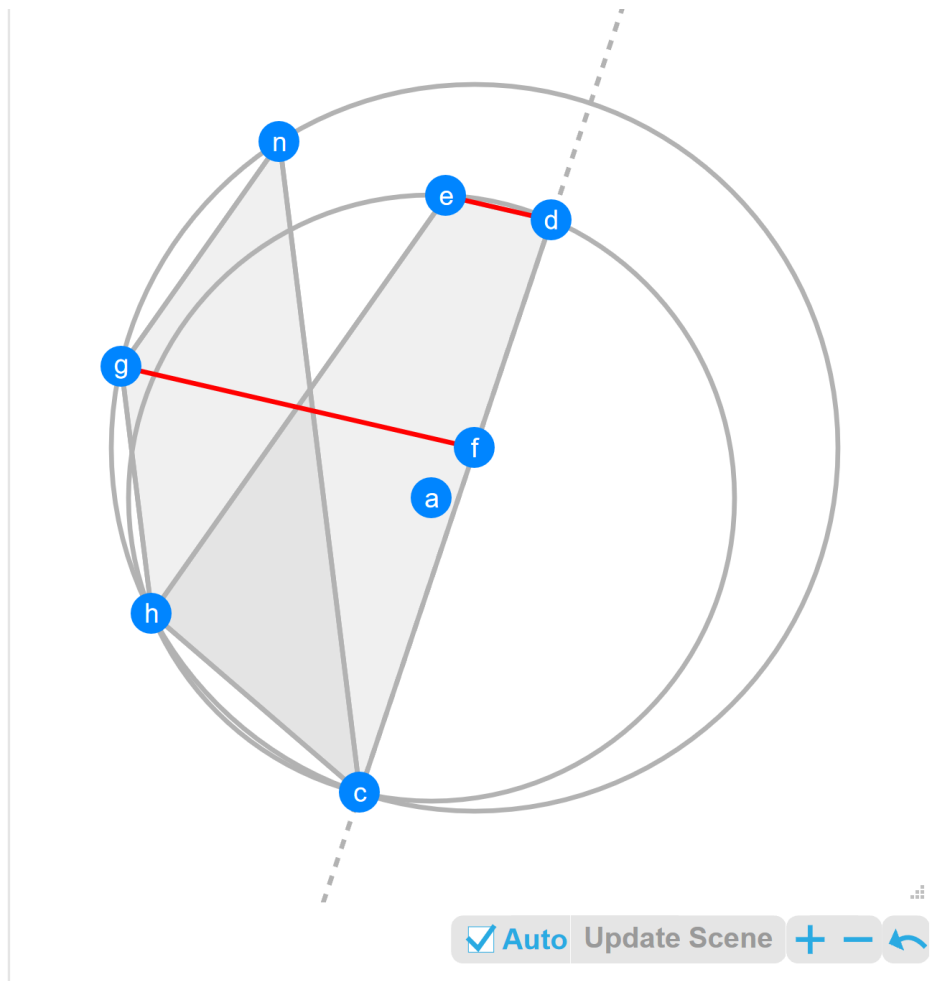
Let $bcde$ be a cyclic quadrilateral with centre a . Let be be parallel to dc . Let bc be parallel to ed . Let ghm be a triangle with circumcentre f . Let L_1 be the angle bisector of fg and hm . Let be be parallel to L_1 . Let L_2 be the reflection of gh in bc . Prove L_2 is perpendicular to mg .



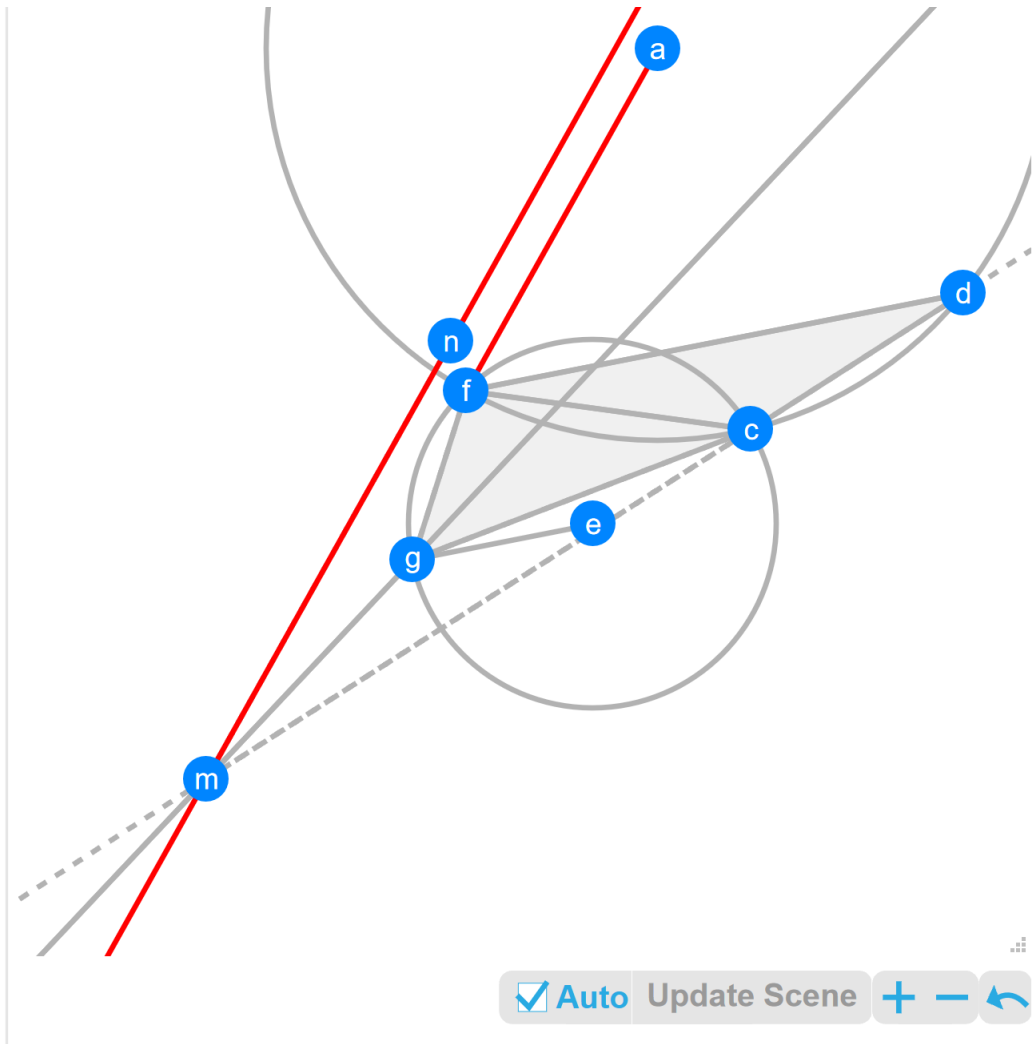
Let $bcnef$ be a cyclic pentagon with centre a . Let bf be parallel to ne . Let hcn be a triangle with circumcentre g . Let ef be parallel to gh . Let L_1 be the angle bisector of bc and nc . Let hc be parallel to L_1 . Prove af is perpendicular to gn .



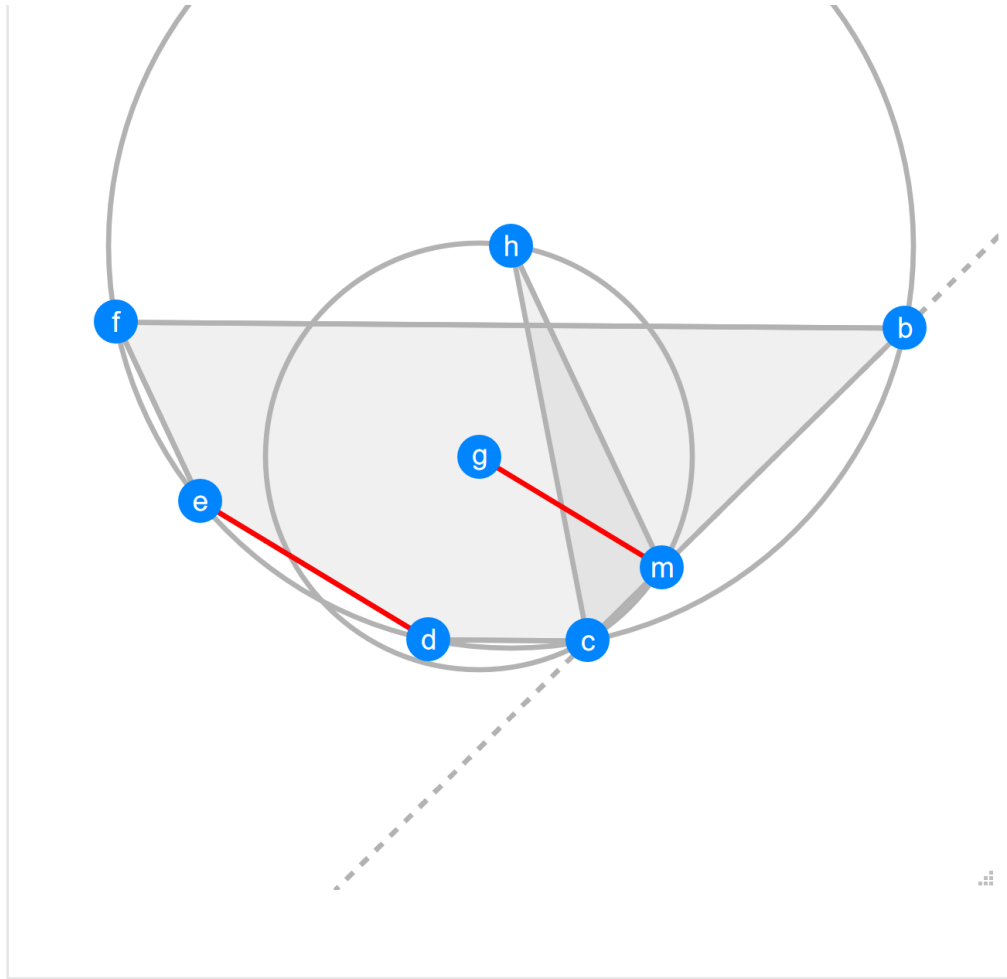
Let $bcde$ be a cyclic quadrilateral with centre g . Let gdm be a triangle with circumcentre f . Let eb be parallel to fm . Let L_1 be the angle bisector of gb and dc . Let L_2 be the angle bisector of gm and md . Let L_1 be parallel to L_2 . Prove bc is perpendicular to ed .



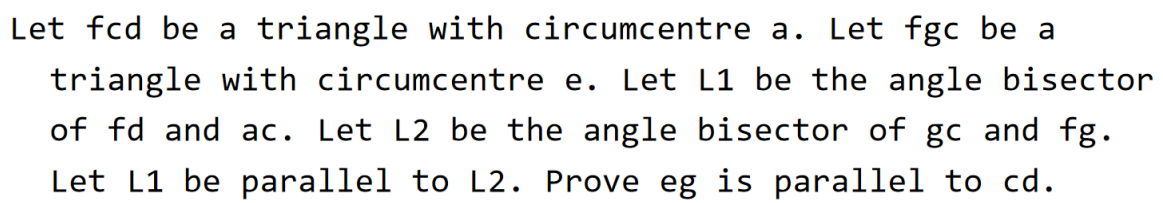
Let $hcde$ be a cyclic quadrilateral with centre a . Let $ghcn$ be a cyclic quadrilateral with centre f . Let he be parallel to ng . Let gh be parallel to nc . Let cdf be collinear. Prove fg is parallel to de .

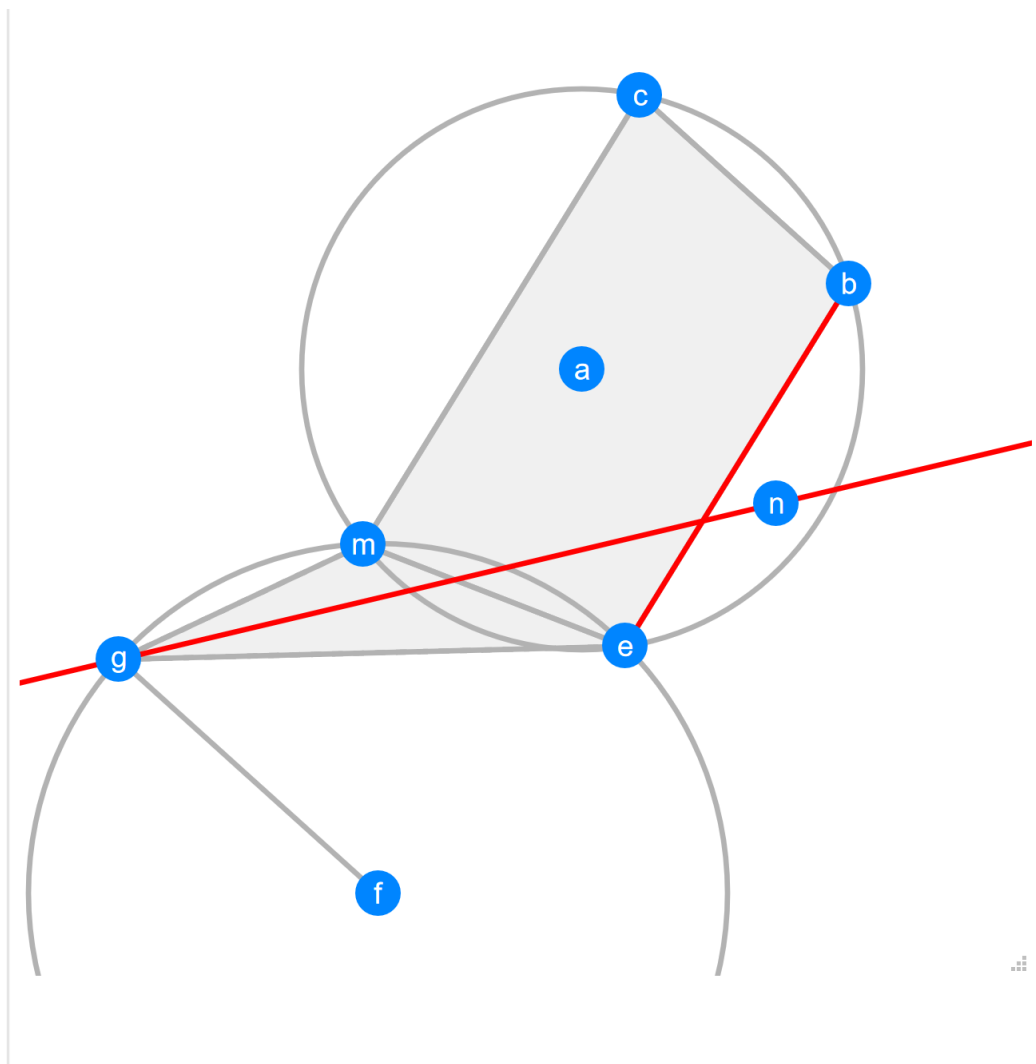


Let fcd be a triangle with circumcentre a . Let fgc be a triangle with circumcentre e . Let df be parallel to eg . Let $L1$ be the angle bisector of gc and fg . Let $L2$ be the reflection of dc in $L1$. Prove af is parallel to $L2$.

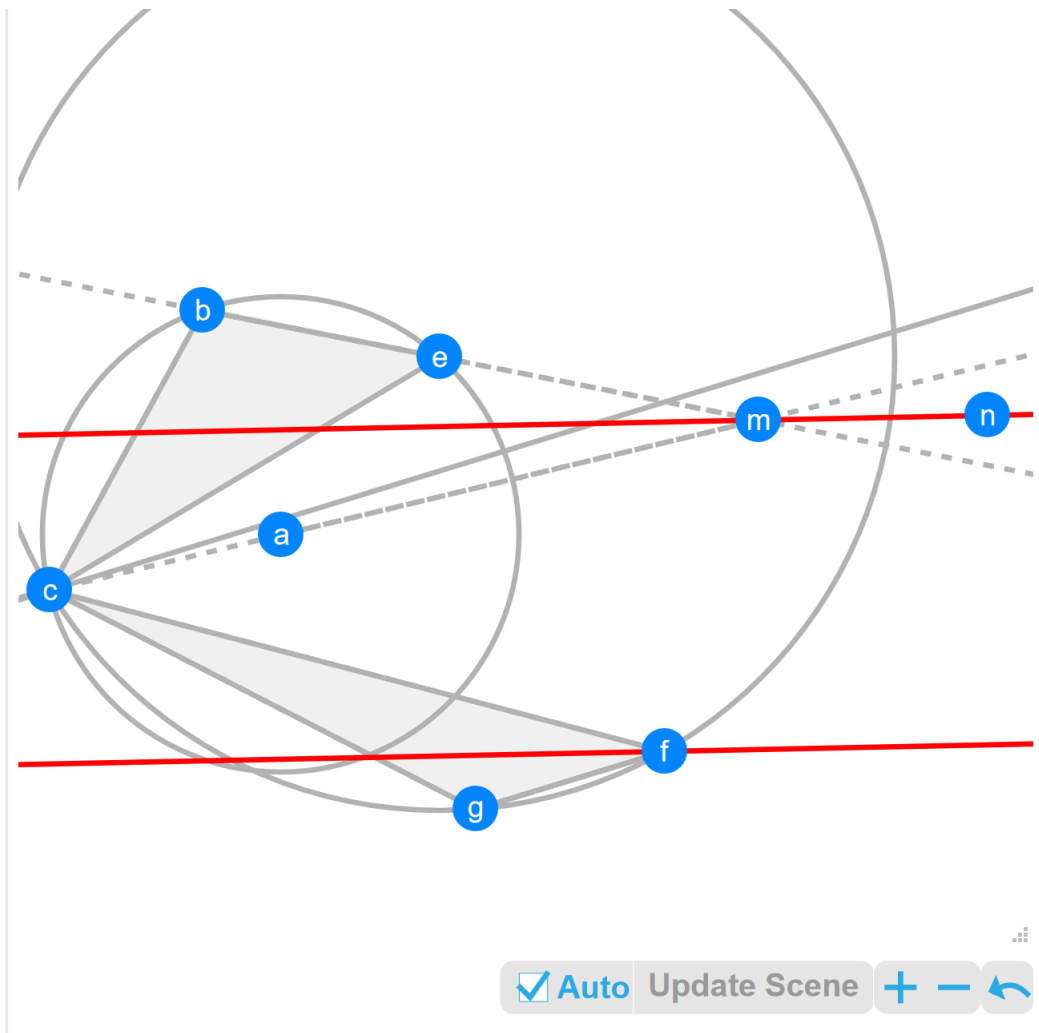


Let $bcdef$ be a cyclic pentagon with centre h . Let bf be parallel to cd . Let hmc be a triangle with circumcentre g . Let fe be parallel to hm . Let cbm be collinear. Prove gm is parallel to de .

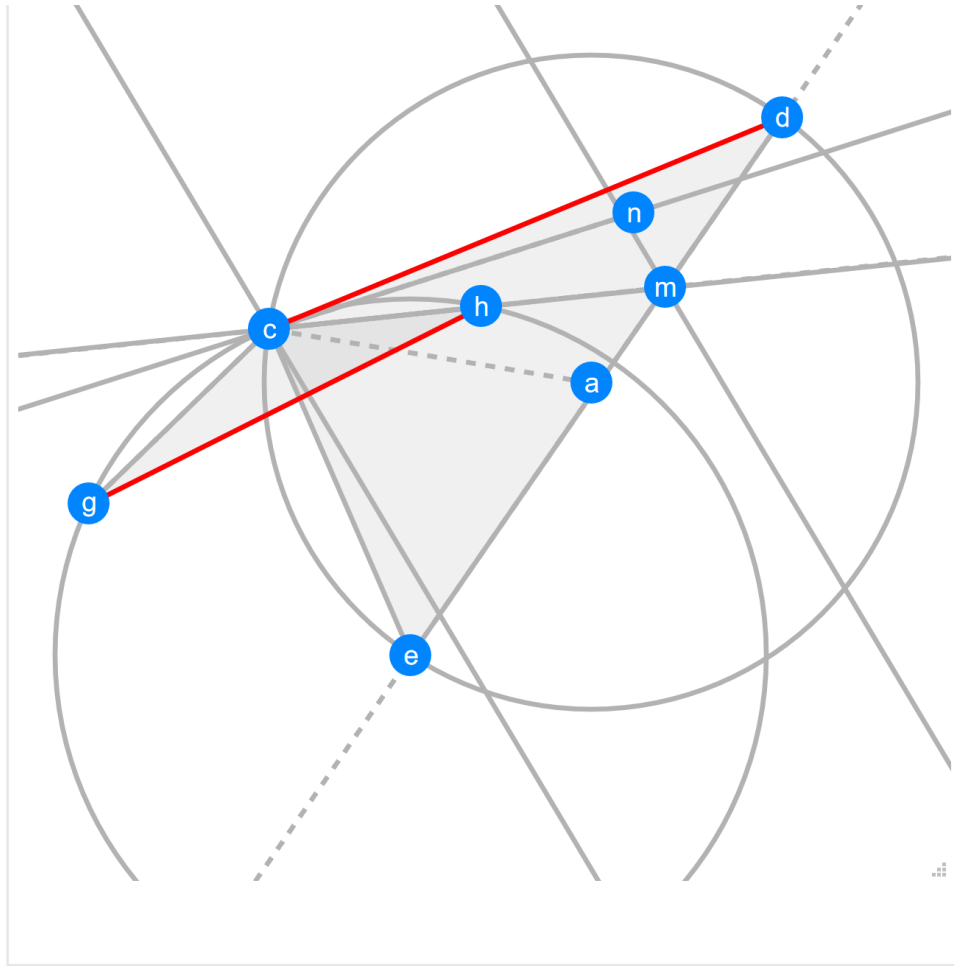




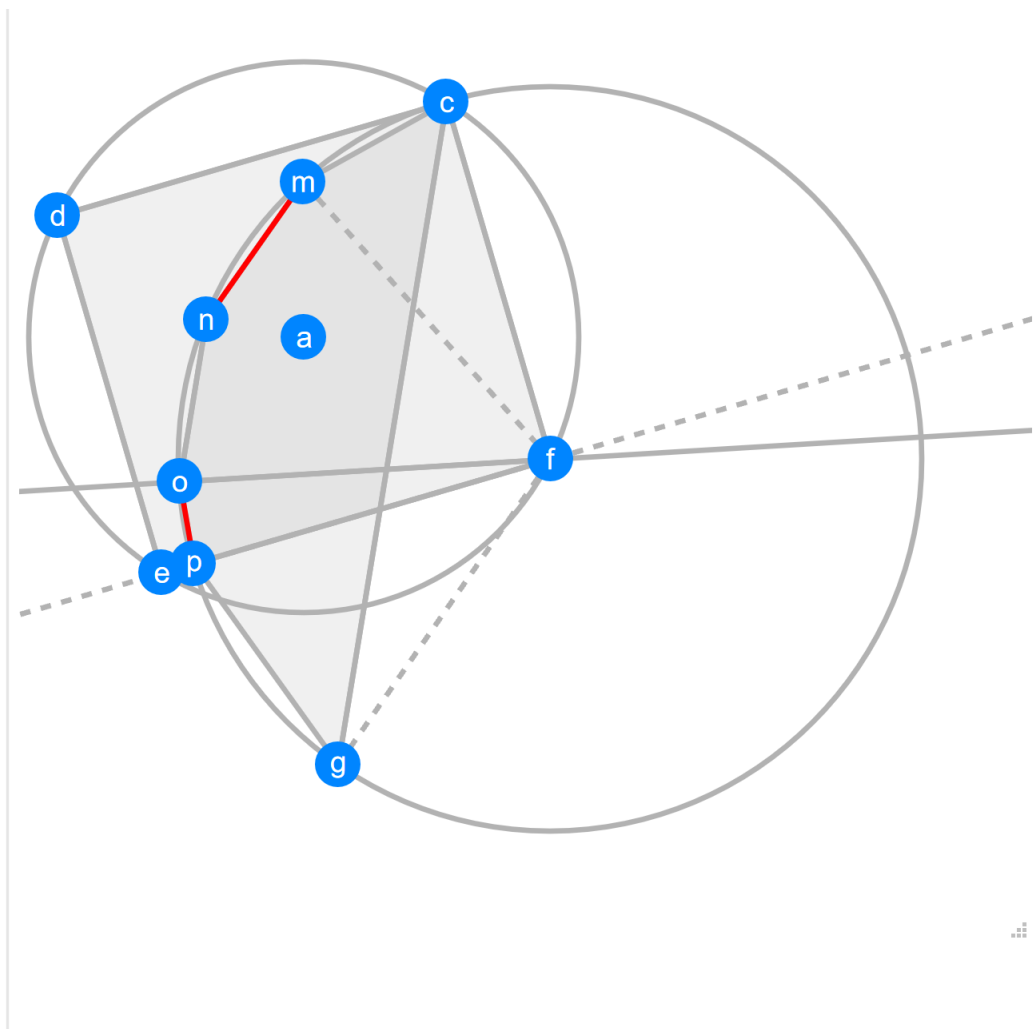
Let $bcme$ be a cyclic quadrilateral with centre a . Let be be parallel to mc . Let gem be a triangle with circumcentre f . Let bc be parallel to fg . Let L_1 be the angle bisector of mg and ge . Determine the angle between $\{b, e\}$ and L_1 .



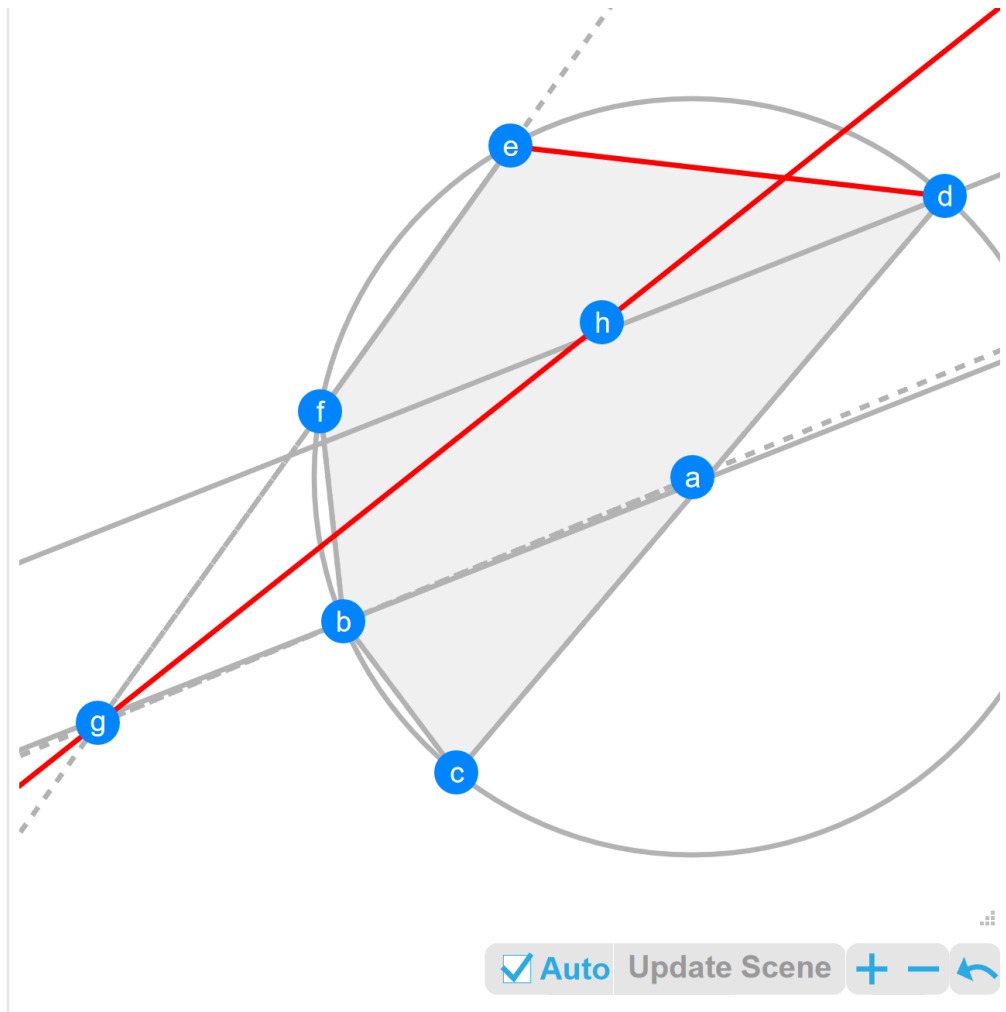
Let bce be a triangle with circumcentre a . Let fgc be a triangle with circumcentre e . Let $L1$ be the angle bisector of cg and bc . Let fg be parallel to $L1$. Let $L2$ be the angle bisector of ac and be . Let $L3$ be the angle bisector of fg and fc . Determine the angle between $L2$ and $L3$.



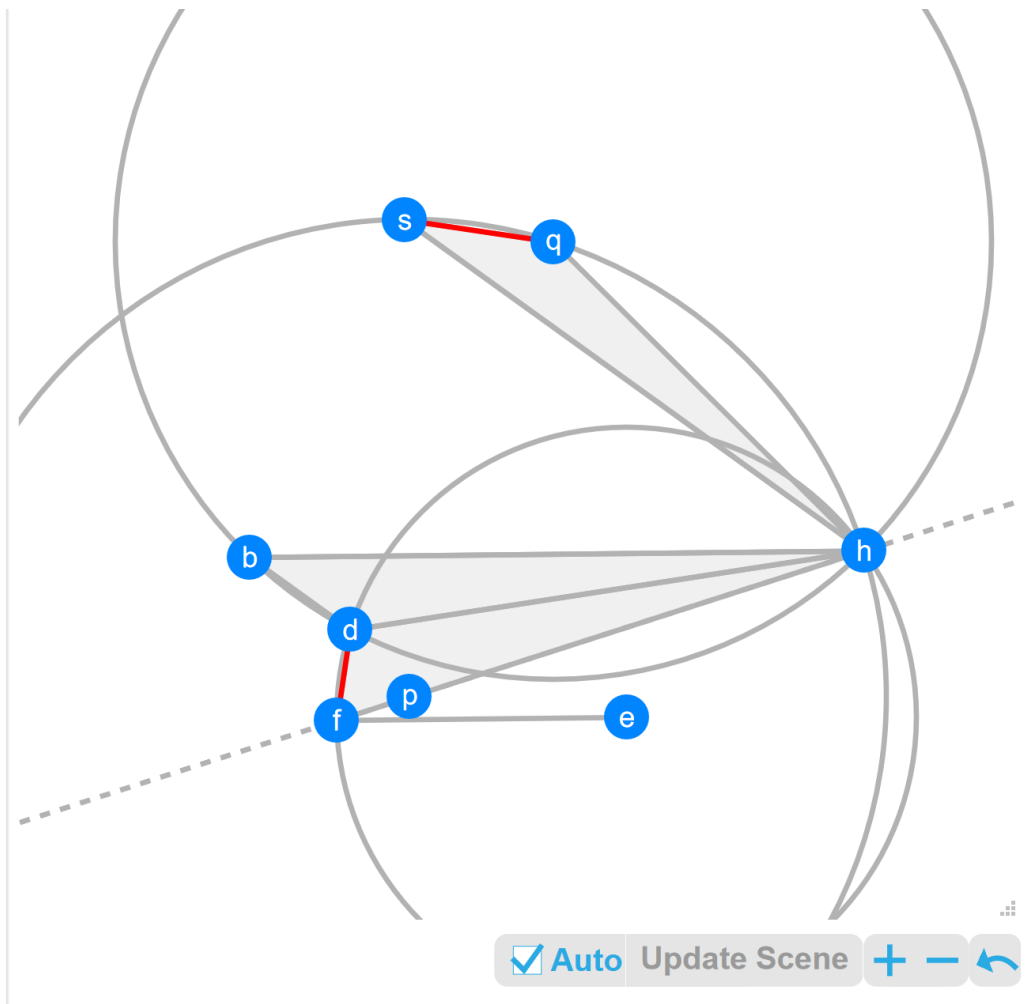
Let ecd be a triangle with circumcentre a . Let cgh be a triangle with circumcentre e . Let $L1$ be the angle bisector of ed and hc . Let $L2$ be the reflection of ac in hc . Let $L3$ be the angle bisector of $L2$ and cg . Let $L1$ be parallel to $L3$. Prove hg is parallel to cd .



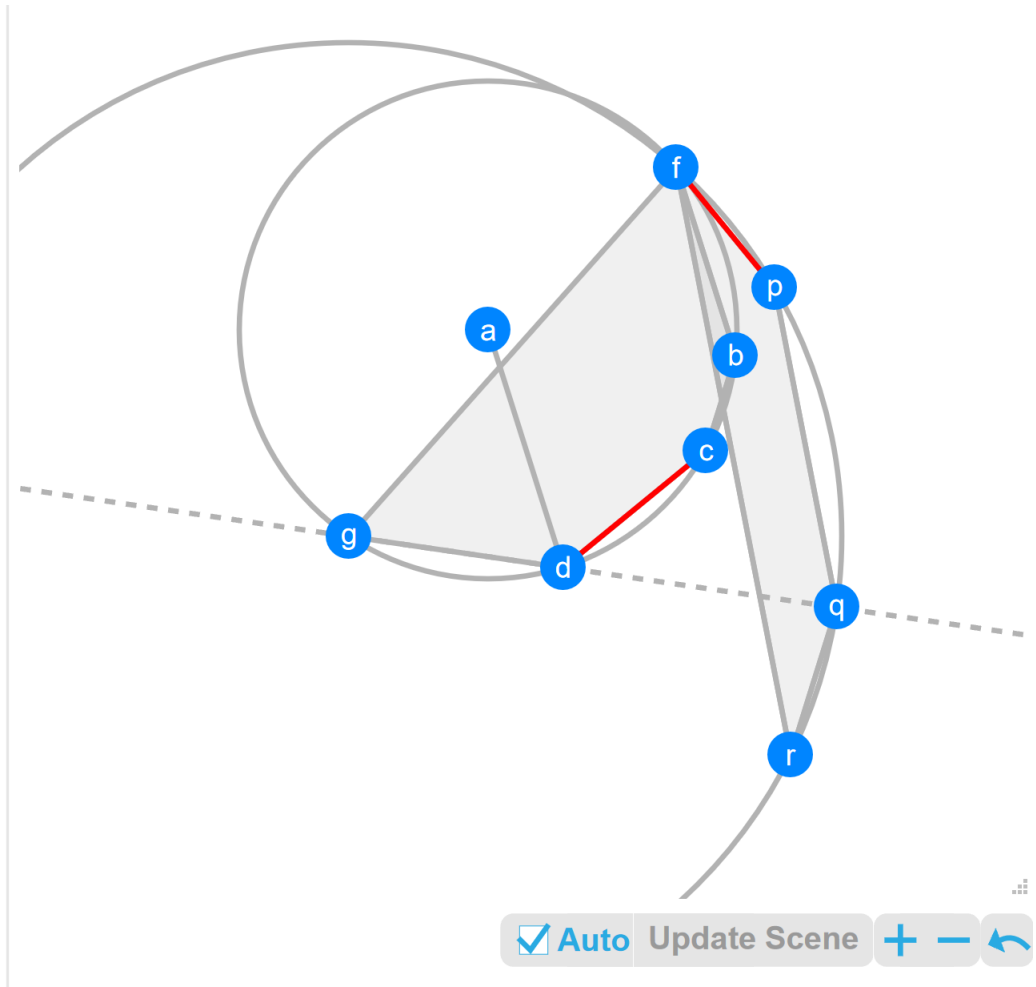
Let $fcde$ be a cyclic quadrilateral with centre a . Let fe be parallel to dc . Let fc be parallel to ed . Let $gcmnop$ be a cyclic hexagon with centre f . Let gc be parallel to on . Let fep be collinear. Let $L1$ be the angle bisector of fm and fg . Let fo be parallel to $L1$. Prove po is 45 degrees to nm .



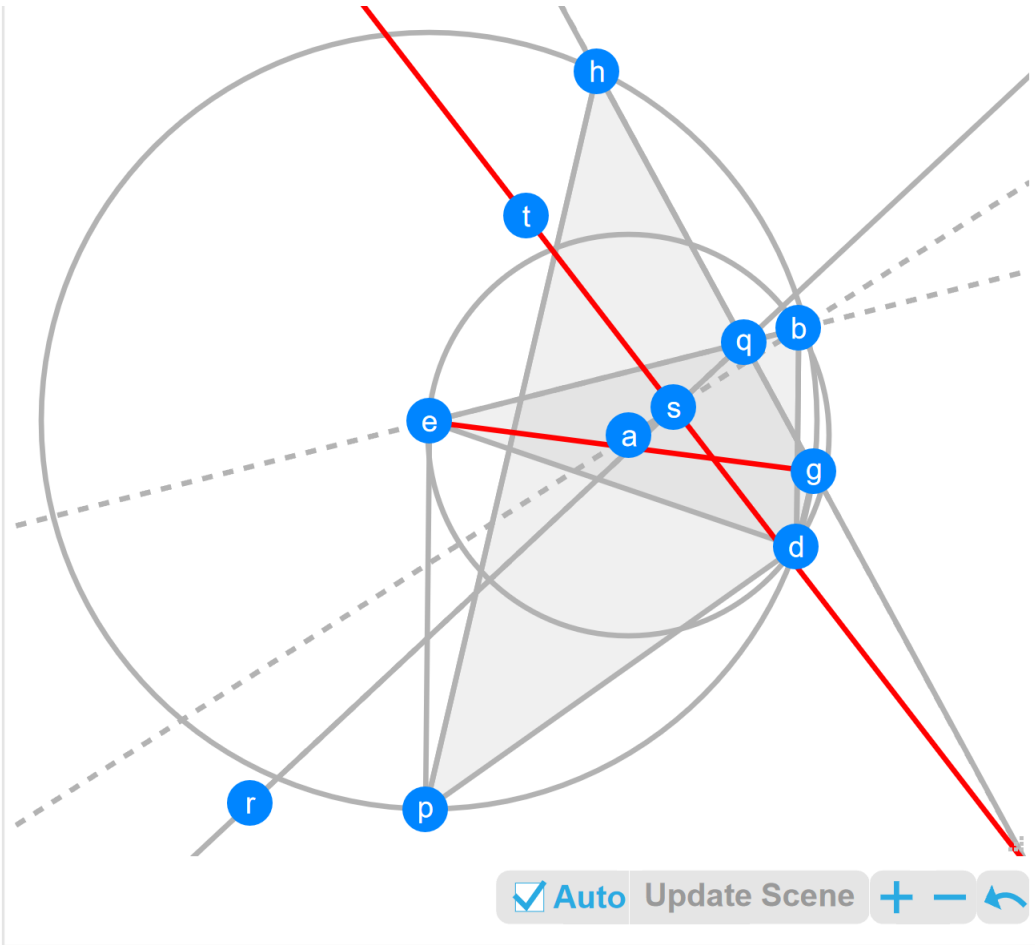
Let $bcdef$ be a cyclic pentagon with centre a . Let $L1$ be the angle bisector of ab and ef . Let $L2$ be the angle bisector of fb and bc . Let $L3$ be the angle bisector of de and cd . Let $L2$ be parallel to $L3$. Determine the angle between $\{d, e\}$ and $L1$.



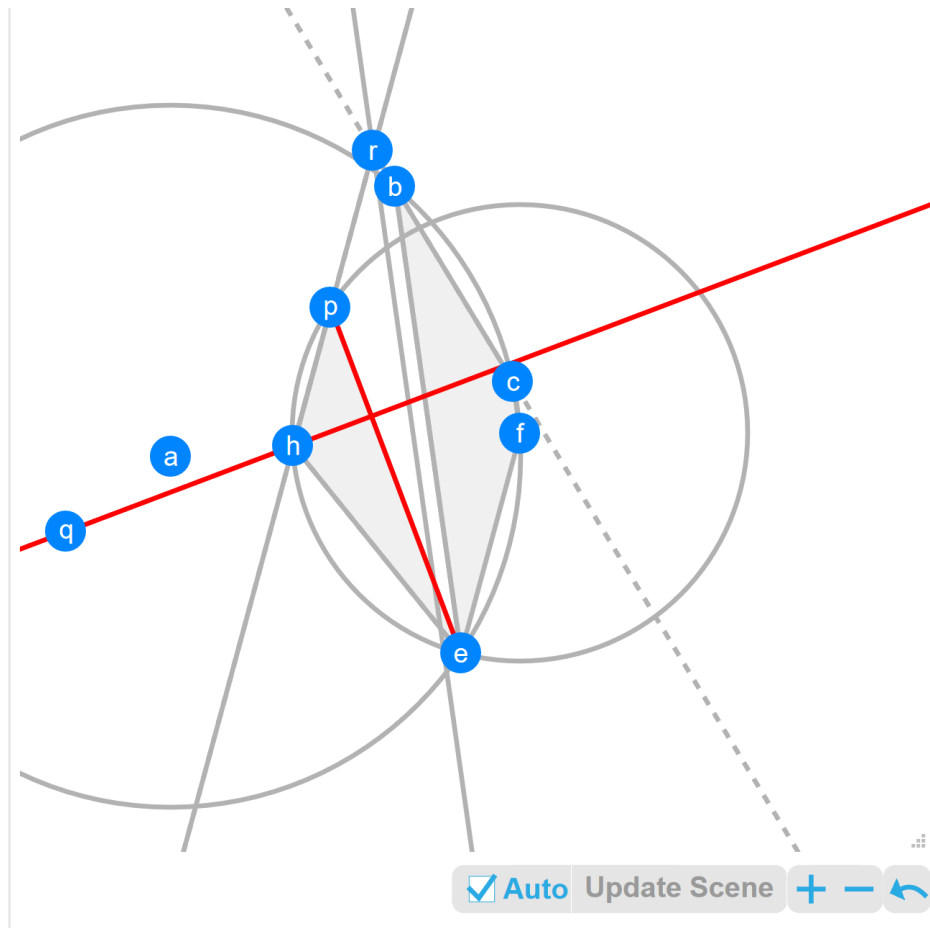
Let bhd be a triangle with circumcentre q . Let fdh be a triangle with circumcentre e . Let bh be parallel to ef . Let qhs be a triangle with circumcentre p . Let bd be parallel to hs . Let hfp be collinear. Prove qs is perpendicular to fd .



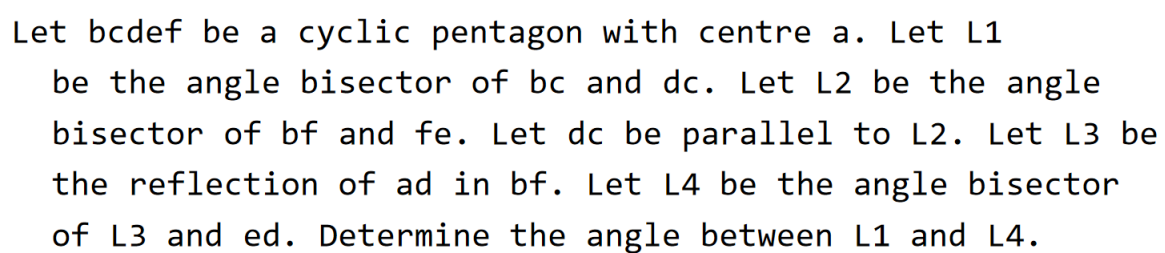
Let $bcdgf$ be a cyclic pentagon with centre a . Let ad be parallel to bf . Let $fpqr$ be a cyclic quadrilateral with centre g . Let rf be parallel to qp . Let bc be parallel to rq . Let gdq be collinear. Prove dc is perpendicular to fp .

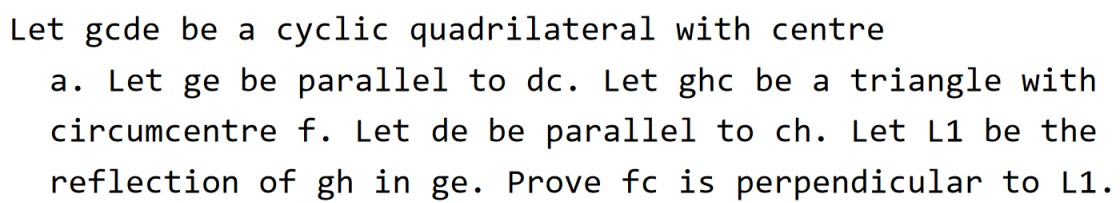


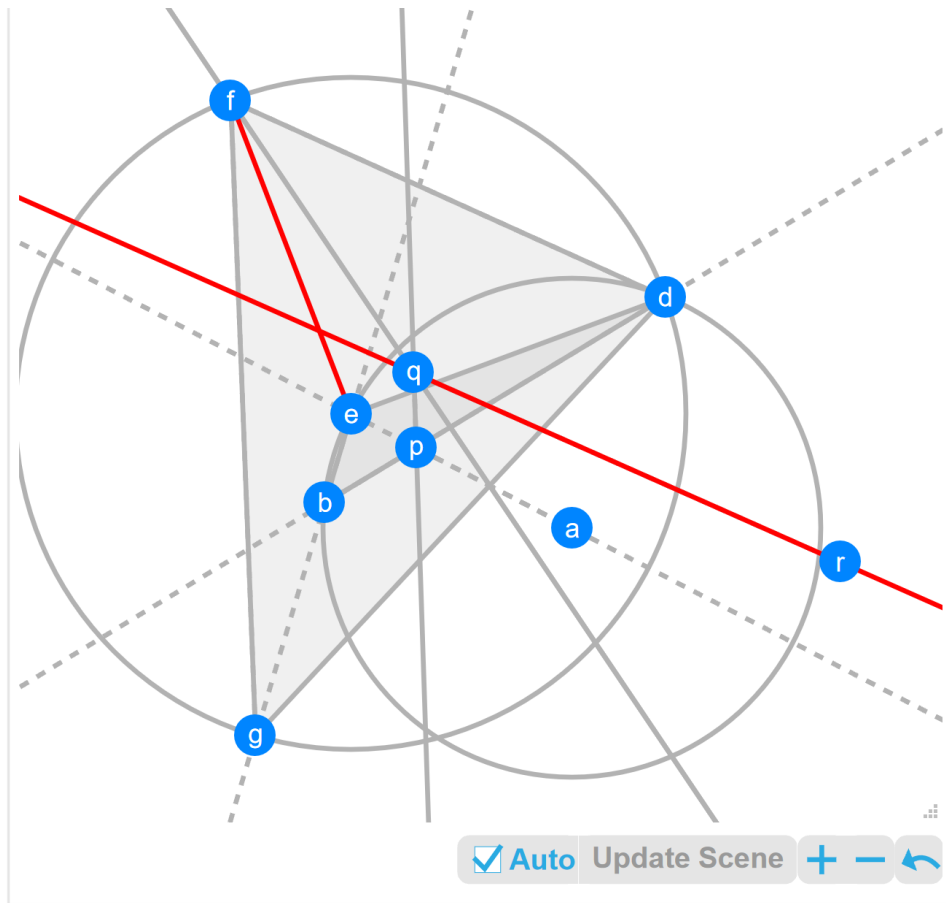
Let bed be a triangle with circumcentre a . Let $dghp$ be a cyclic quadrilateral with centre e . Let dg be parallel to ph . Let bd be parallel to ep . Let $L1$ be the reflection of eb in hg . Let $L2$ be the angle bisector of ab and $L1$. Determine the angle between $\{e, g\}$ and $L2$.



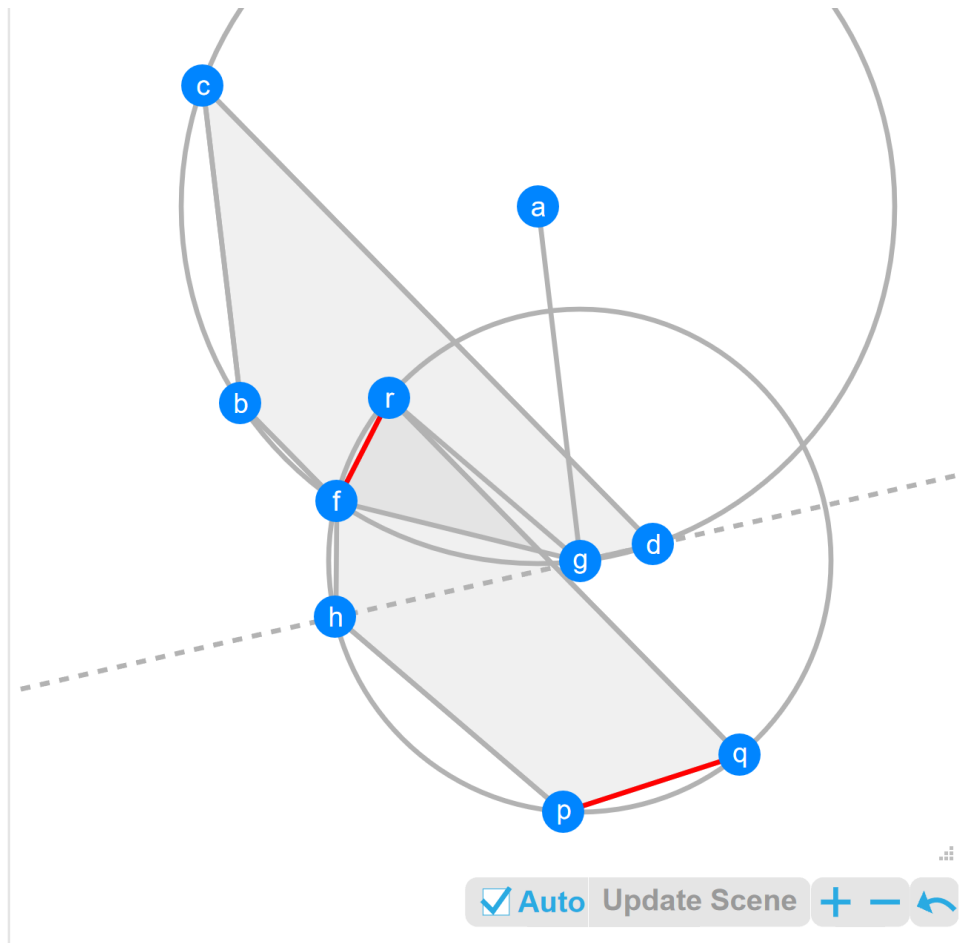
Let $bcfe$ be a cyclic quadrilateral with centre a . Let be be parallel to fc . Let ehp be a triangle with circumcentre f . Let L_1 be the reflection of eh in hp . Let L_2 be the angle bisector of hp and bc . Let be be parallel to L_2 . Prove L_1 is perpendicular to pe .



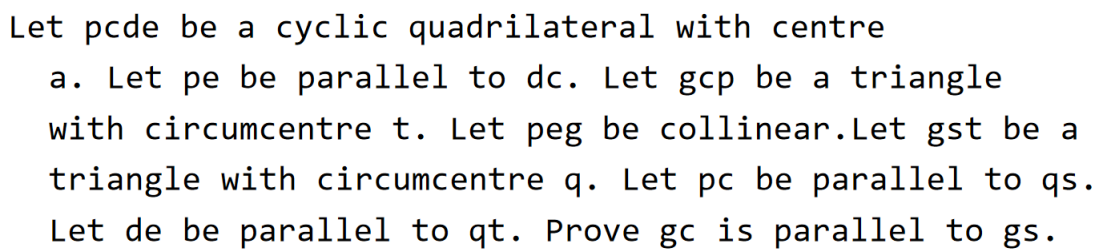


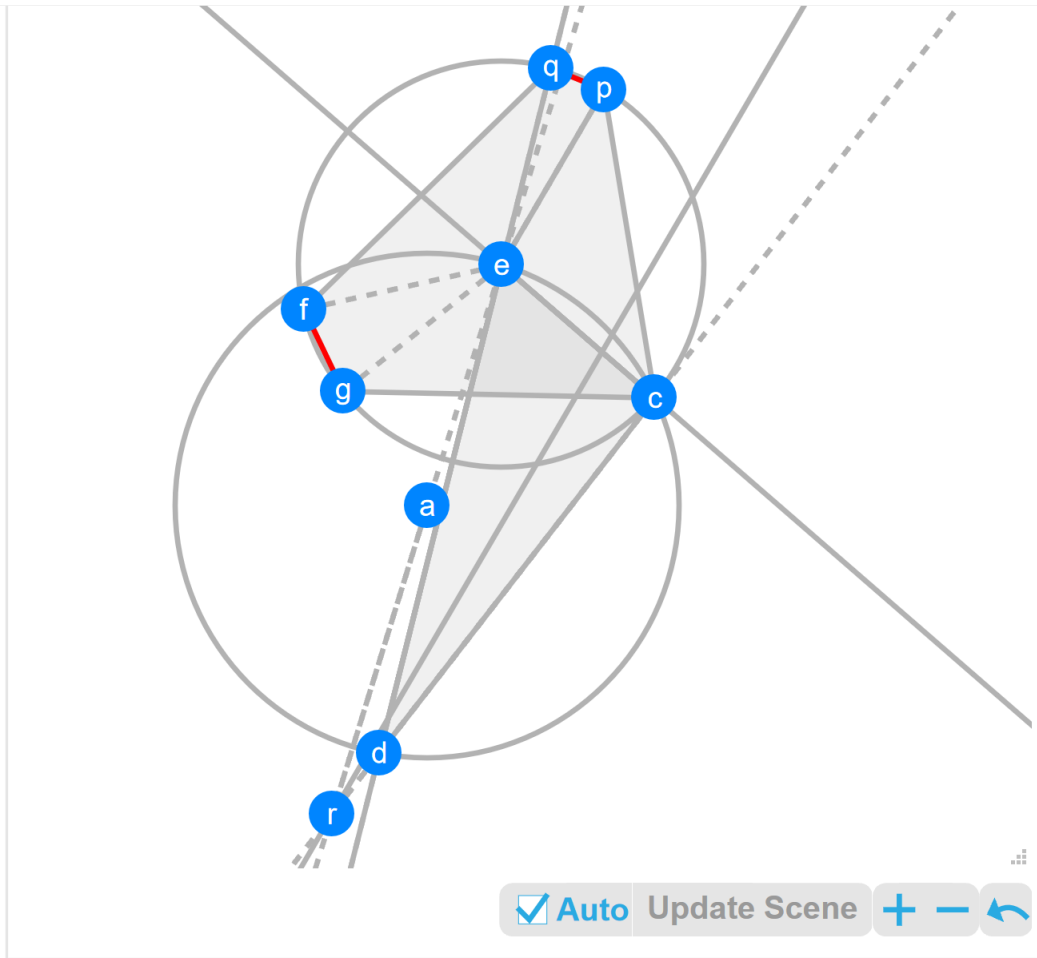


Let bed be a triangle with circumcentre a . Let fgd be a triangle with circumcentre e . Let ebg be collinear. Let $L1$ be the angle bisector of bd and ae . Let $L2$ be the angle bisector of df and fg . Let $L3$ be the reflection of $L1$ in $L2$. Prove ef is 45 degrees to $L3$.

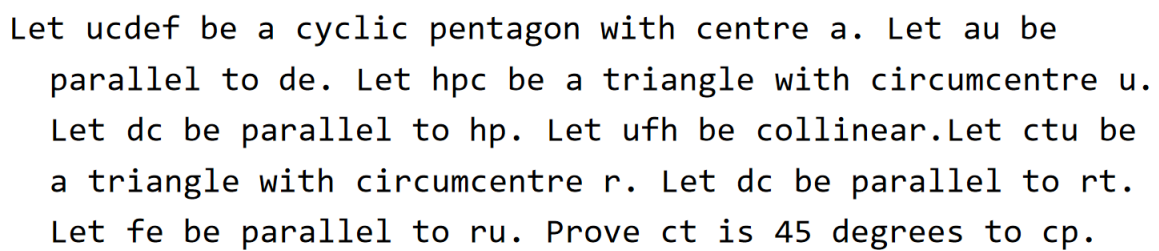


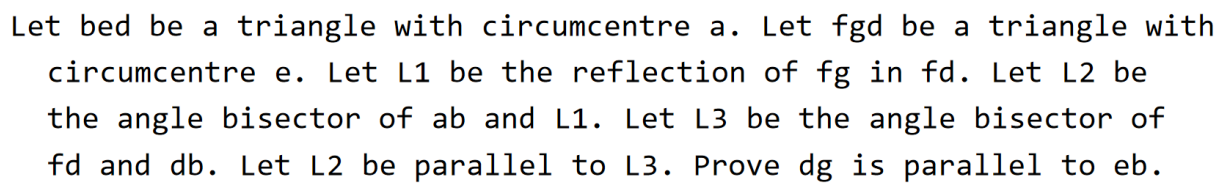
Let $bcdgf$ be a cyclic pentagon with centre a . Let ag be parallel to bc . Let bf be parallel to dc . Let $hpqrf$ be a cyclic pentagon with centre g . Let gr be parallel to hp . Let bf be parallel to qr . Let gdh be collinear. Prove pq is 45 degrees to rf .

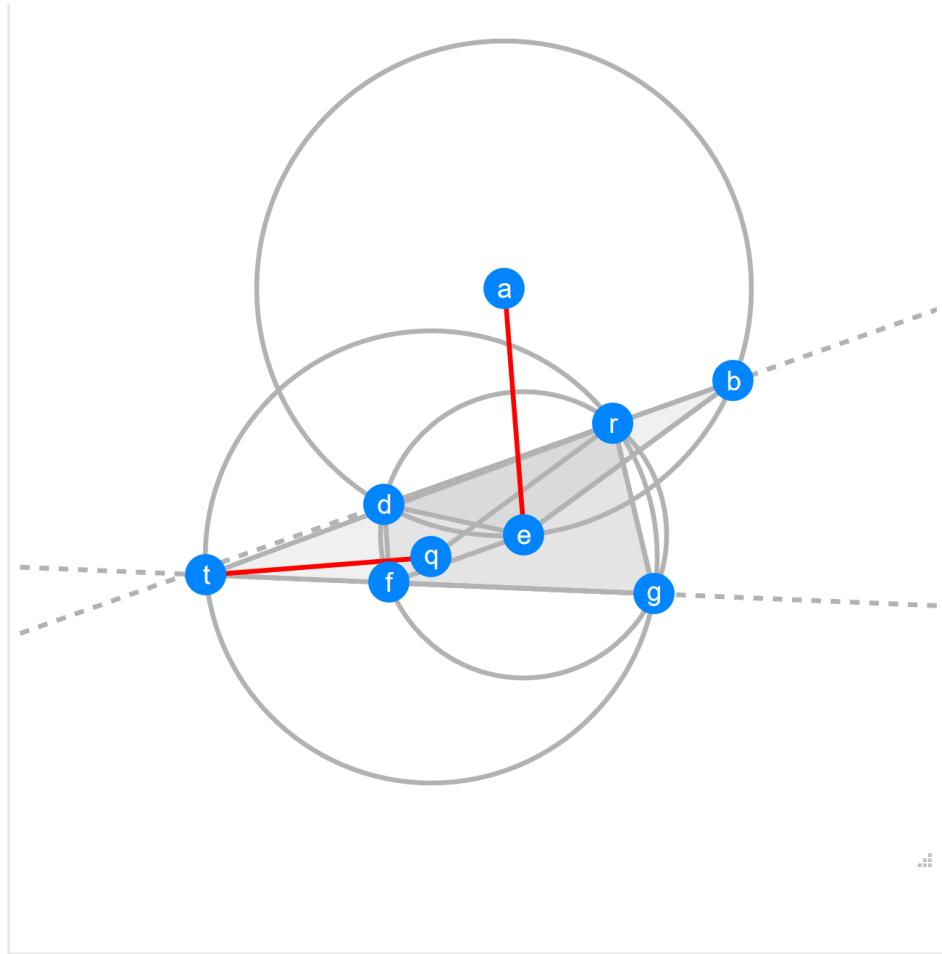




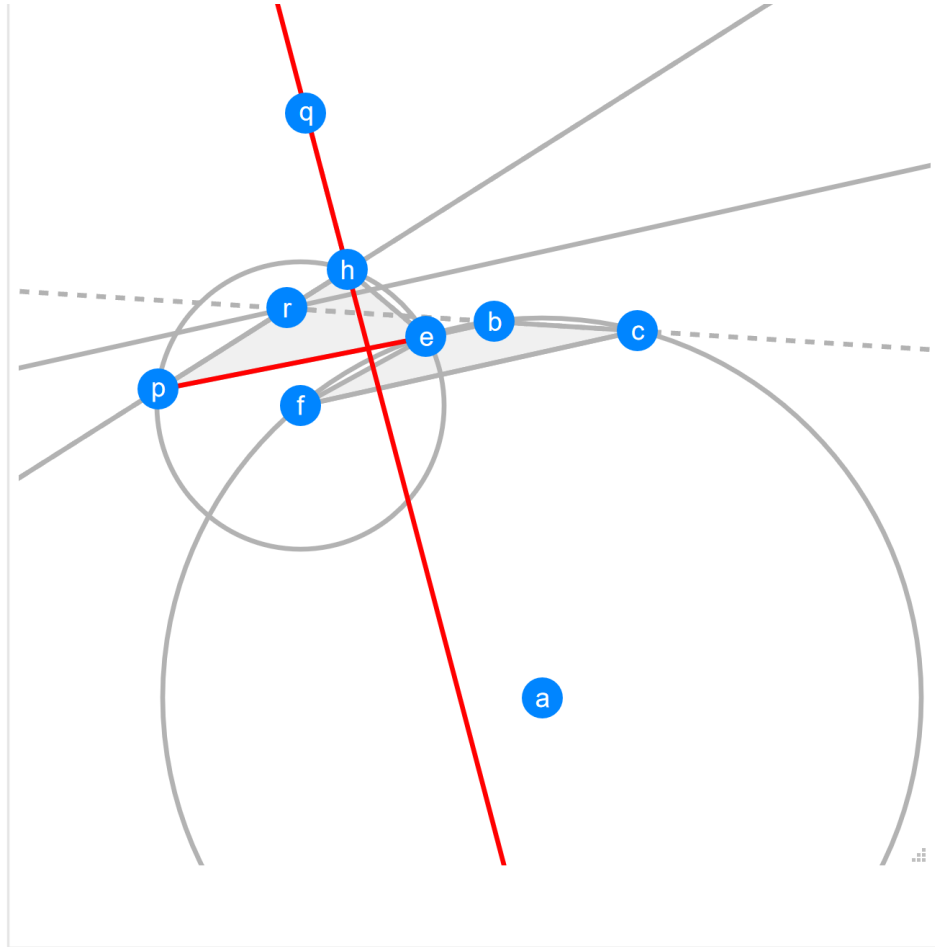
Let ecd be a triangle with circumcentre a . Let $fgcpq$ be a cyclic pentagon with centre e . Let edq be collinear. Let $L1$ be the angle bisector of ef and ec . Let de be parallel to $L1$. Let $L2$ be the angle bisector of ep and eg . Let ec be parallel to $L2$. Let $L3$ be the angle bisector of ae and cd . Let ep be parallel to $L3$. Prove fg is 45 degrees to qp .



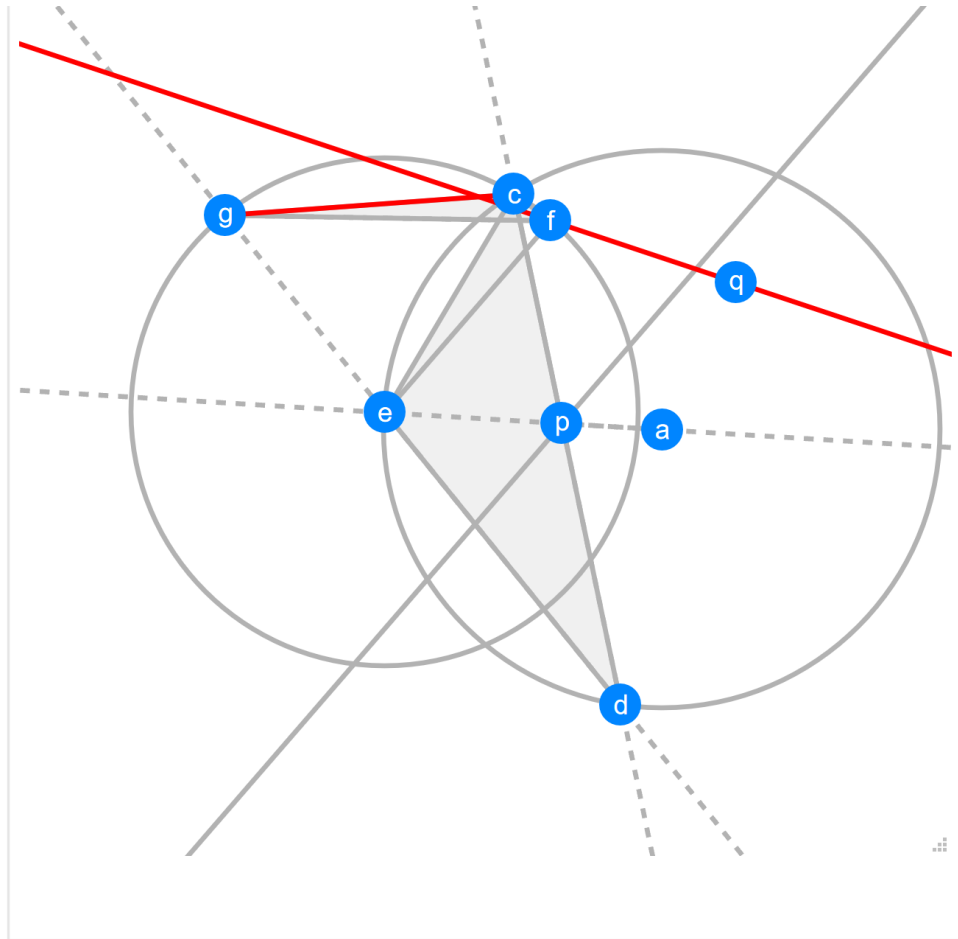




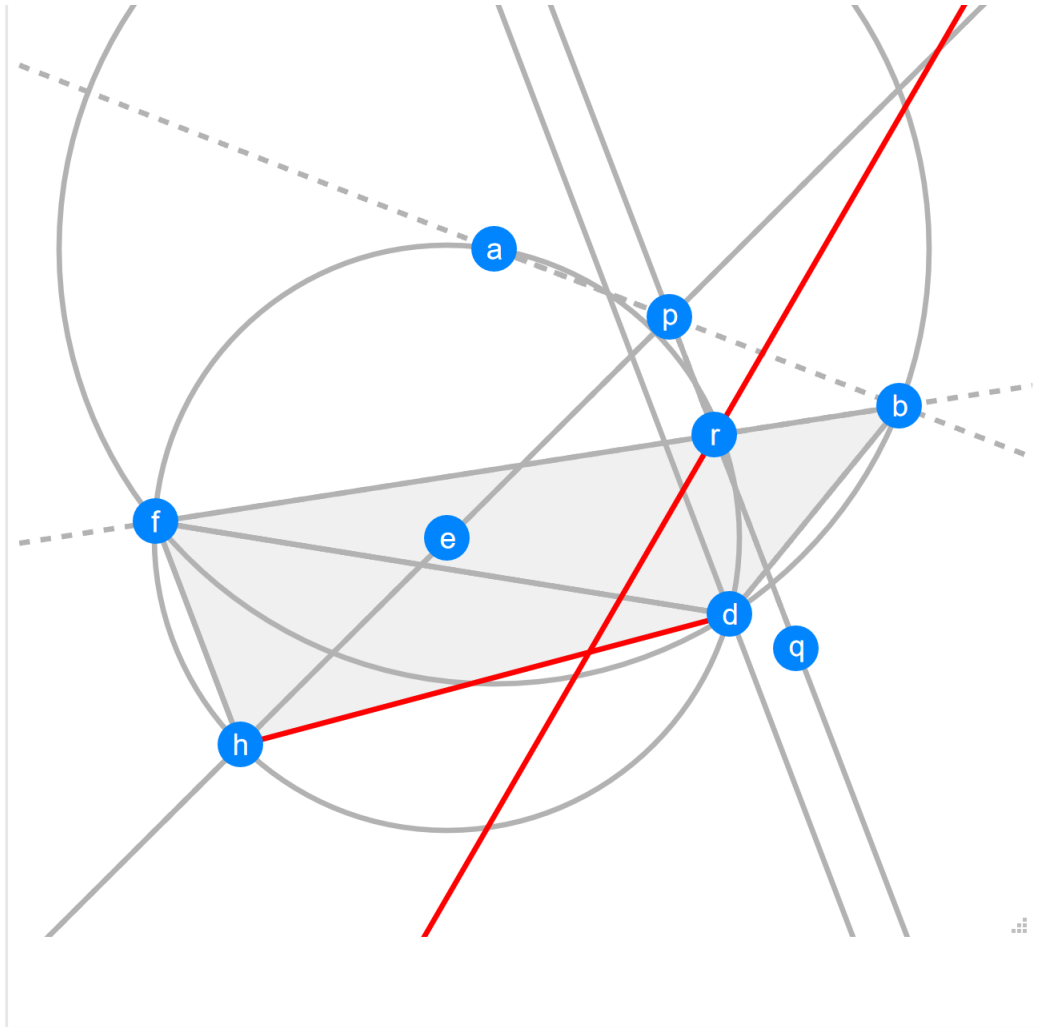
Let bed be a triangle with circumcentre a . Let $fgrd$ be a cyclic quadrilateral with centre e . Let dbr be collinear. Let bd be parallel to ef . Let rgt be a triangle with circumcentre q . Let gft be collinear. Let be be parallel to qr . Prove ae is perpendicular to qt .



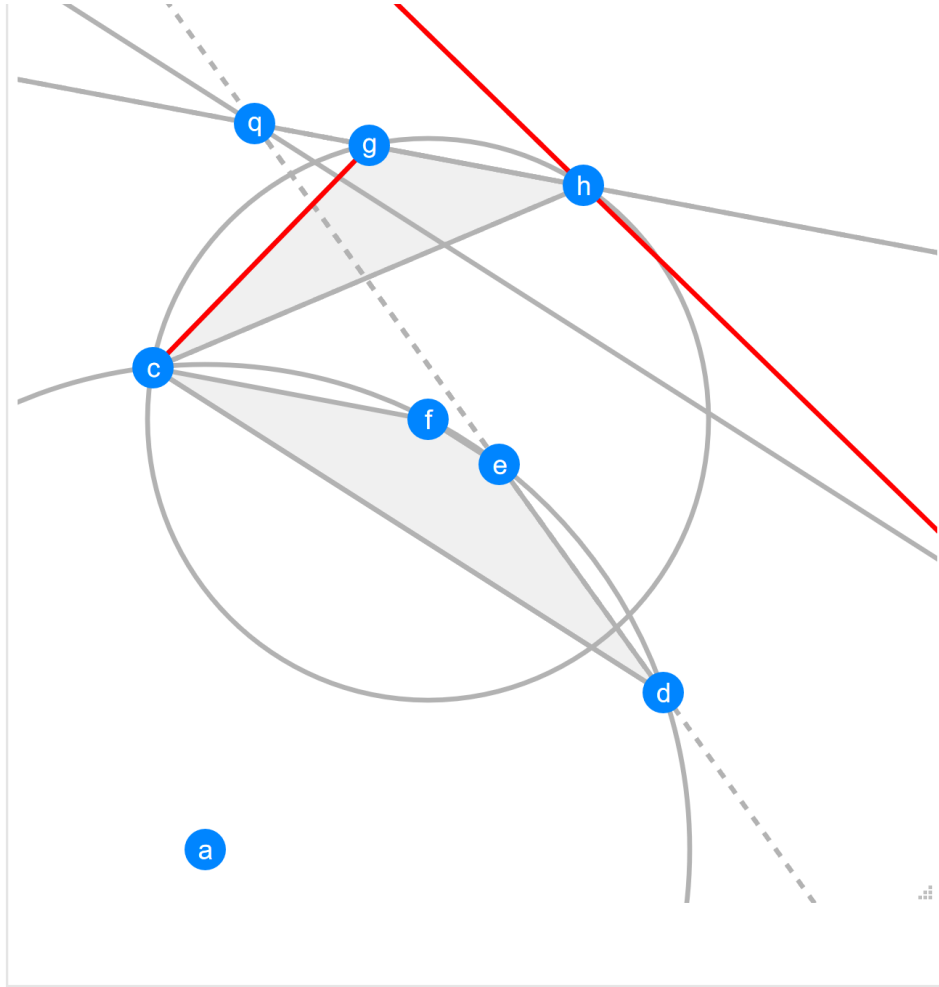
Let $bcfe$ be a cyclic quadrilateral with centre a . Let be be parallel to fc . Let ehp be a triangle with circumcentre f . Let $L1$ be the reflection of eh in hp . Let $L2$ be the angle bisector of hp and bc . Let be be parallel to $L2$. Prove $L1$ is perpendicular to pe .



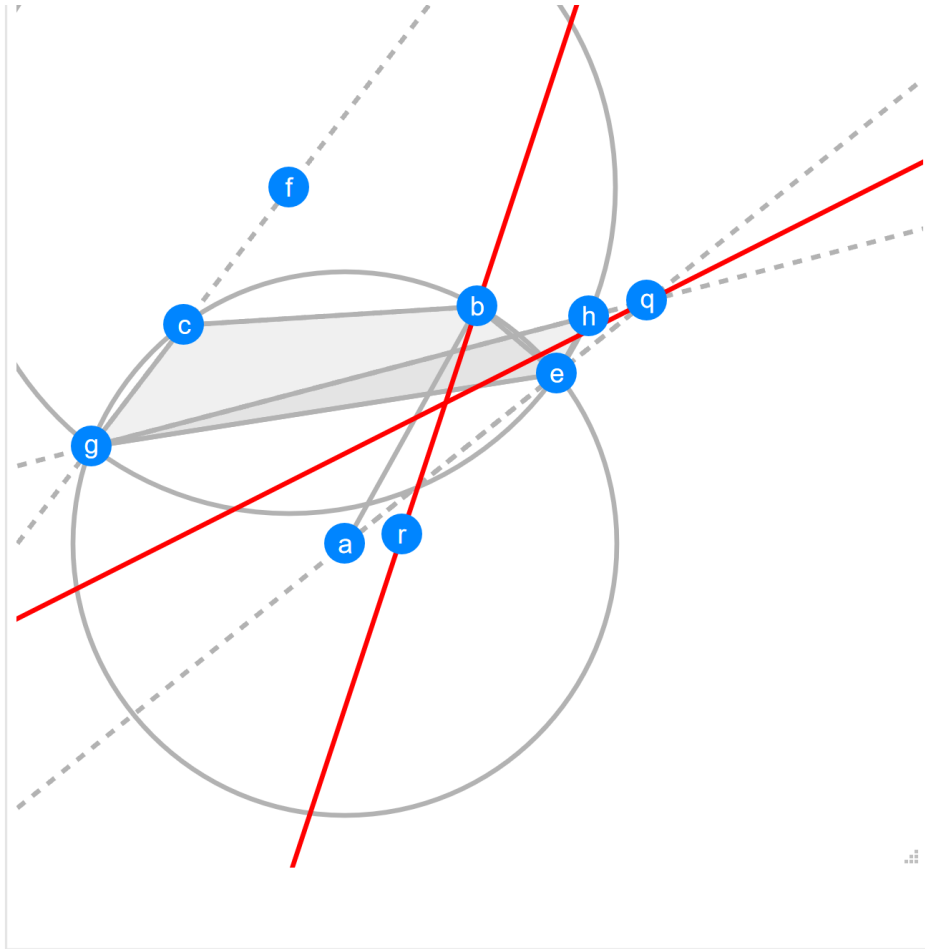
Let ecd be a triangle with circumcentre a . Let fgc be a triangle with circumcentre e . Let edg be collinear. Let L_1 be the angle bisector of fg and fc . Let L_2 be the angle bisector of ae and dc . Let ef be parallel to L_2 . Determine the angle between L_1 and $\{g, c\}$.



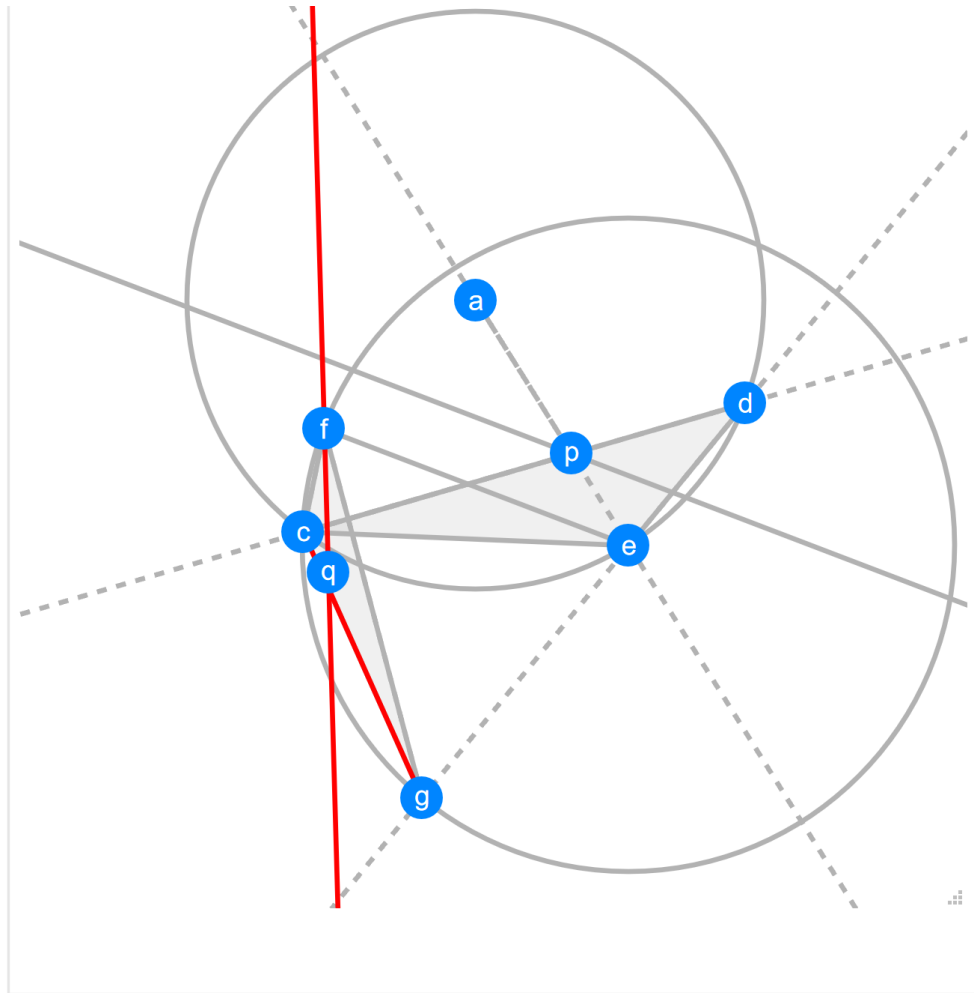
Let bfd be a triangle with circumcentre a . Let fdh be a triangle with circumcentre e . Let $L1$ be the angle bisector of db and fd . Let fh be parallel to $L1$. Let $L2$ be the reflection of ab in eh . Let $L3$ be the angle bisector of $L2$ and bf . Determine the angle between $\{h, d\}$ and $L3$.



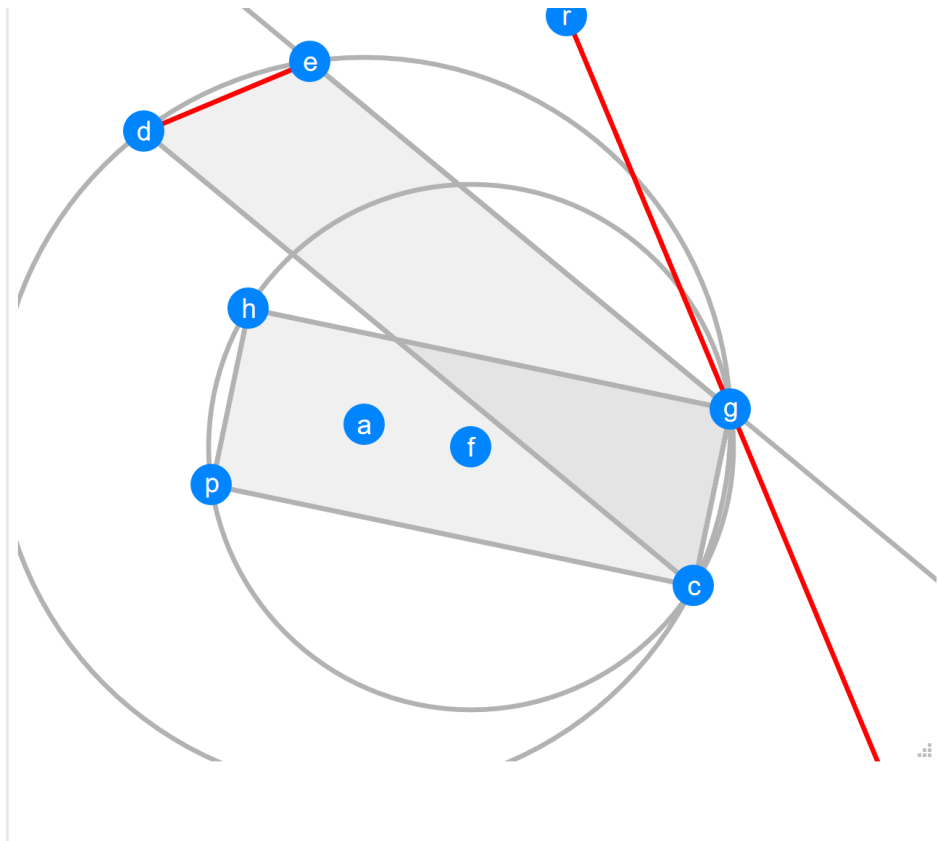
Let $fcde$ be a cyclic quadrilateral with centre a . Let fe be parallel to dc . Let ghc be a triangle with circumcentre f . Let $L1$ be the angle bisector of gh and ed . Let fe be parallel to $L1$. Let $L2$ be the reflection of ch in gh . Prove $L2$ is perpendicular to gc .



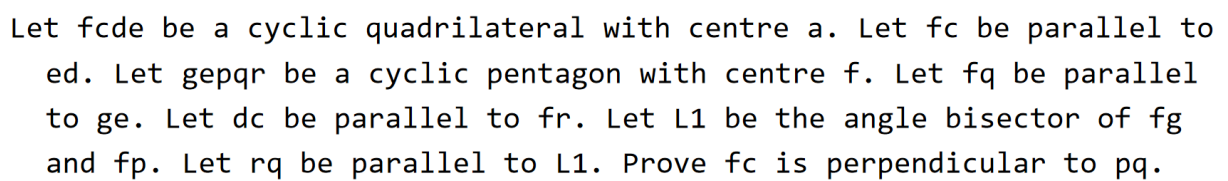
Let $bcge$ be a cyclic quadrilateral with centre a . Let ghe be a triangle with circumcentre f . Let ab be parallel to eh . Let gcf be collinear. Let L_1 be the angle bisector of eb and bc . Let L_2 be the angle bisector of gh and ae . Determine the angle between L_1 and L_2 .

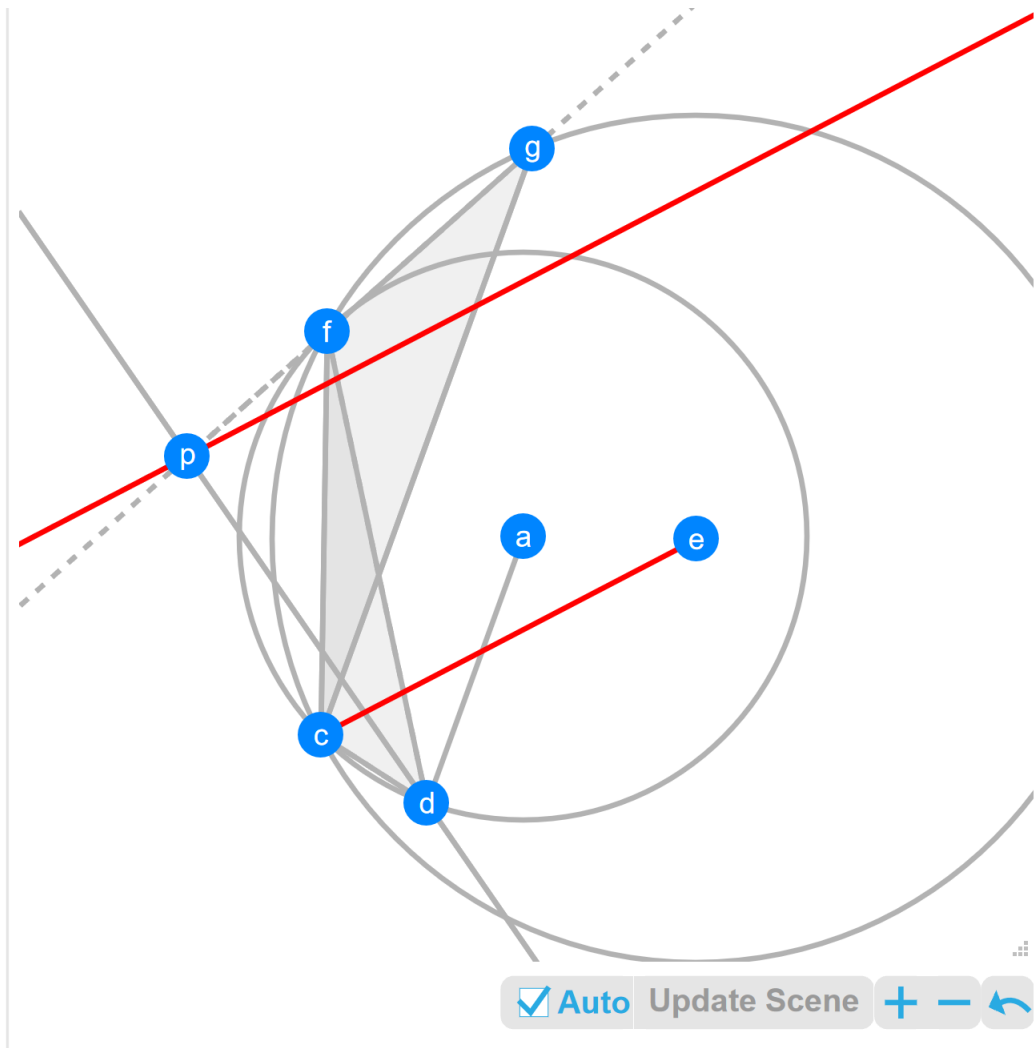


Let ecd be a triangle with circumcentre a . Let fgc be a triangle with circumcentre e . Let edg be collinear. Let $L1$ be the angle bisector of fg and fc . Let $L2$ be the angle bisector of ae and dc . Let ef be parallel to $L2$. Determine the angle between $L1$ and $\{g, c\}$.

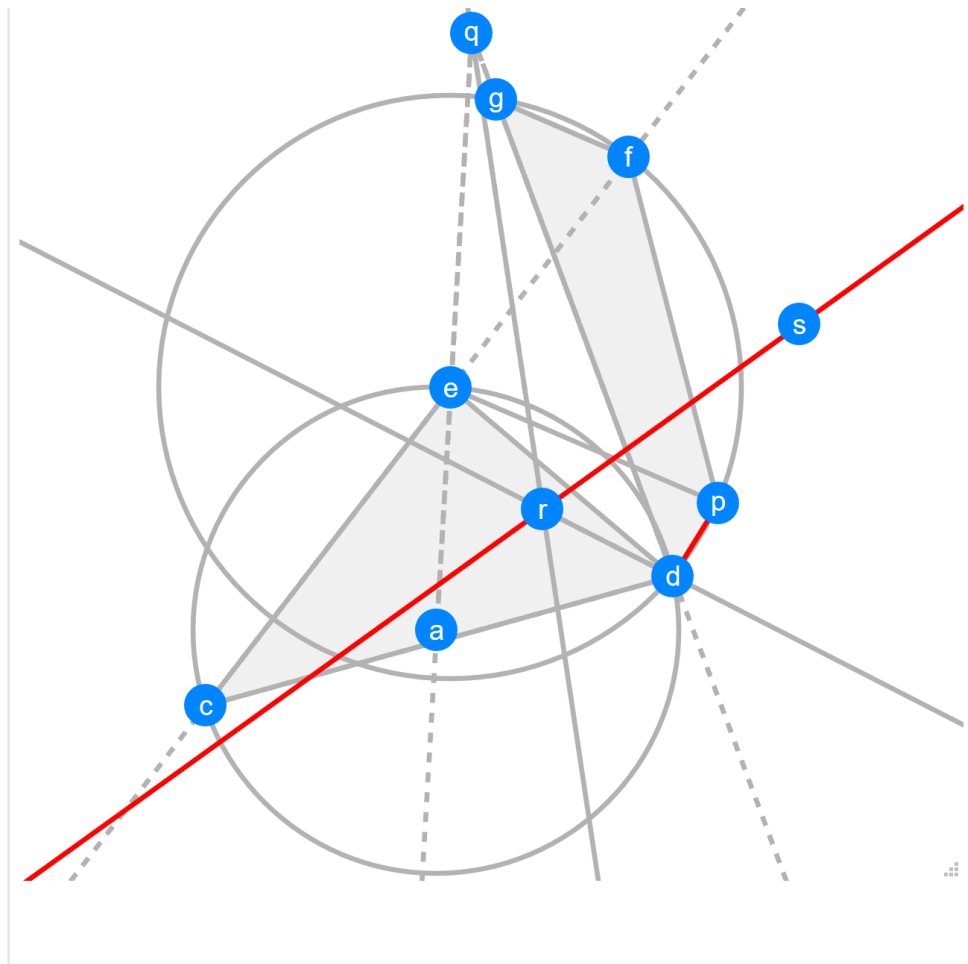


Let $gcde$ be a cyclic quadrilateral with centre a . Let ge be parallel to dc . Let $ghpc$ be a cyclic quadrilateral with centre f . Let gc be parallel to ph . Let gh be parallel to cp . Let $L1$ be the reflection of gh in ge . Prove $L1$ is perpendicular to ed .

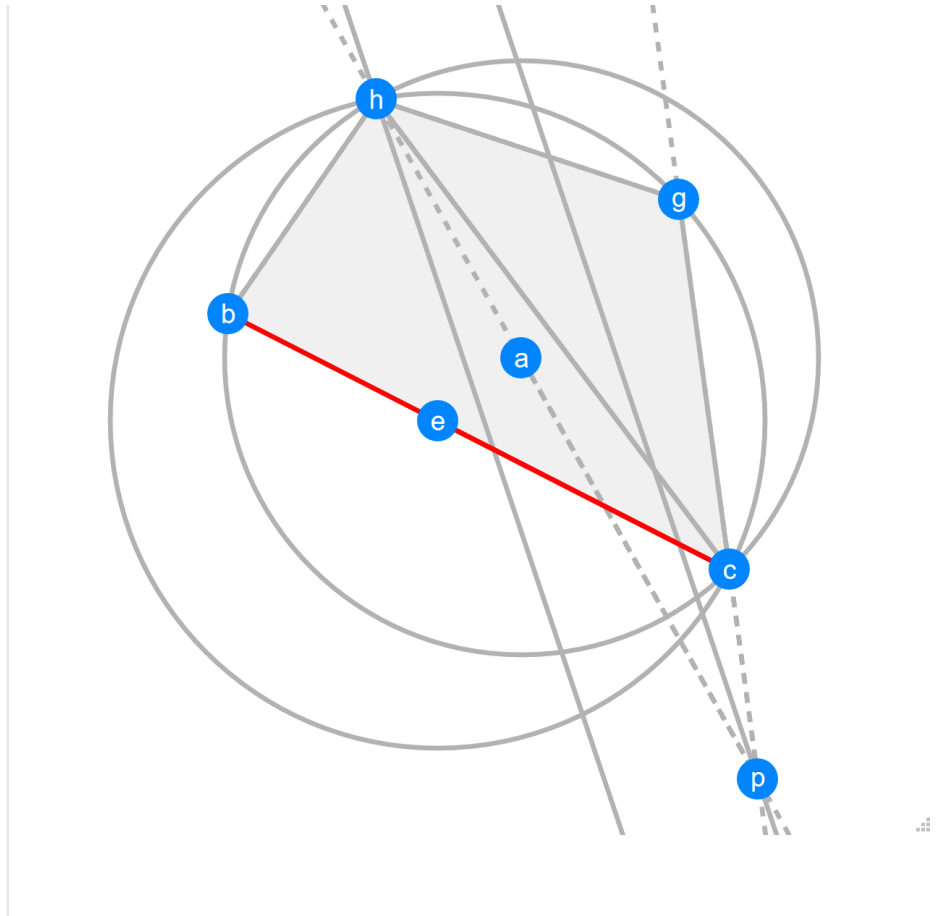




Let fcd be a triangle with circumcentre a . Let fgc be a triangle with circumcentre e . Let ad be parallel to cg . Let $L1$ be the angle bisector of fd and dc . Let $L2$ be the reflection of fg in $L1$. Prove ec is parallel to $L2$.

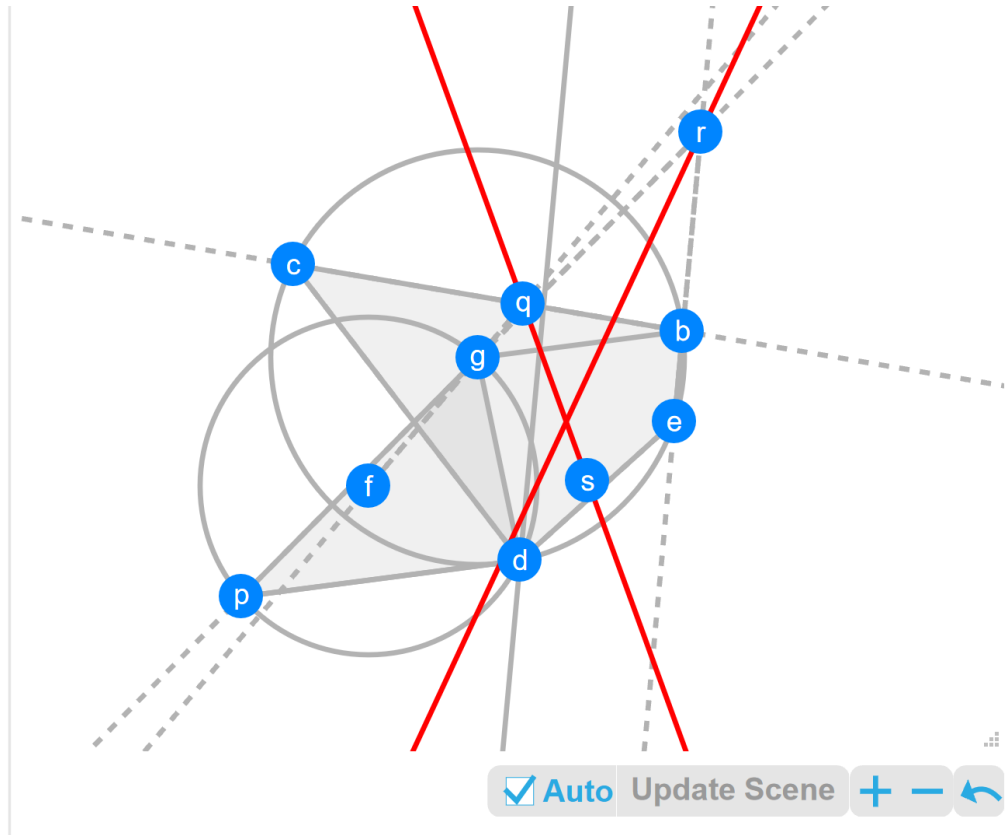


Let ecd be a triangle with circumcentre a . Let $fgdp$ be a cyclic quadrilateral with centre e . Let ep be parallel to fg . Let ecf be collinear. Let $L1$ be the angle bisector of cd and gd . Let $L2$ be the angle bisector of gd and ae . Let $L3$ be the angle bisector of $L1$ and $L2$. Determine the angle between $L3$ and $\{d, p\}$.

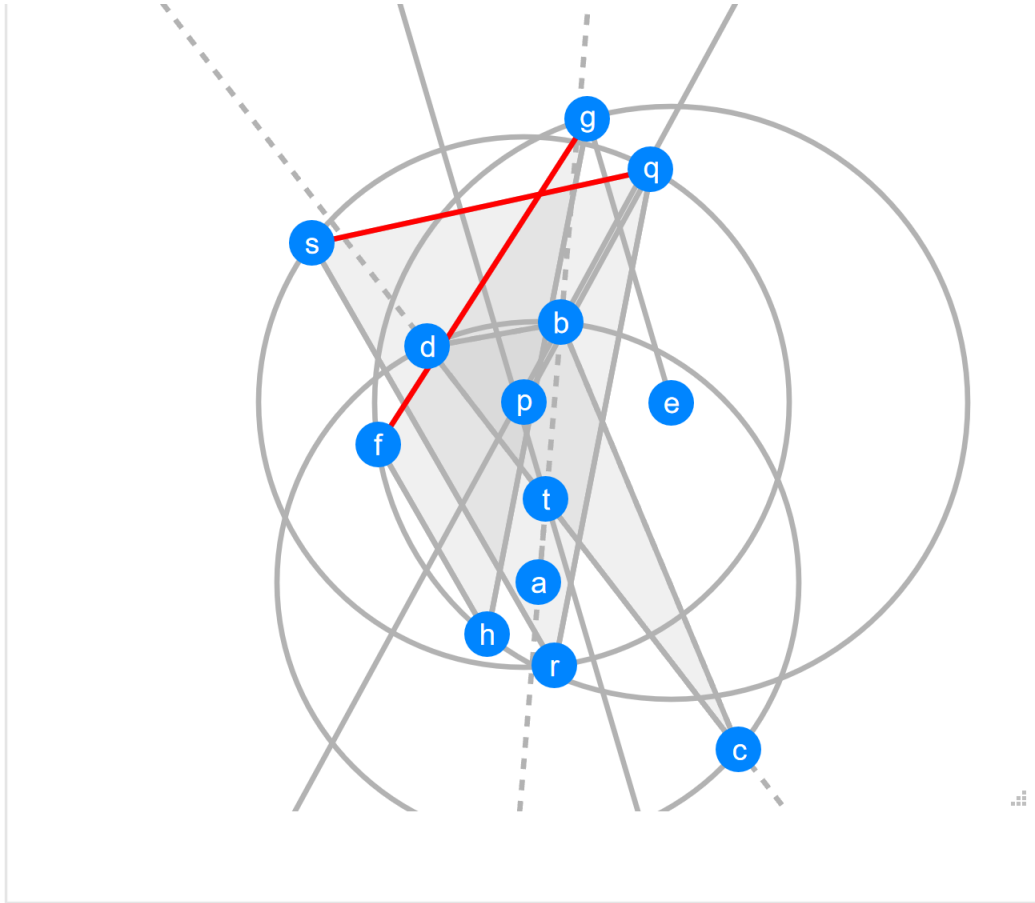


Let bch be a triangle with circumcentre a . Let cgh be a triangle with circumcentre e . Let L_1 be the angle bisector of bh and hg . Let L_2 be the angle bisector of ah and cg . Let L_1 be parallel to L_2 . Determine the angle between ec and bc . (

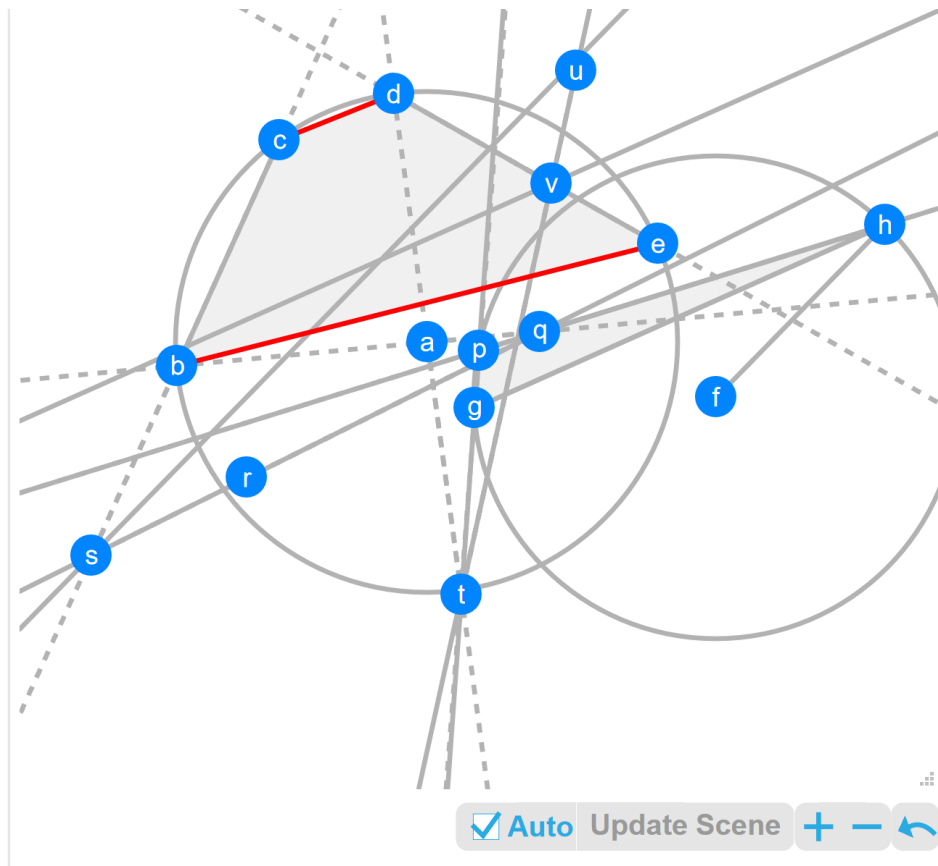
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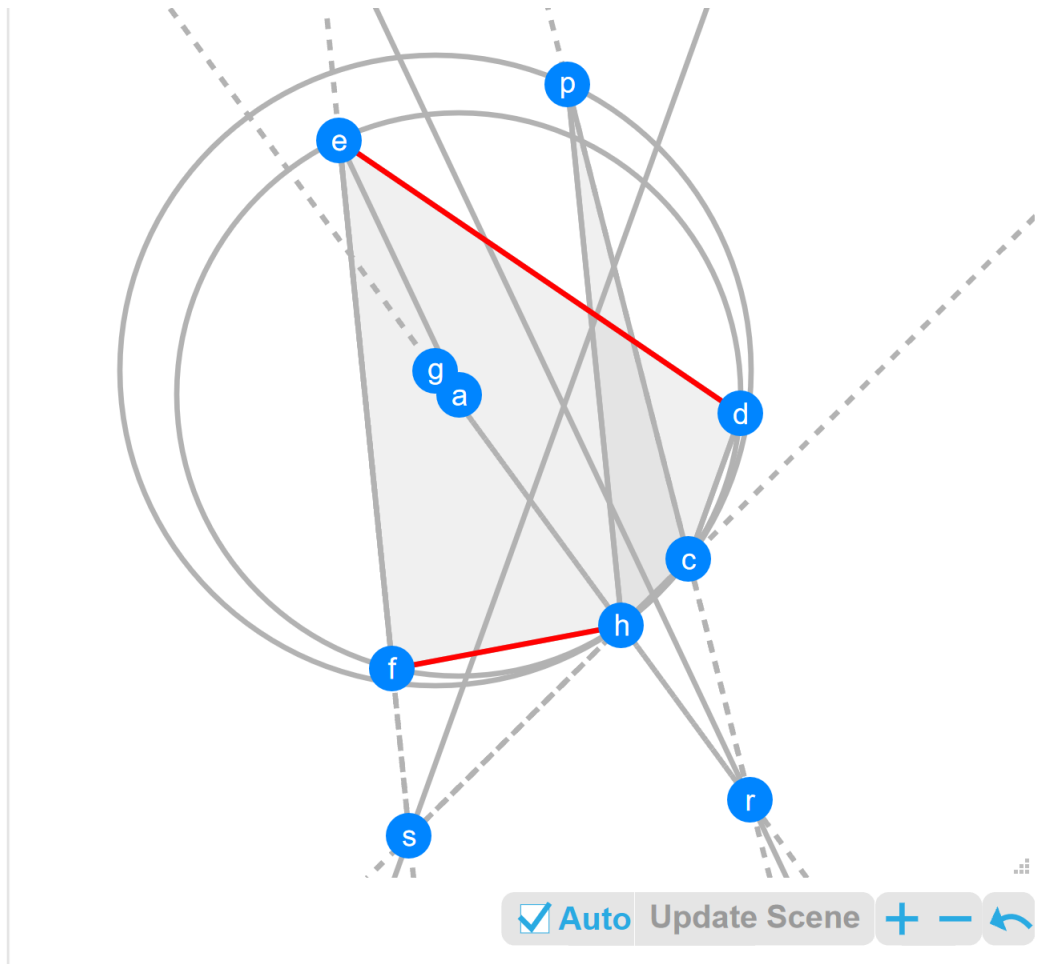
Let $bcde$ be a cyclic quadrilateral with centre g . Let gdp be a triangle with circumcentre f . Let gb be parallel to pd . Let $L1$ be the angle bisector of bc and fg . Let $L2$ be the angle bisector of eb and gp . Let $L3$ be the angle bisector of edc . Let eb be parallel to $L3$. Determine the angle between $L1$ and $L2$.



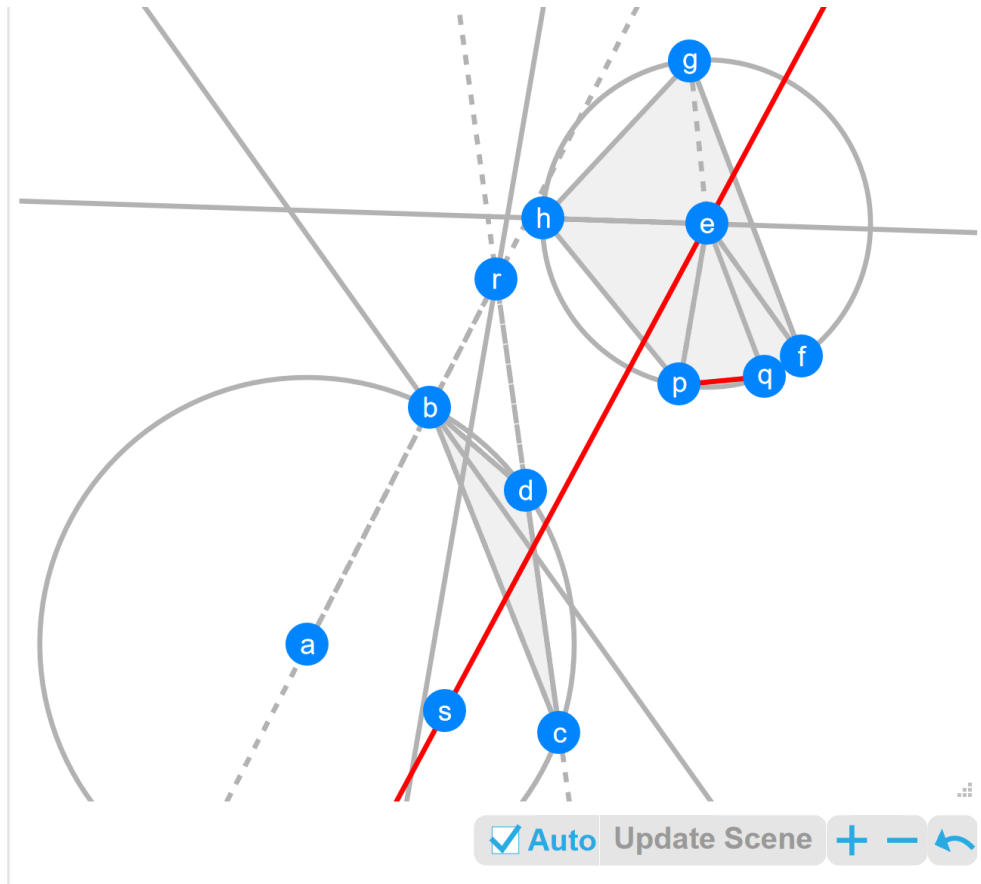
Let bcd be a triangle with circumcentre a . Let fgh be a triangle with circumcentre e . Let qrs be a triangle with circumcentre p . Let hg be parallel to qr . Let fh be parallel to rs . Let L_1 be the angle bisector of ab and cd . Let eg be parallel to L_1 . Let L_2 be the angle bisector of dbc . Let pq be parallel to L_2 . Prove sq is 45 degrees to fg .



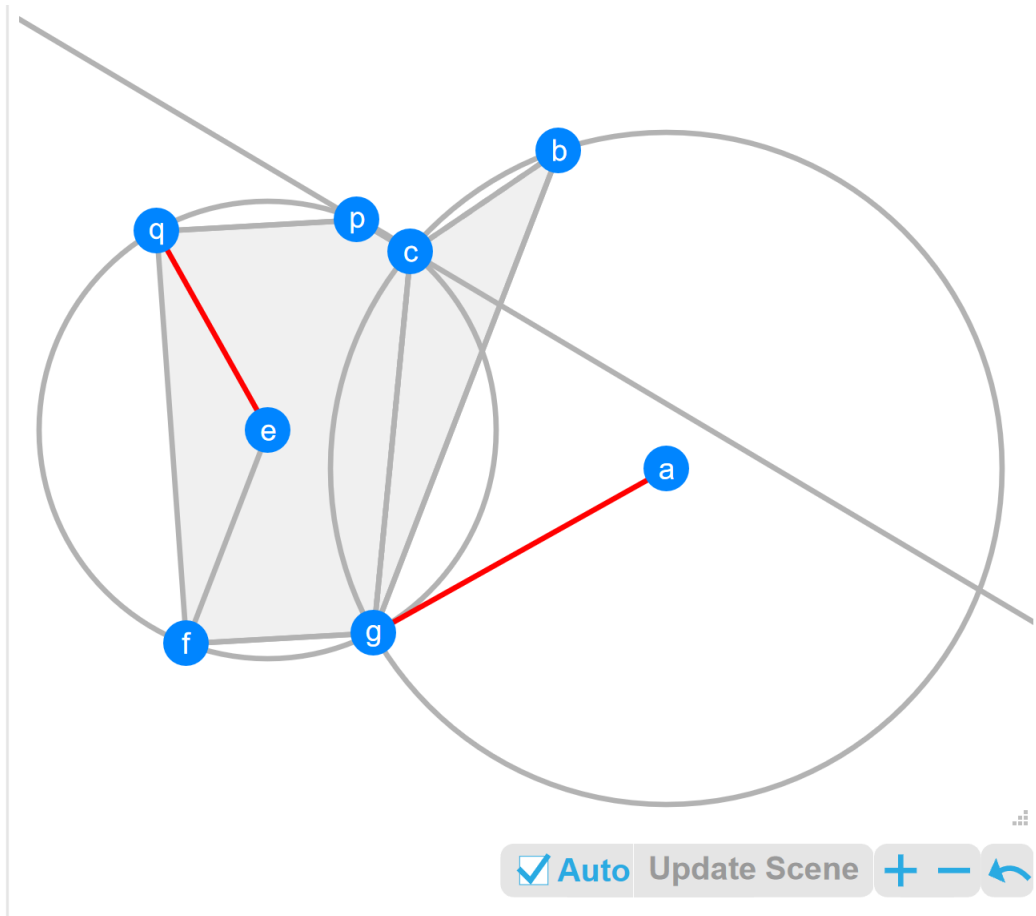
Let $bcde$ be a cyclic quadrilateral with centre a . Let ghp be a triangle with circumcentre f . Let L_1 be the reflection of ab in ph . Let L_2 be the angle bisector of L_1 and bc . Let fh be parallel to L_2 . Let L_3 be the reflection of ad in gp . Let L_4 be the angle bisector of L_3 and ed . Let gh be parallel to L_4 . Prove cd is parallel to eb .



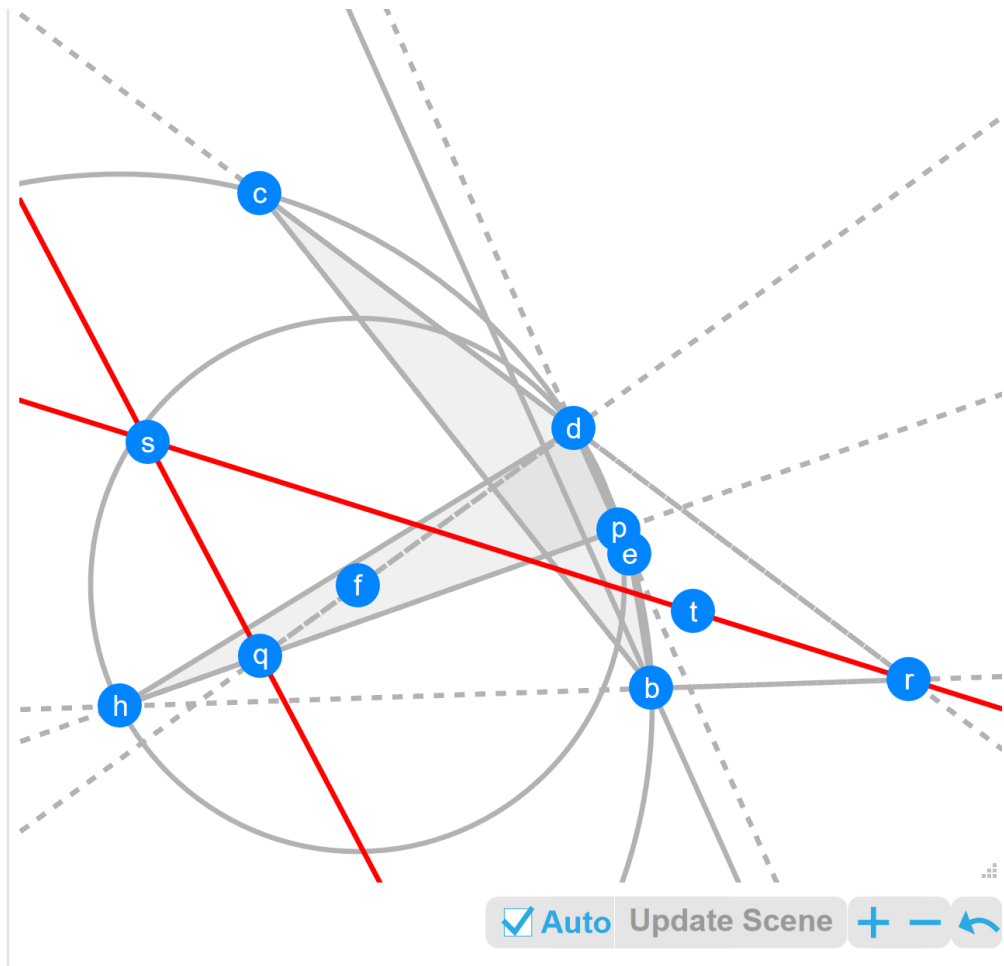
Let $hedef$ be a cyclic pentagon with centre a . Let hpc be a triangle with circumcentre g . Let ef be parallel to ph . Let $L1$ be the angle bisector of pc and gh . Let ae be parallel to $L1$. Let $L2$ be the angle bisector of ef and hc . Let dc be parallel to $L2$. Prove hf is 45 degrees to de .



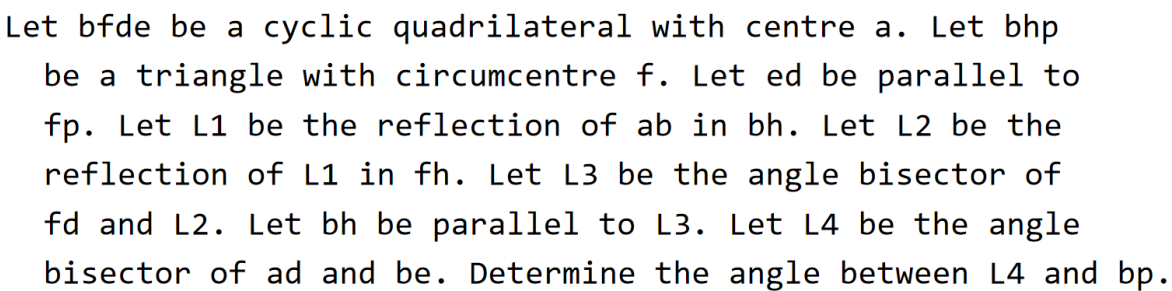
Let bcd be a triangle with circumcentre a . Let $fghpq$ be a cyclic pentagon with centre e . Let eq be parallel to fg . Let L_1 be the angle bisector of cd and ab . Let ep be parallel to L_1 . Let L_2 be the angle bisector of dbc . Let ef be parallel to L_2 . Let L_3 be the angle bisector of gep . Let eh be parallel to L_3 . Let L_4 be the angle bisector of hef . Determine the angle between L_4 and pq .

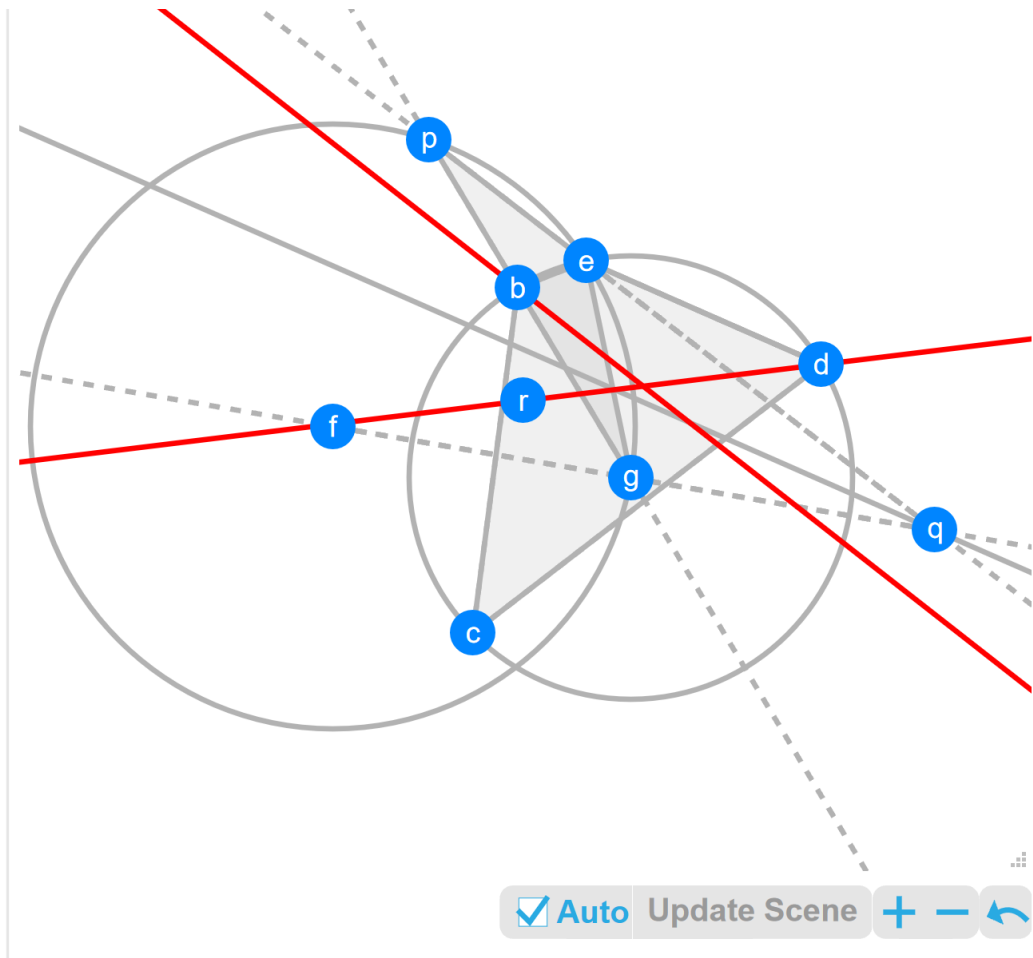


Let bcg be a triangle with circumcentre a . Let $fgcpg$ be a cyclic pentagon with centre e . Let fg be parallel to qp . Let bg be parallel to ef . Let $L1$ be the angle bisector of bcg . Let pc be parallel to $L1$. Prove ag is perpendicular to eq .

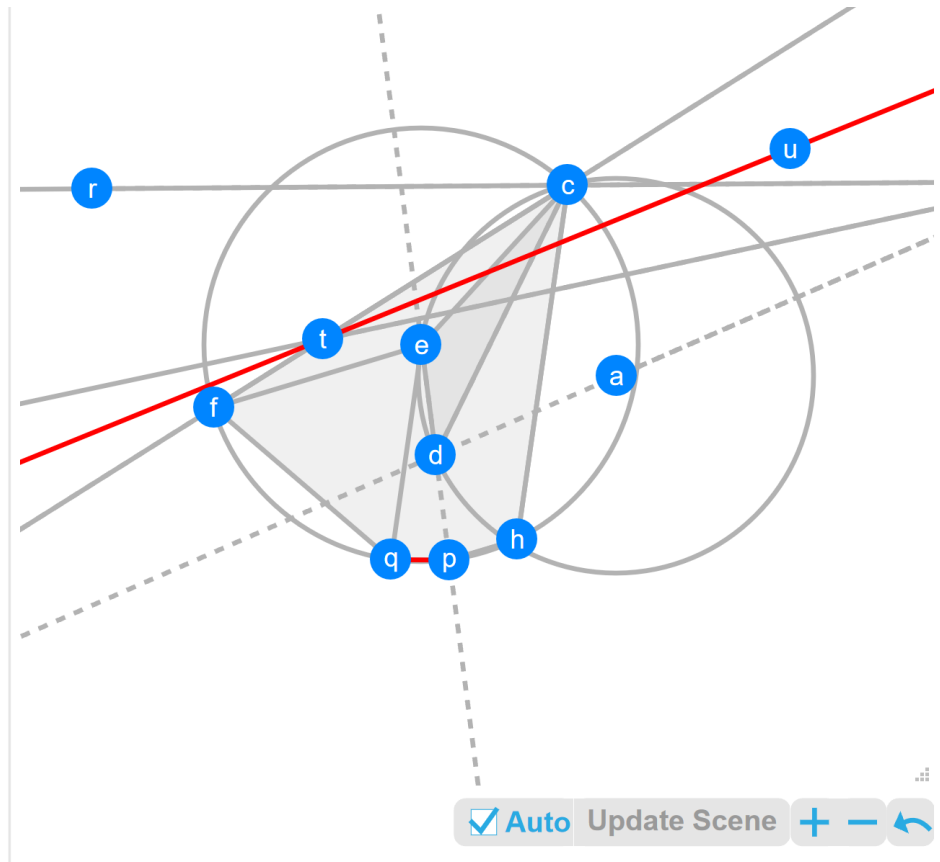


Let $bcde$ be a cyclic quadrilateral with centre h . Let dhp be a triangle with circumcentre f . Let dep be collinear. Let $L1$ be the angle bisector of hp and fd . Let $L2$ be the angle bisector of cbe . Let ed be parallel to $L2$. Let $L3$ be the angle bisector of dc and hb . Determine the angle between $L1$ and $L3$.

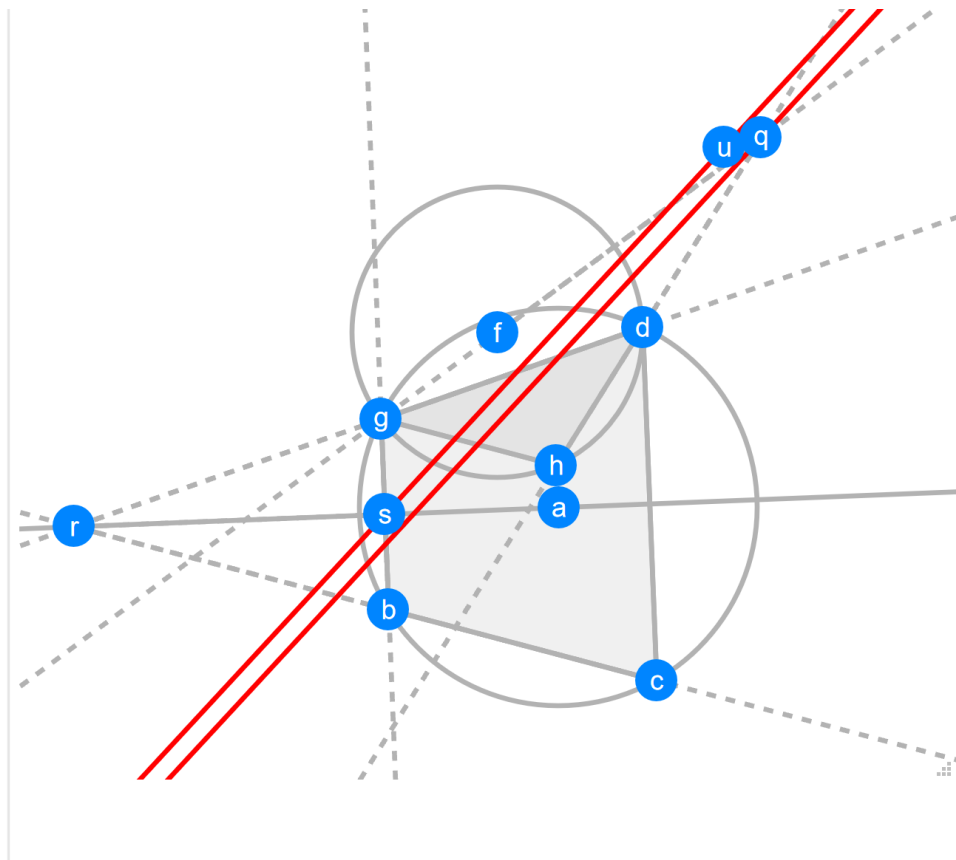




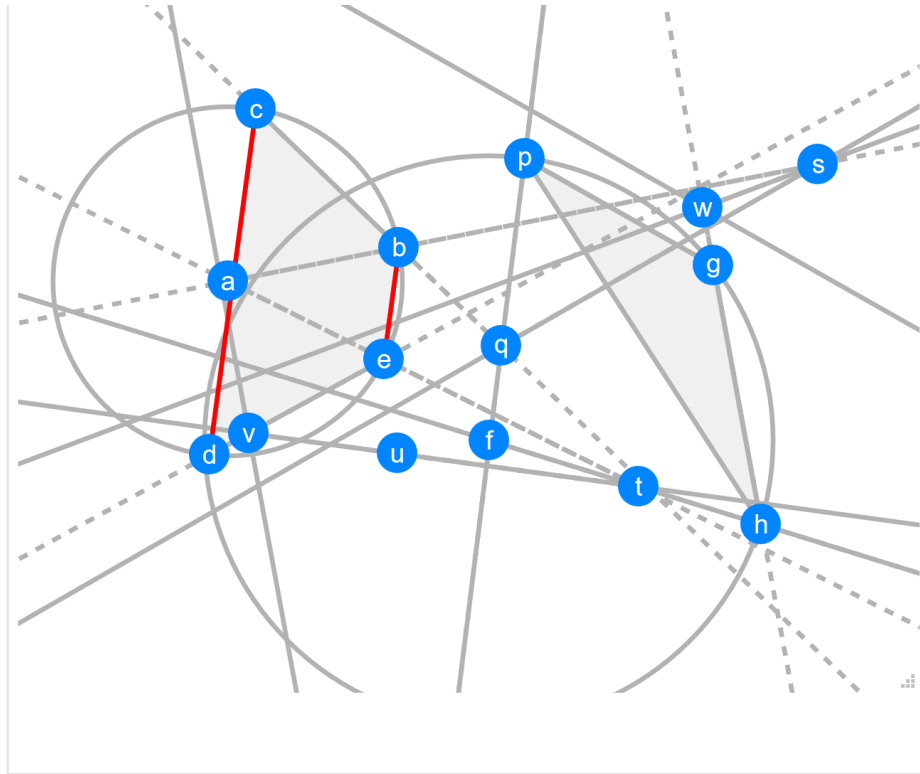
Let $bcde$ be a cyclic quadrilateral with centre g . Let gep be a triangle with circumcentre f . Let gbp be collinear. Let L_1 be the angle bisector of fg and ep . Let ed be parallel to L_1 . Let L_2 be the angle bisector of cde . Let L_3 be the angle bisector of ebc . Determine the angle between L_2 and L_3 .



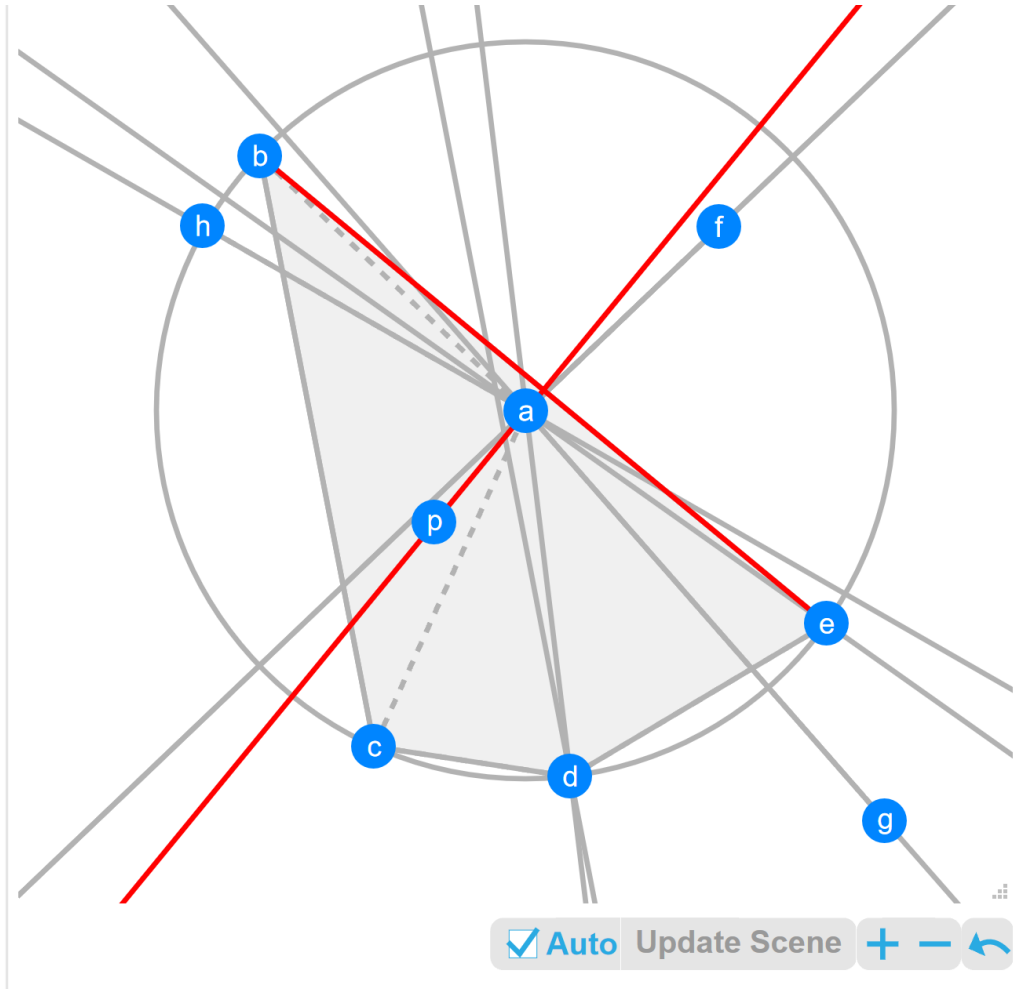
Let ecd be a triangle with circumcentre a . Let $fchpq$ be a cyclic pentagon with centre e . Let eq be parallel to hc . Let ef be parallel to hp . Let edp be collinear. Let $L1$ be the reflection of dc in fc . Let $L2$ be the angle bisector of ad and $L1$. Let $L3$ be the angle bisector of $L2$ and fc . Determine the angle between pq and $L3$.



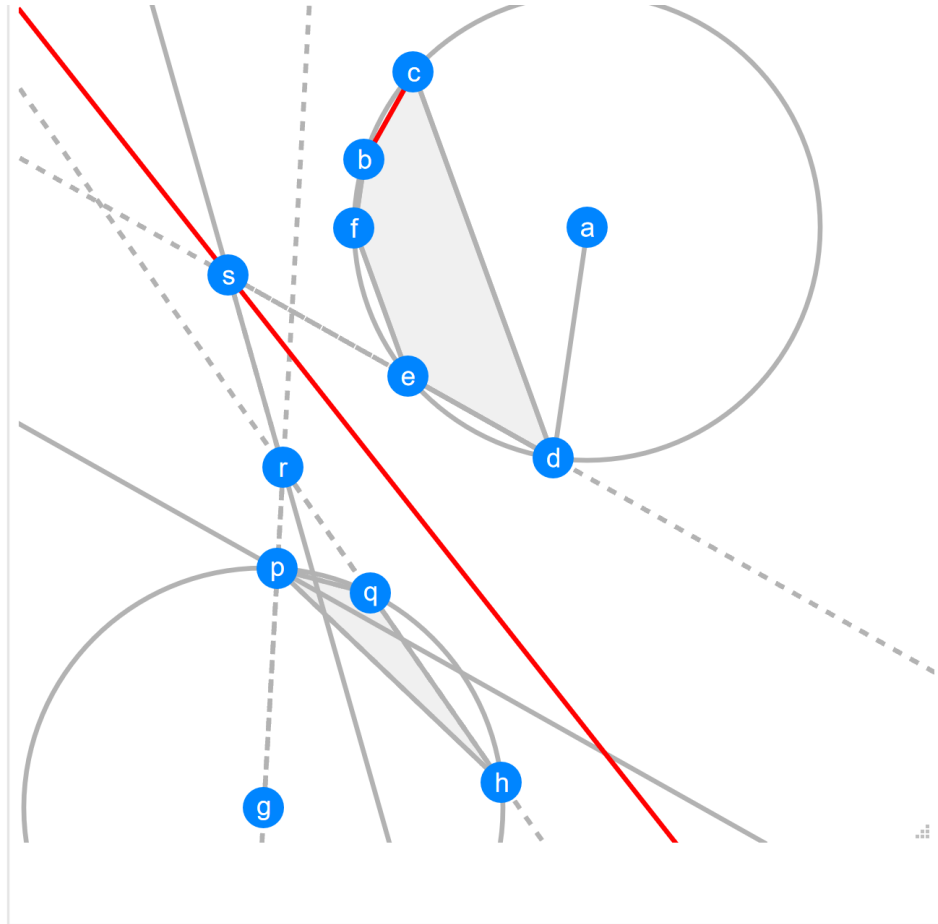
Let $bcdg$ be a cyclic quadrilateral with centre a . Let bg be parallel to dc . Let ghd be a triangle with circumcentre f . Let bc be parallel to hg . Let $L1$ be the angle bisector of hd and fg . Let $L2$ be the angle bisector of gd and bc . Let $L3$ be the angle bisector of bg and $L2$. Determine the angle between $L1$ and $L3$.



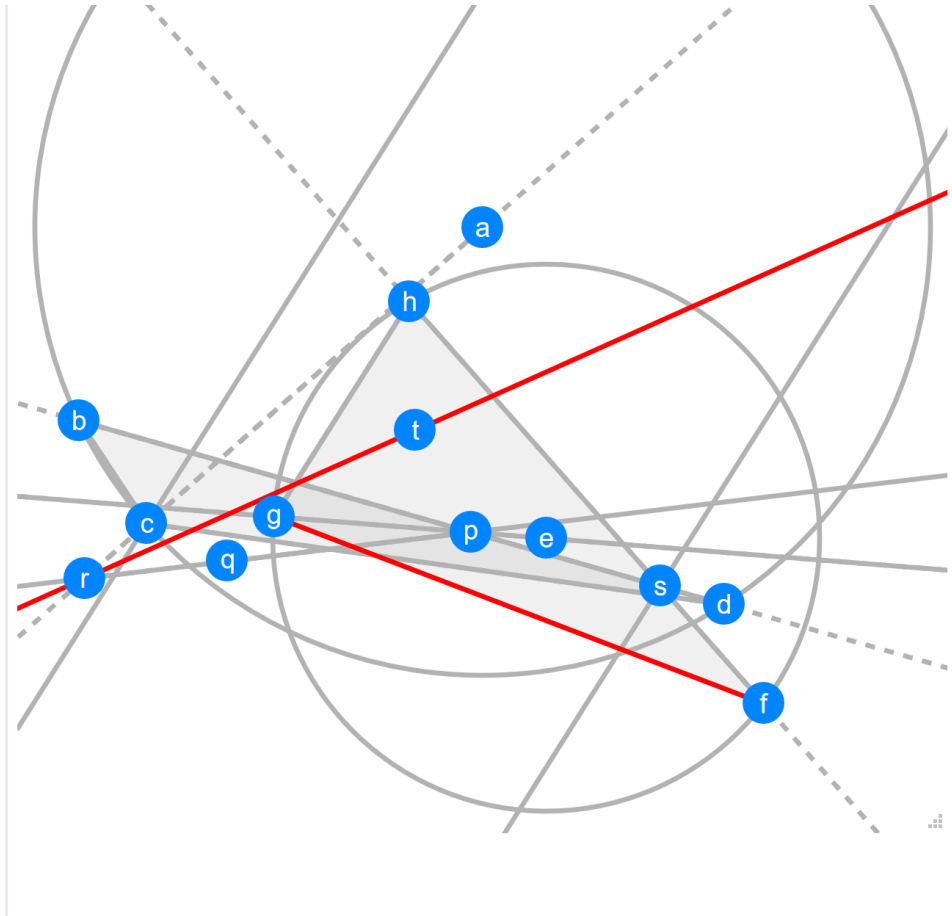
Let $bcde$ be a cyclic quadrilateral with centre a . Let ghp be a triangle with circumcentre f . Let L_1 be the reflection of bc in fp . Let L_2 be the angle bisector of L_1 and ab . Let L_3 be the reflection of ae in fh . Let L_4 be the angle bisector of L_3 and de . Let gh be parallel to L_4 . Let L_5 be the angle bisector of L_2 and gh . Let gp be parallel to L_5 . Prove be is parallel to dc .



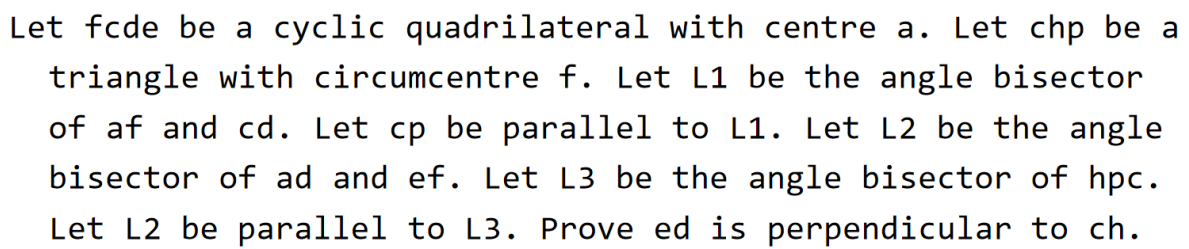
Let $bcde$ be a cyclic quadrilateral with centre a . Let L_1 be the reflection of ac in ae . Let L_2 be the reflection of ab in L_1 . Let L_3 be the reflection of L_1 in ad . Let L_4 be the angle bisector of L_2 and L_3 . Let L_5 be the angle bisector of edc . Let cb be parallel to L_5 . Determine the angle between L_4 and eb .

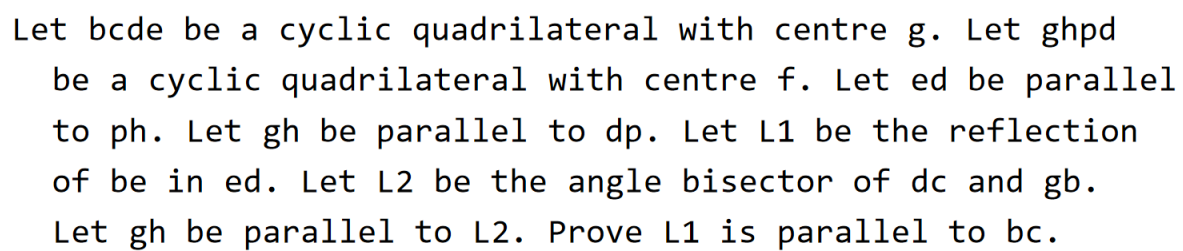


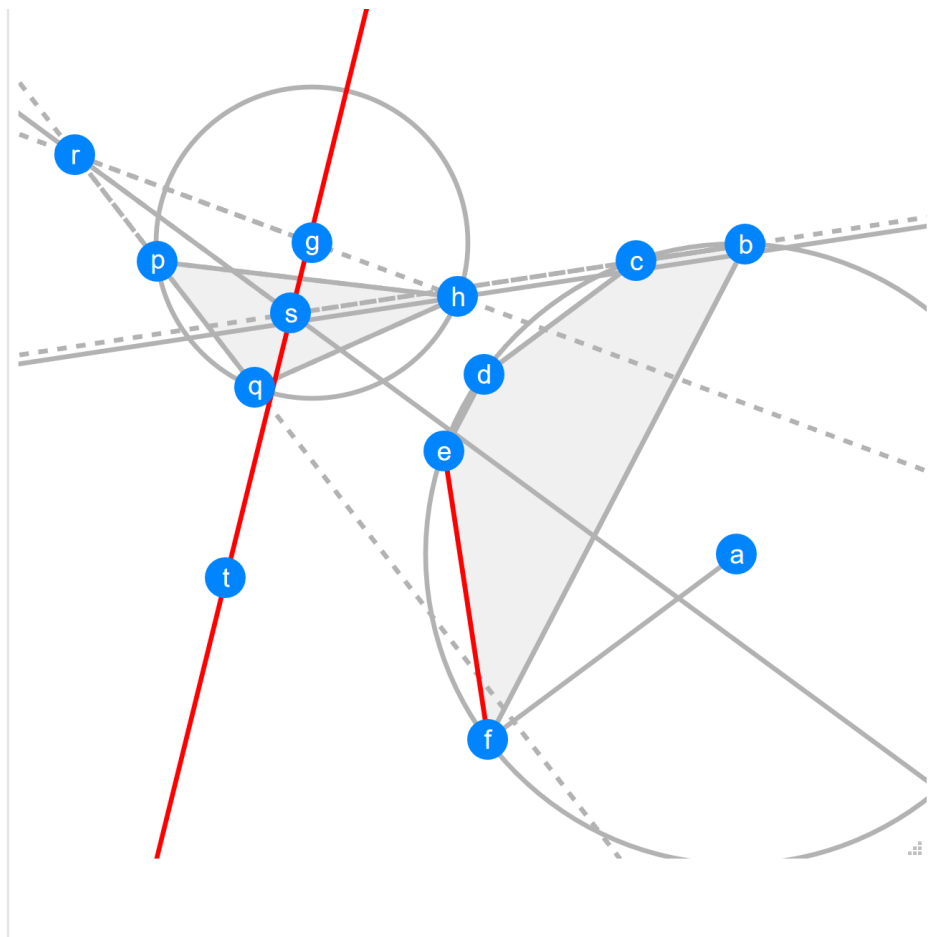
Let $bcdef$ be a cyclic pentagon with centre a . Let ad be parallel to bf .
 Let dc be parallel to fe . Let hpq be a triangle with circumcentre g . Let L_1 be the angle bisector of hpq . Let de be parallel to L_1 .
 Let L_2 be the angle bisector of gp and hq . Let L_3 be the angle bisector of L_2 and de . Determine the angle between L_3 and bc .



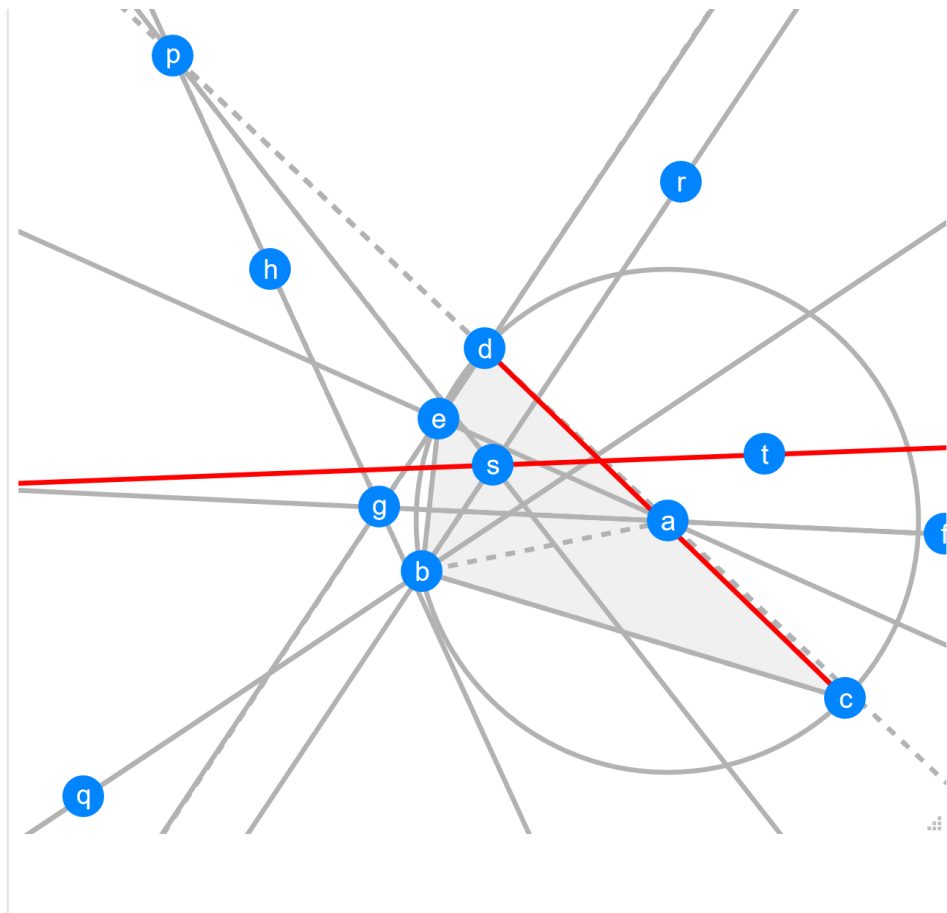
Let bcd be a triangle with circumcentre a . Let fgh be a triangle with circumcentre e . Let $L1$ be the angle bisector of bcd . Let hg be parallel to $L1$. Let $L2$ be the reflection of bd in eg . Let $L3$ be the angle bisector of ac and $L2$. Let $L4$ be the angle bisector of bd and fh . Let hg be parallel to $L4$. Determine the angle between $L3$ and fg .



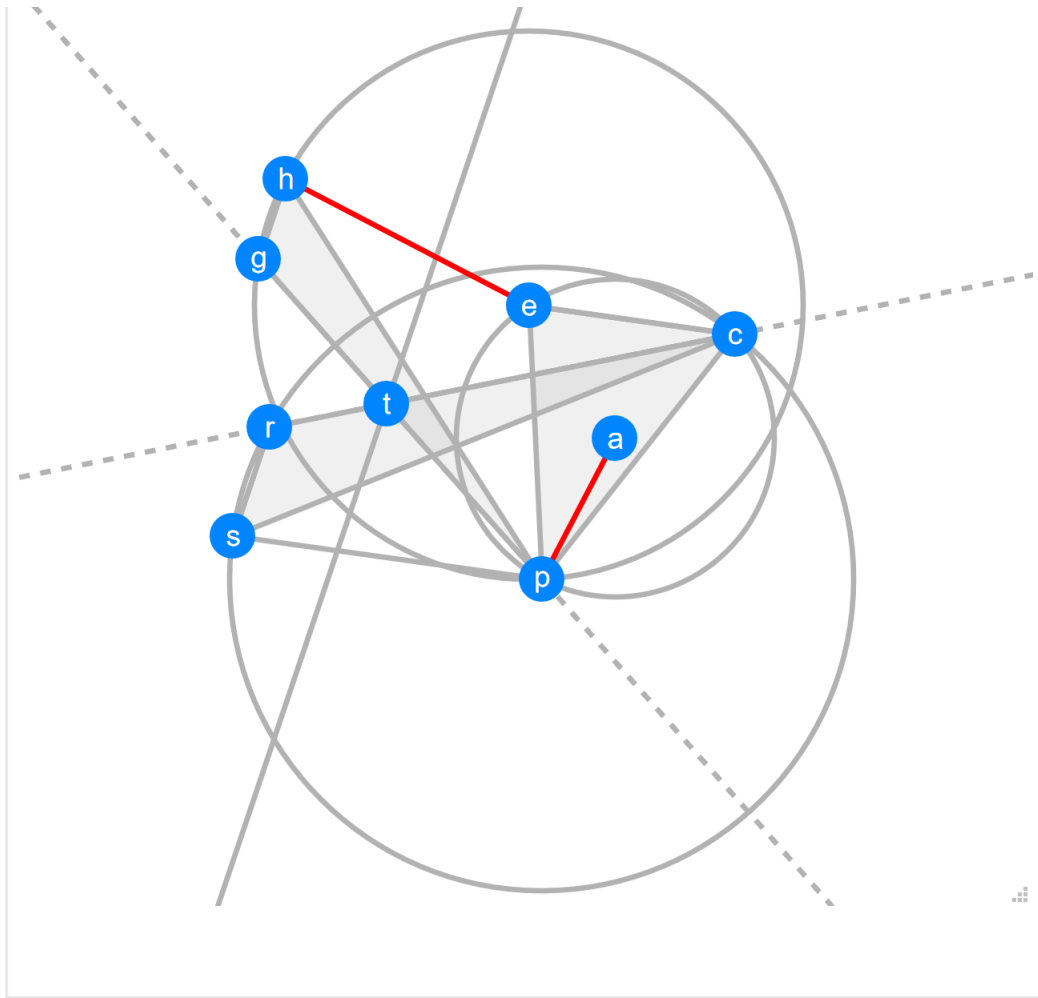




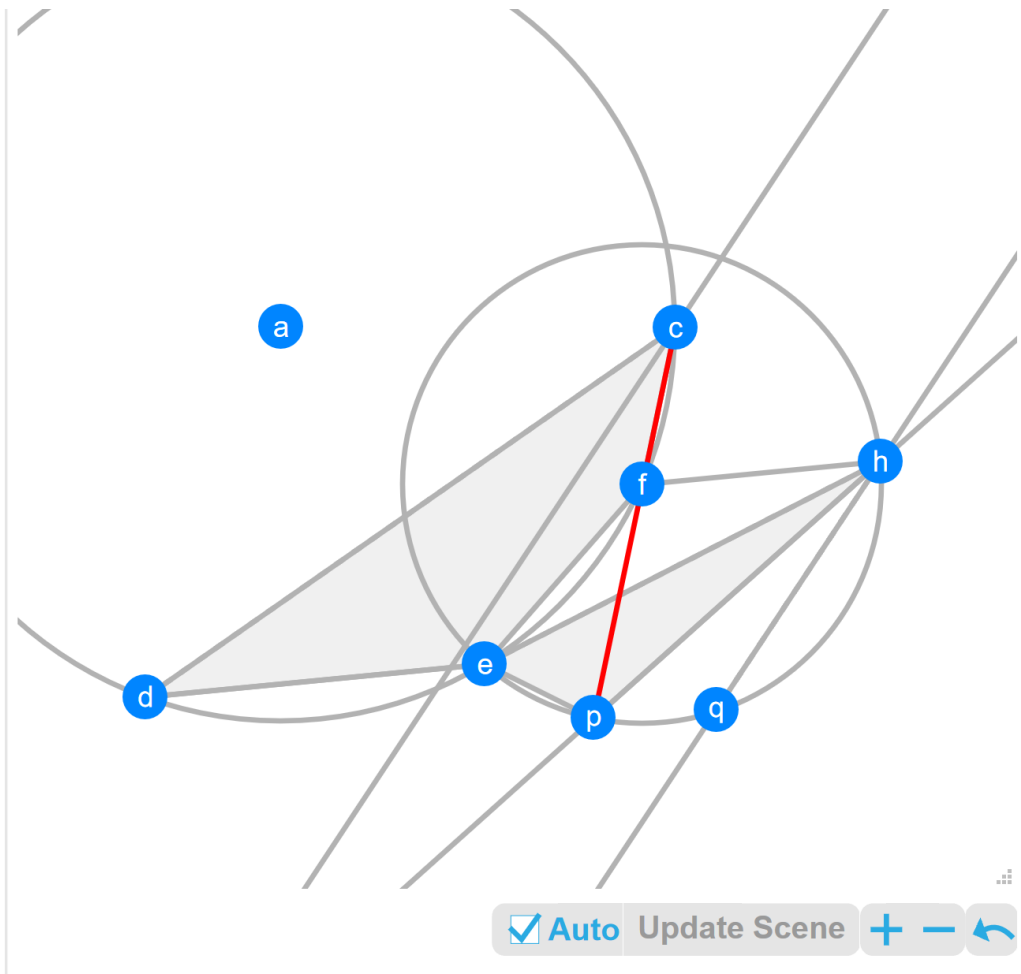
Let $bcdef$ be a cyclic pentagon with centre a . Let af be parallel to dc .
 Let bf be parallel to de . Let hpq be a triangle with circumcentre g . Let $L1$ be the angle bisector of pq and gh . Let $L2$ be the angle bisector of qhp . Let bc be parallel to $L2$. Let $L3$ be the angle



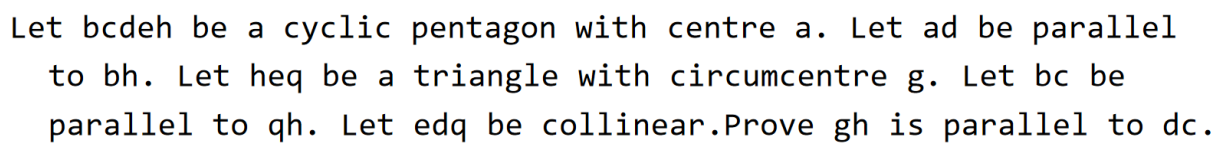
Let $bcde$ be a cyclic quadrilateral with centre a . Let $L1$ be the angle bisector of cbe . Let $L2$ be the reflection of ac in ae . Let $L3$ be the reflection of $L2$ in ed . Let $L4$ be the angle bisector of ad and $L3$. Let $L5$ be the reflection of ab in $L1$. Let $L6$ be the angle bisector of $L5$ and $L4$. Determine the angle between cd and $L6$.

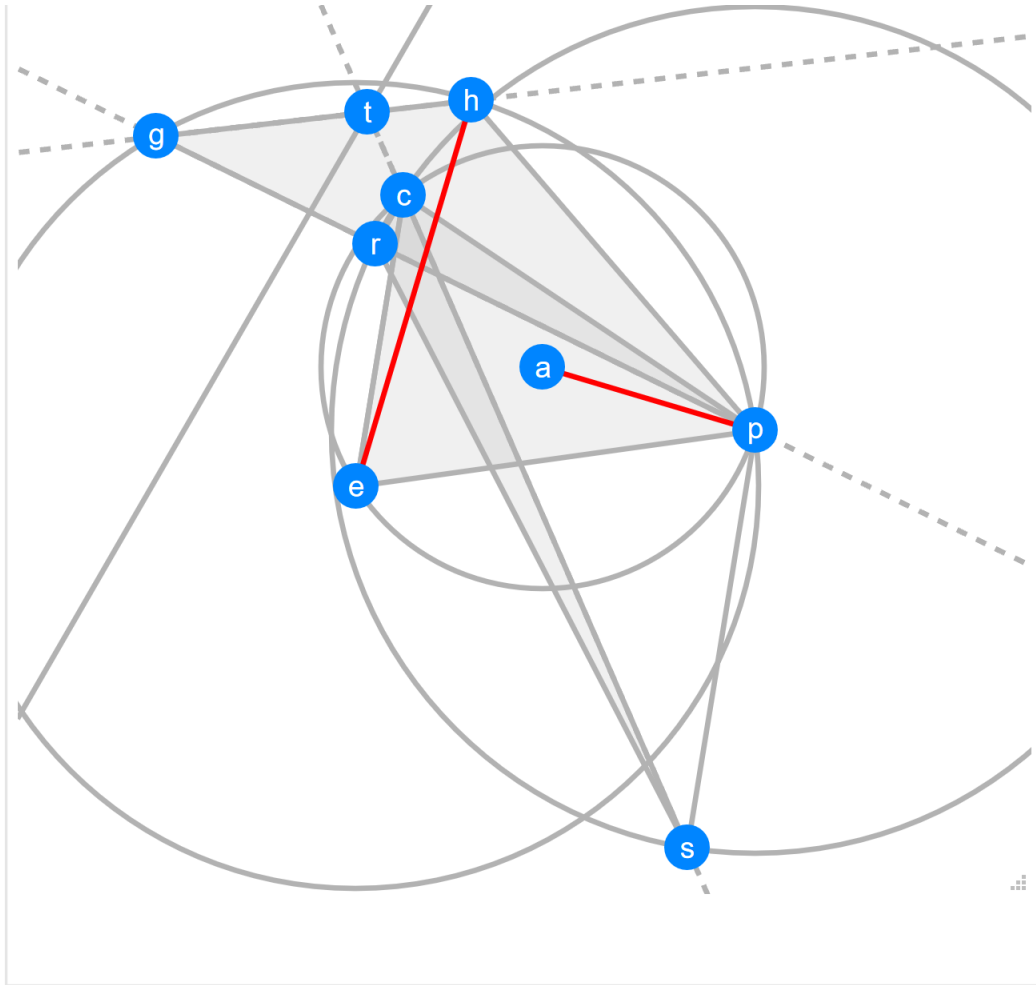


Let pce be a triangle with circumcentre a . Let pgh be a triangle with circumcentre e . Let crs be a triangle with circumcentre p . Let hg be parallel to sr . Let ec be parallel to ps . Let $L1$ be the angle bisector of cr and pg . Let hg be parallel to $L1$. Prove ap is perpendicular to eh .

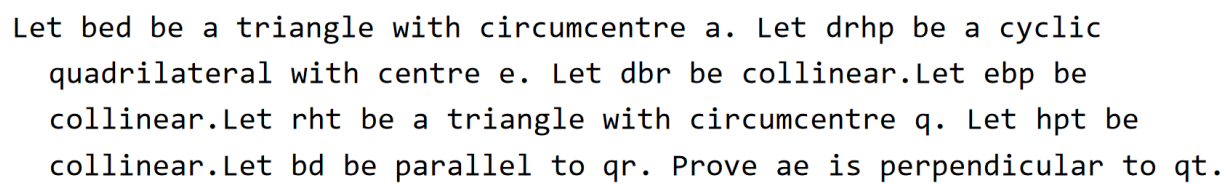


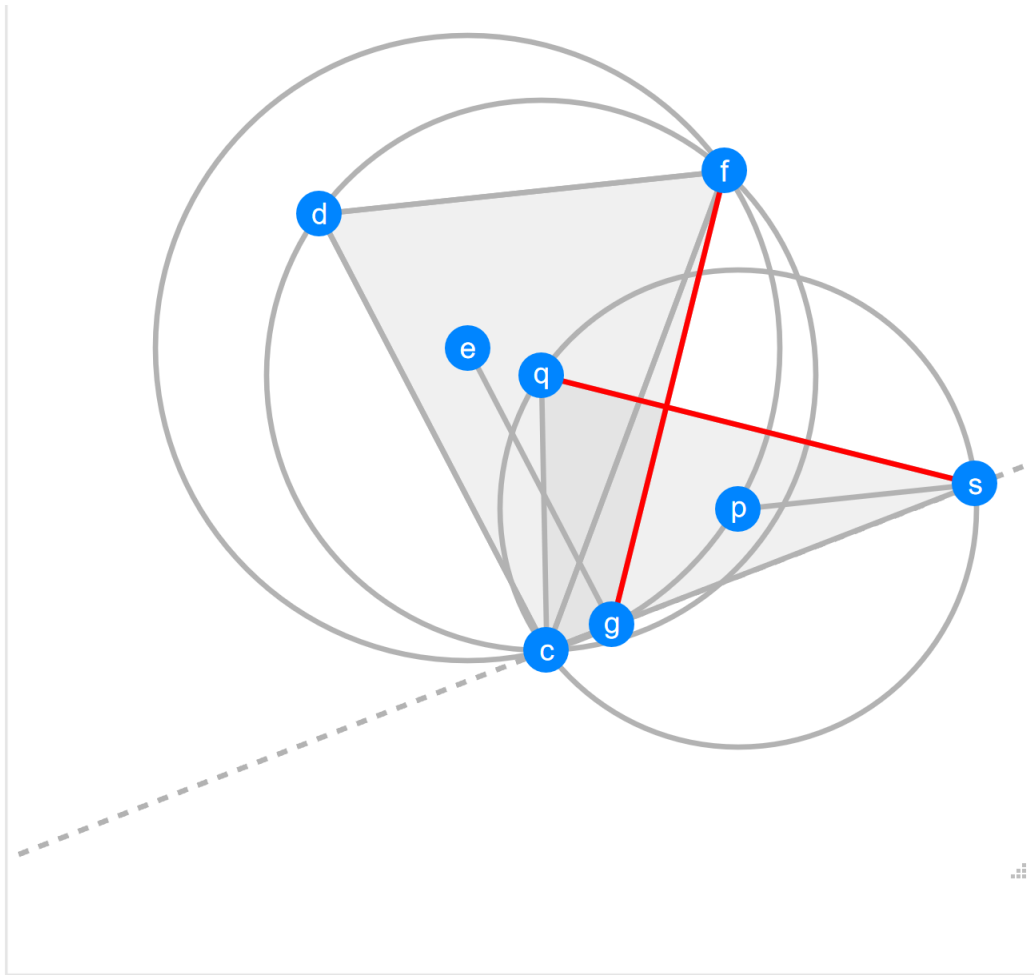
Let $fcde$ be a cyclic quadrilateral with centre a . Let ehp be a triangle with circumcentre f . Let de be parallel to fh . Let L_1 be the reflection of eh in hp . Let L_2 be the angle bisector of dcf . Let L_1 be parallel to L_2 . Prove fc is parallel to fp .



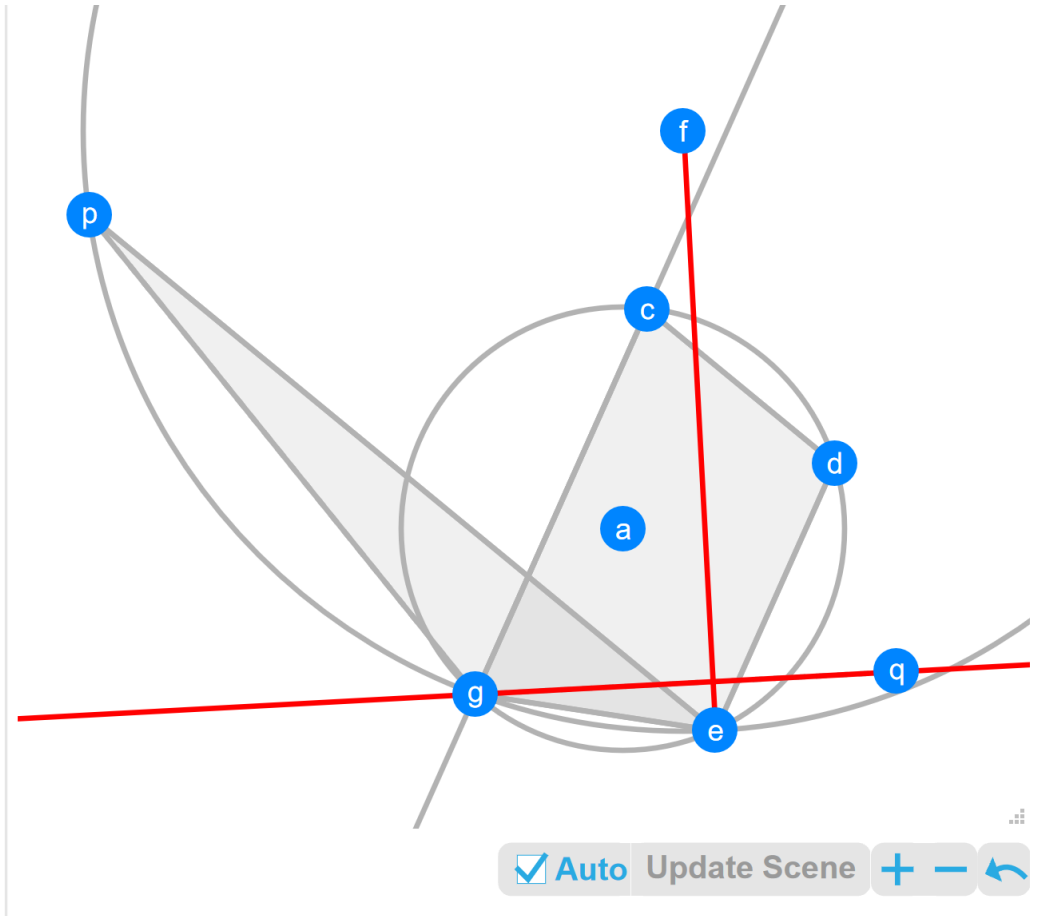


Let pce be a triangle with circumcentre a . Let pgh be a triangle with circumcentre e . Let crs be a triangle with circumcentre p . Let pgr be collinear. Let ec be parallel to ps . Let $L1$ be the angle bisector of sc and hg . Let cr be parallel to $L1$. Prove ap is perpendicular to eh .

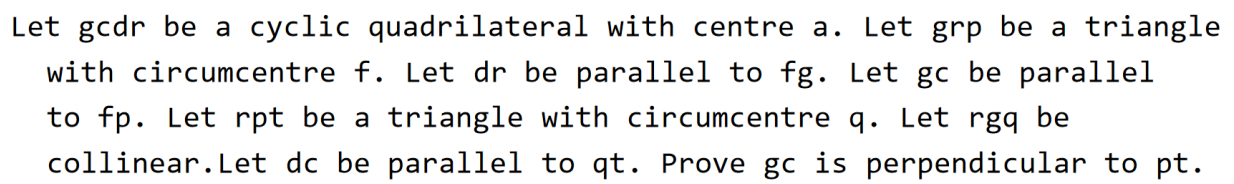


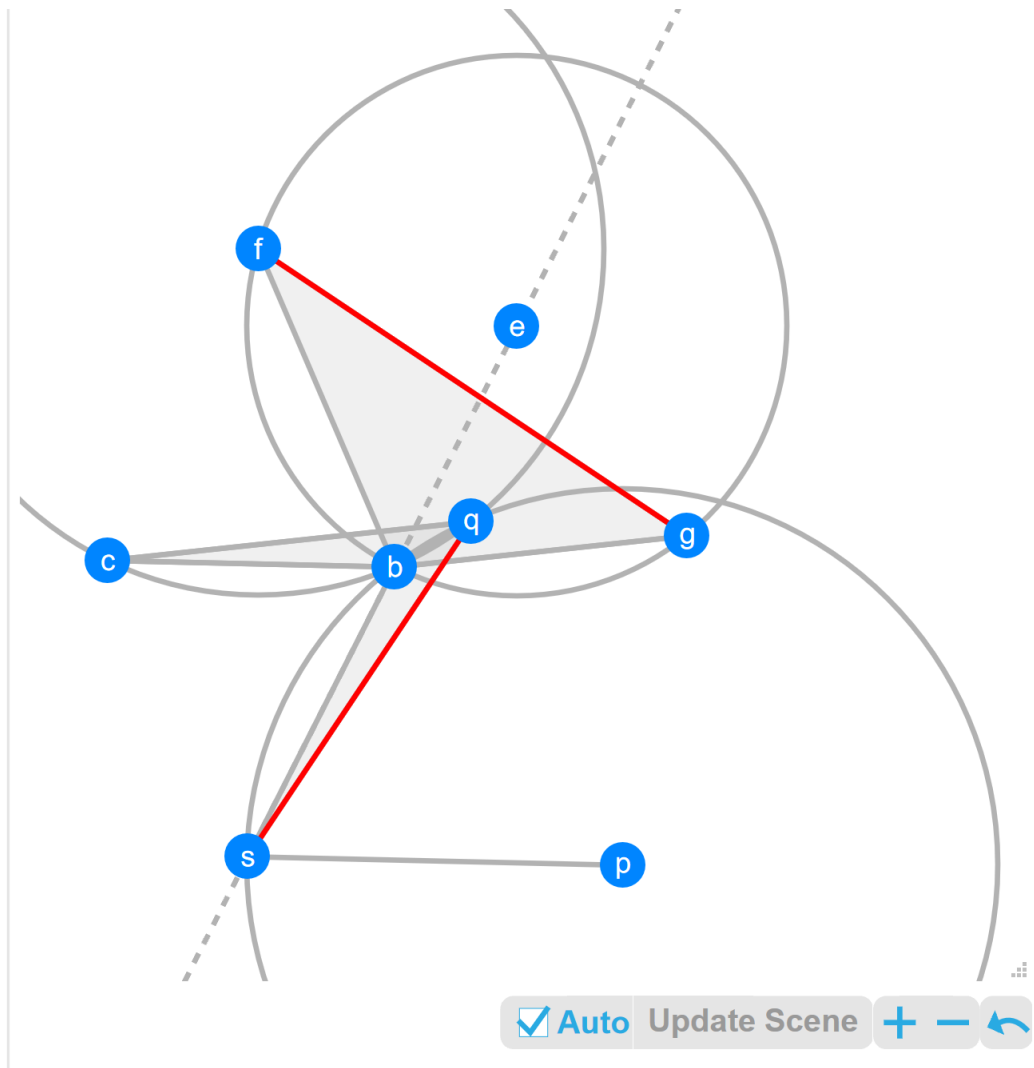


Let fcd be a triangle with circumcentre q . Let fgc be a triangle with circumcentre e . Let cd be parallel to eg . Let qcs be a triangle with circumcentre p . Let cgs be collinear. Let fd be parallel to ps . Prove qs is perpendicular to fg .

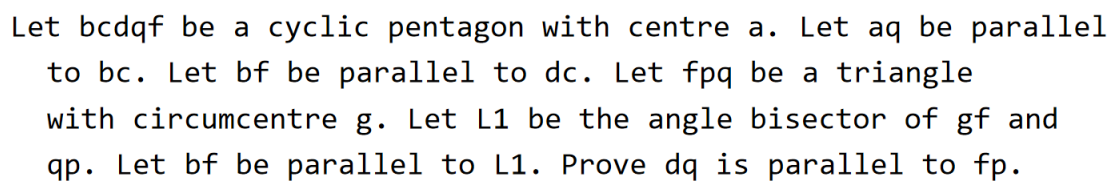


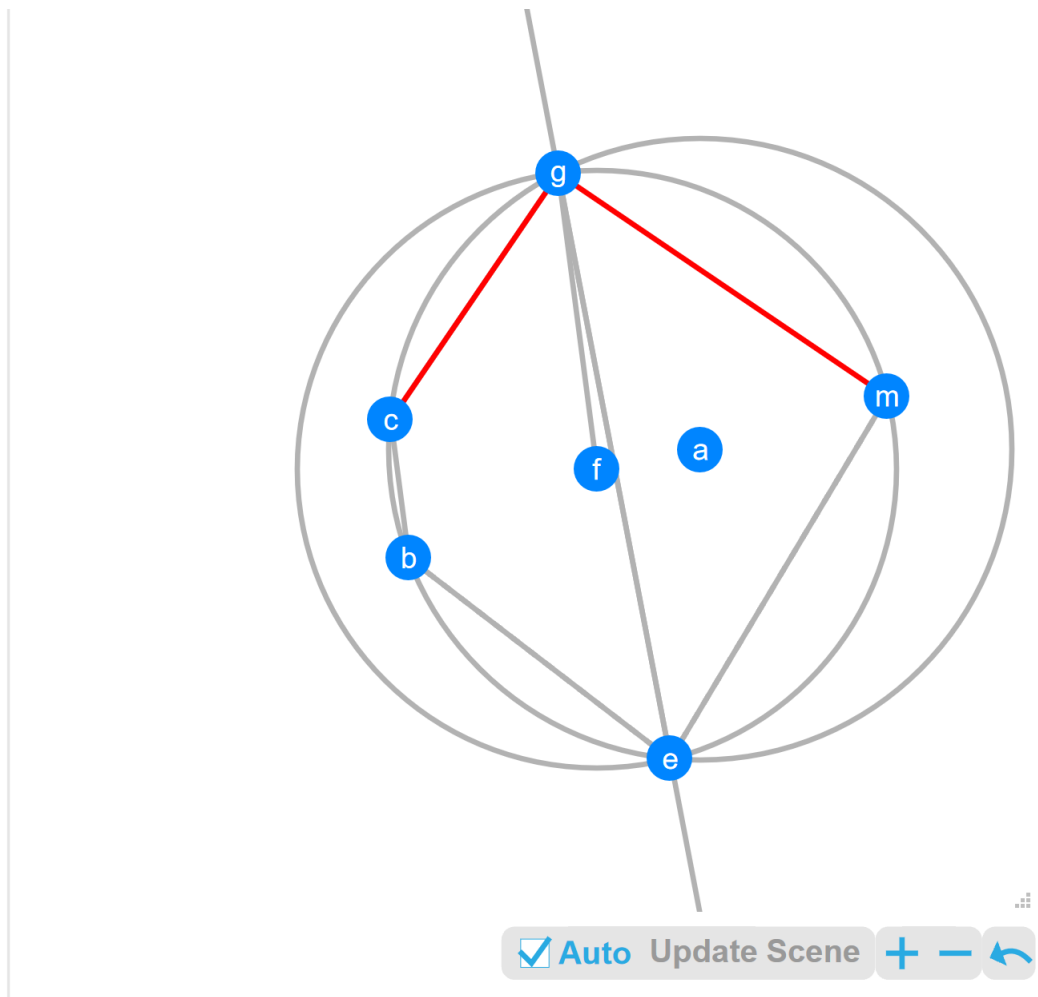
Let $gcde$ be a cyclic quadrilateral with centre a . Let gc be parallel to de . Let gep be a triangle with circumcentre f . Let dc be parallel to ep . Let L_1 be the reflection of gp in gc . Prove fe is perpendicular to L_1 .



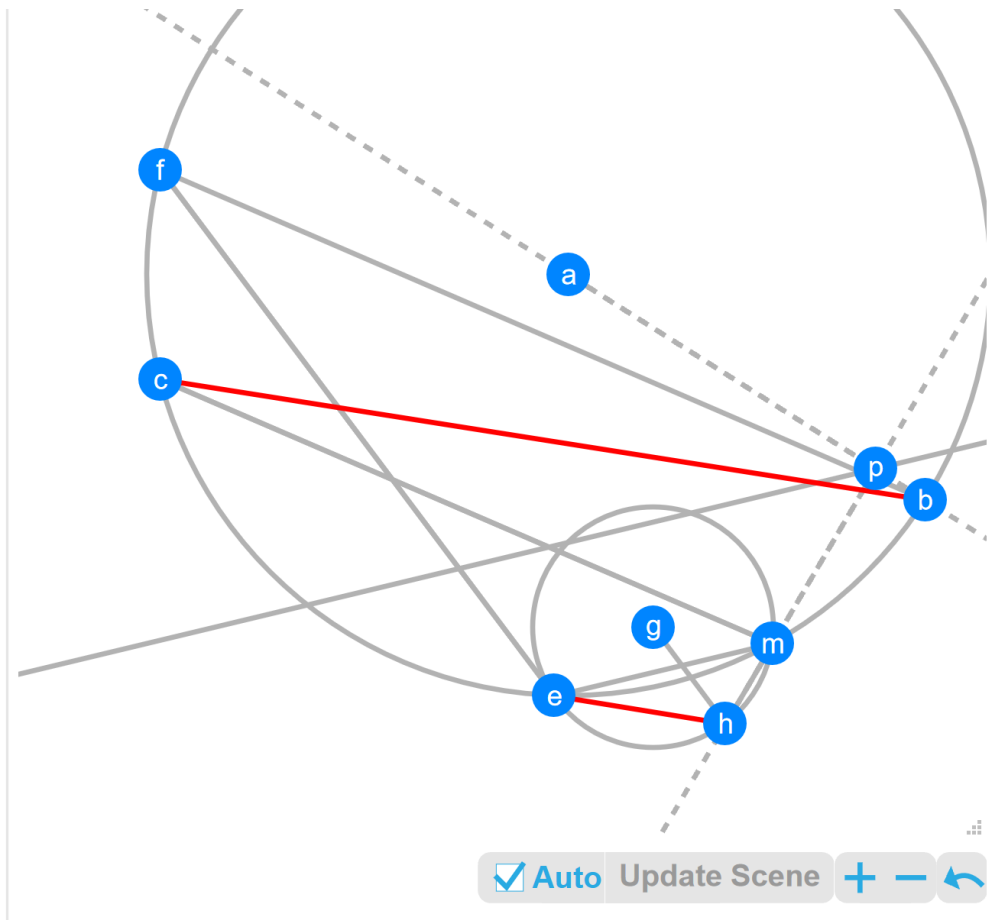


Let bcq be a triangle with circumcentre f . Let fgb be a triangle with circumcentre e . Let qc be parallel to bg . Let qbs be a triangle with circumcentre p . Let bes be collinear. Let bc be parallel to ps . Prove qs is perpendicular to fg .

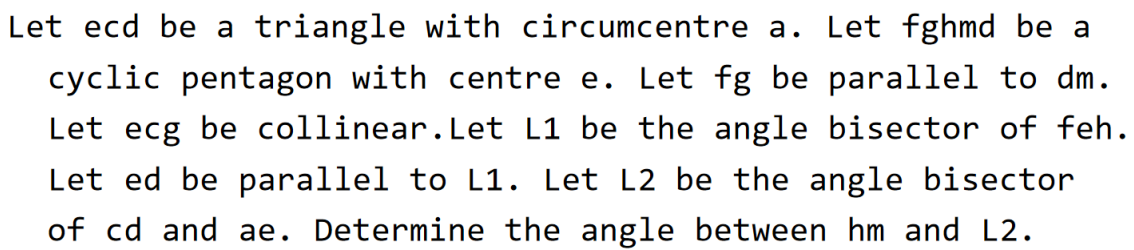


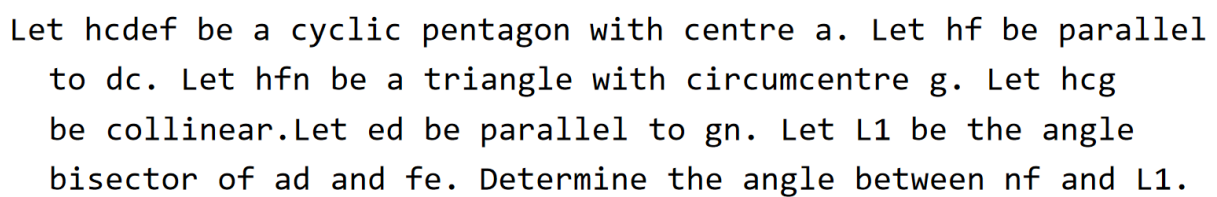


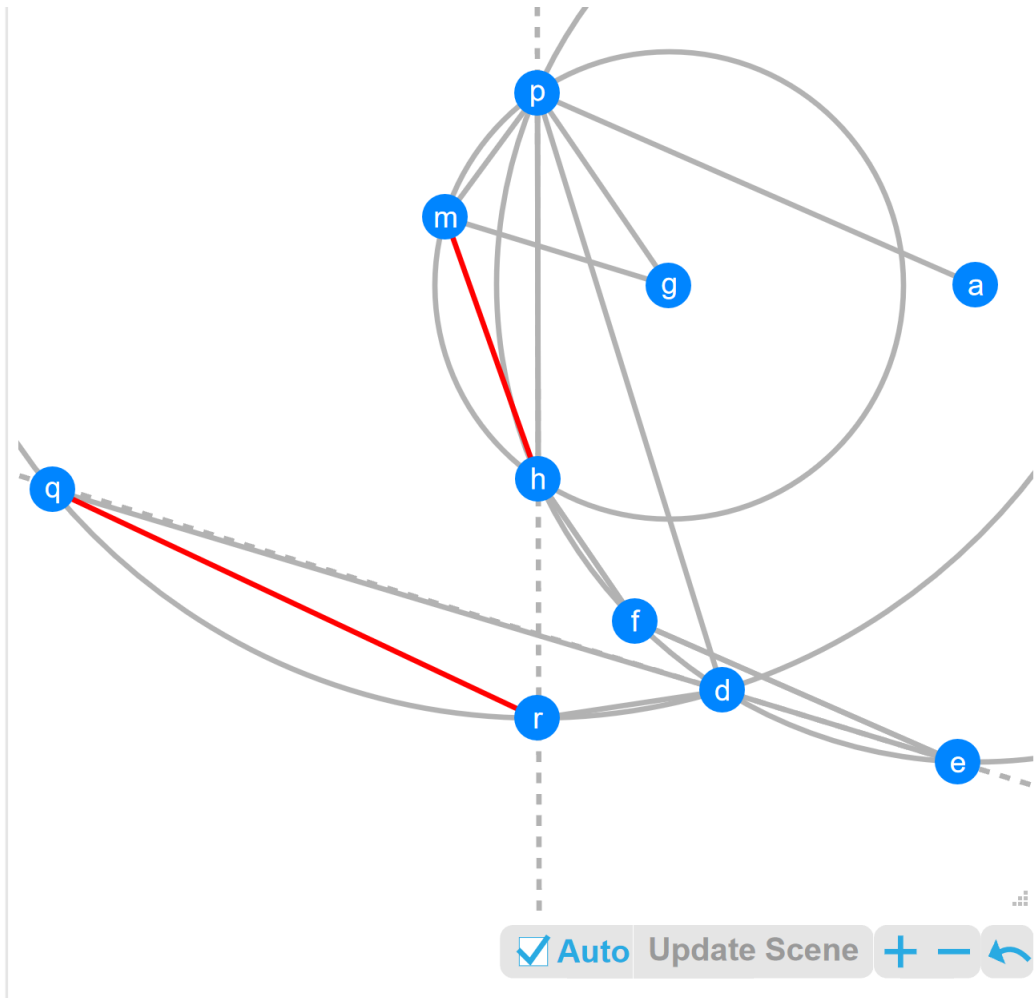
Let $bcge$ be a cyclic quadrilateral with centre a . Let gem be a triangle with circumcentre f . Let bc be parallel to fg . Let L_1 be the angle bisector of bem . Let ge be parallel to L_1 . Prove mg is perpendicular to gc .



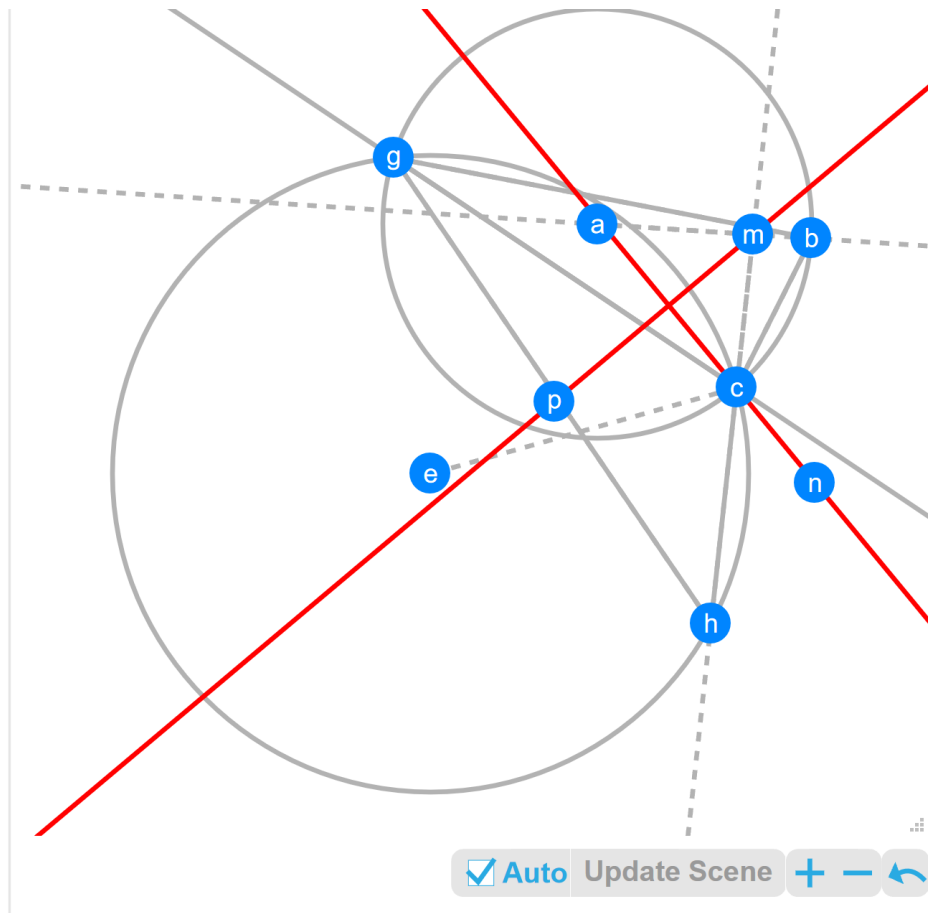
Let $bcme$ be a cyclic pentagon with centre a . Let fb be parallel to mc . Let hme be a triangle with circumcentre g . Let fe be parallel to gh . Let L_1 be the angle bisector of ab and hm . Let me be parallel to L_1 . Prove eh is parallel to bc .



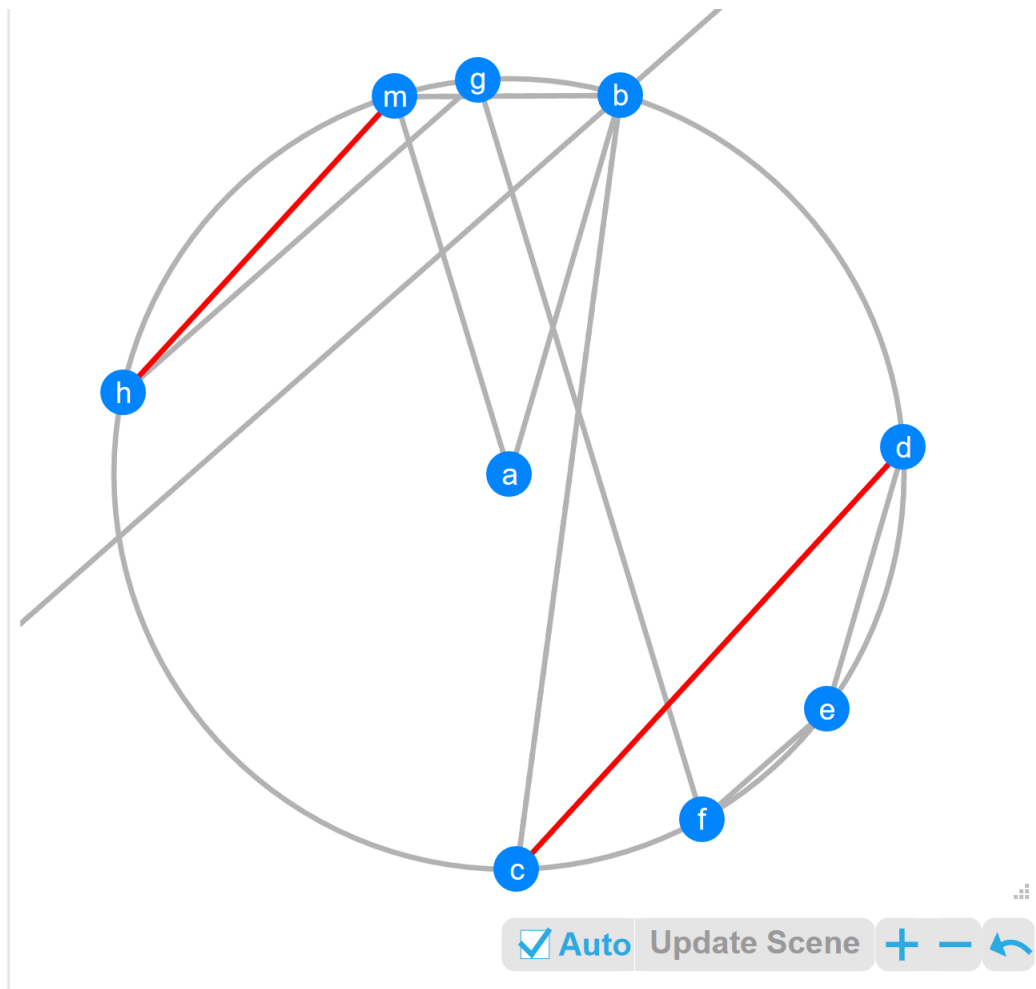




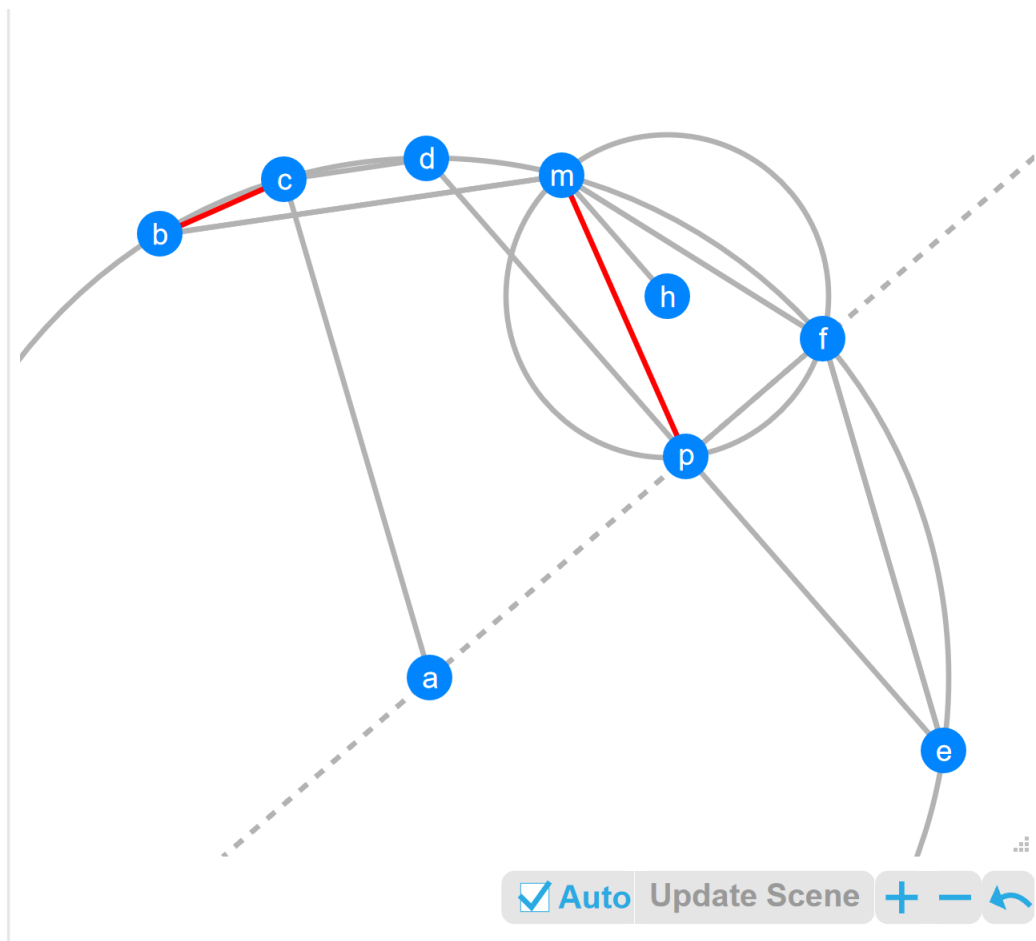
Let $hpdef$ be a cyclic pentagon with centre a . Let ap be parallel to fe . Let hmp be a triangle with circumcentre g . Let de be parallel to gm . Let hf be parallel to gp . Let qrd be a triangle with circumcentre p . Let deq be collinear. Let phr be collinear. Prove qr is 45 degrees to hm .



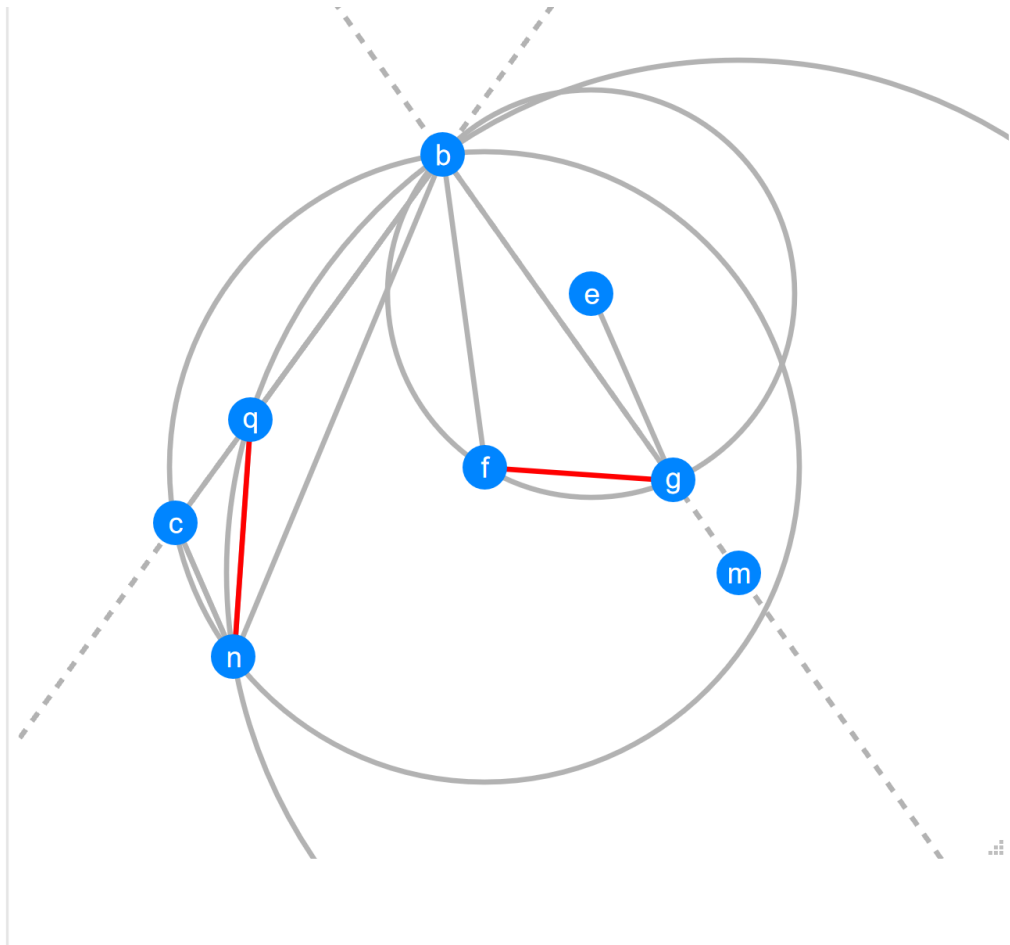
Let bcg be a triangle with circumcentre a . Let cgh be a triangle with circumcentre e . Let $L1$ be the angle bisector of bce . Let $L2$ be the angle bisector of hgb . Let gc be parallel to $L2$. Let $L3$ be the angle bisector of ch and ab . Determine the angle between $L1$ and $L3$.



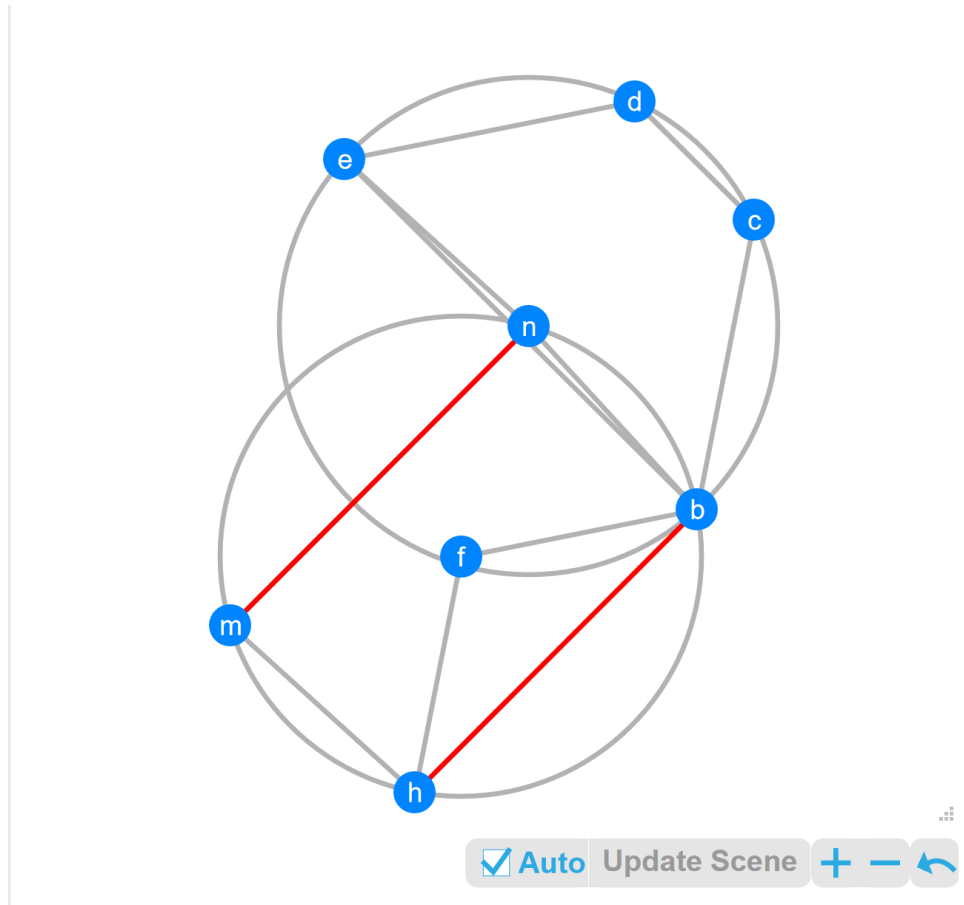
Let $bcdefghm$ be a cyclic octagon with centre a . Let ab be parallel to de . Let am be parallel to fg . Let ef be parallel to gh . Let $L1$ be the angle bisector of cbm . Let ef be parallel to $L1$. Prove mh is parallel to dc .



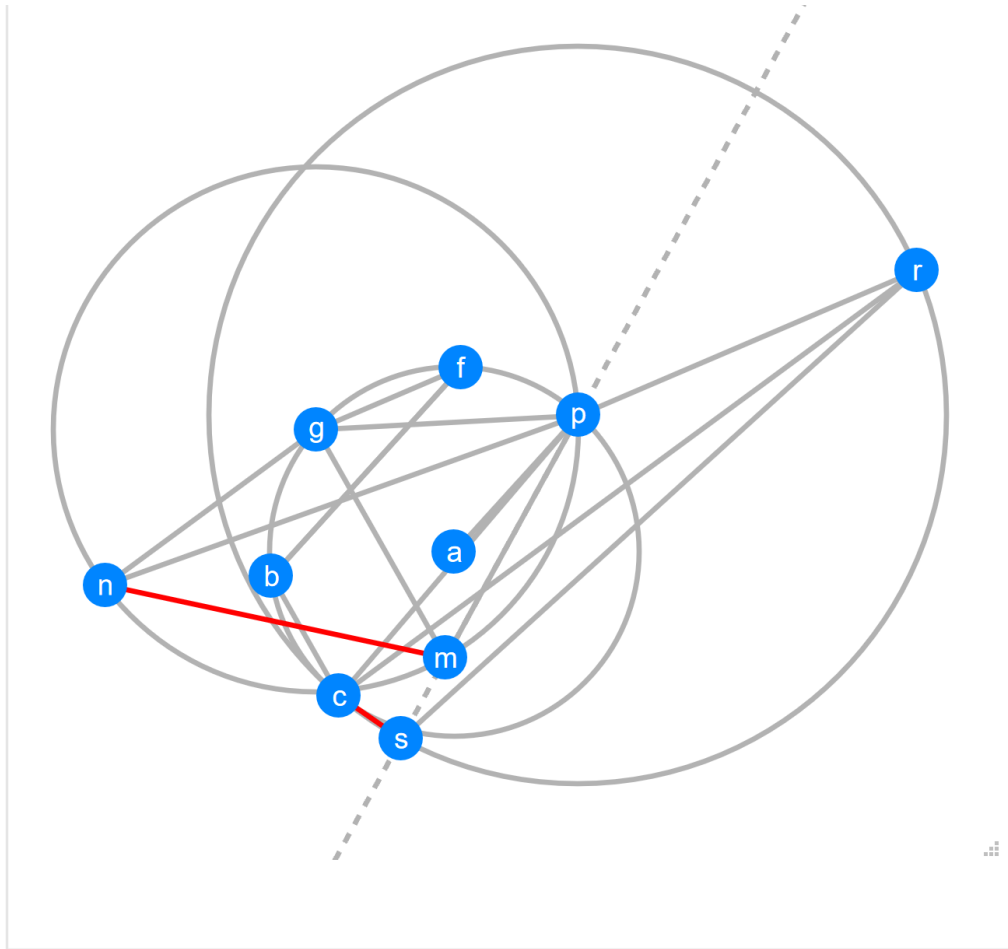
Let $bcdefm$ be a cyclic hexagon with centre a . Let bm be parallel to cd . Let ac be parallel to fe . Let mfp be a triangle with circumcentre h . Let fap be collinear. Let de be parallel to hm . Prove pm is perpendicular to bc .



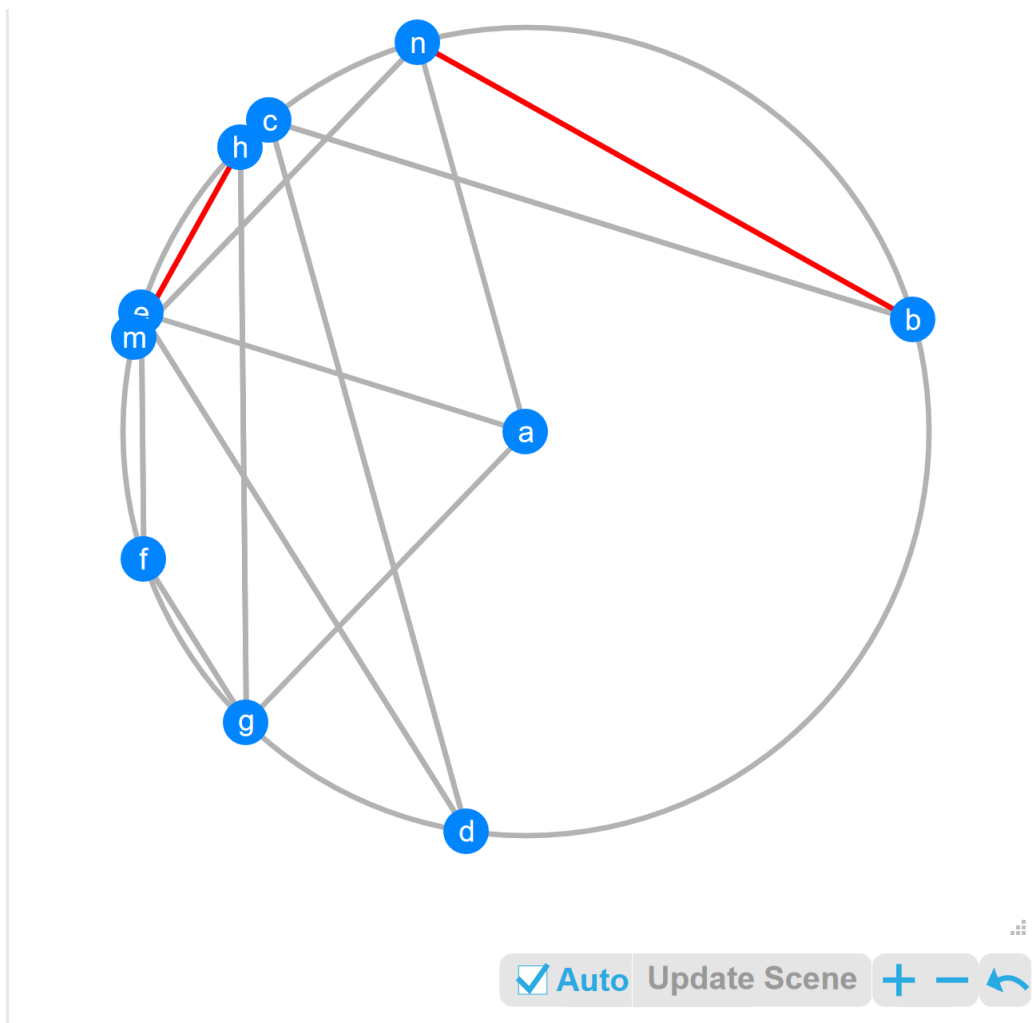
Let bcn be a triangle with circumcentre f . Let fgb be a triangle with circumcentre e . Let nc be parallel to eg . Let nbq be a triangle with circumcentre m . Let bcq be collinear. Let bgm be collinear. Prove nq is perpendicular to fg .



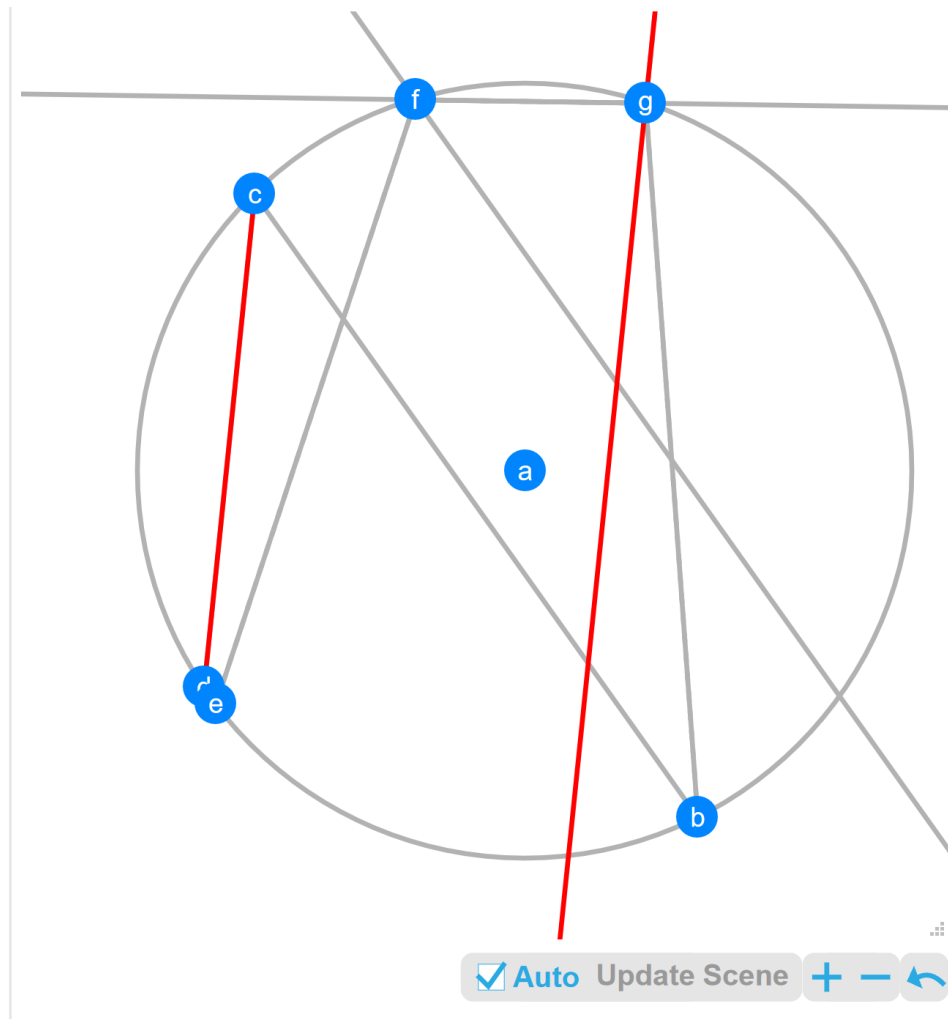
Let $bcde$ be a cyclic quadrilateral with centre n . Let eb be parallel to dc . Let $bhmn$ be a cyclic quadrilateral with centre f . Let ne be parallel to hm . Let de be parallel to fb . Let bc be parallel to fh . Determine the angle between bh and nm . (177.202)



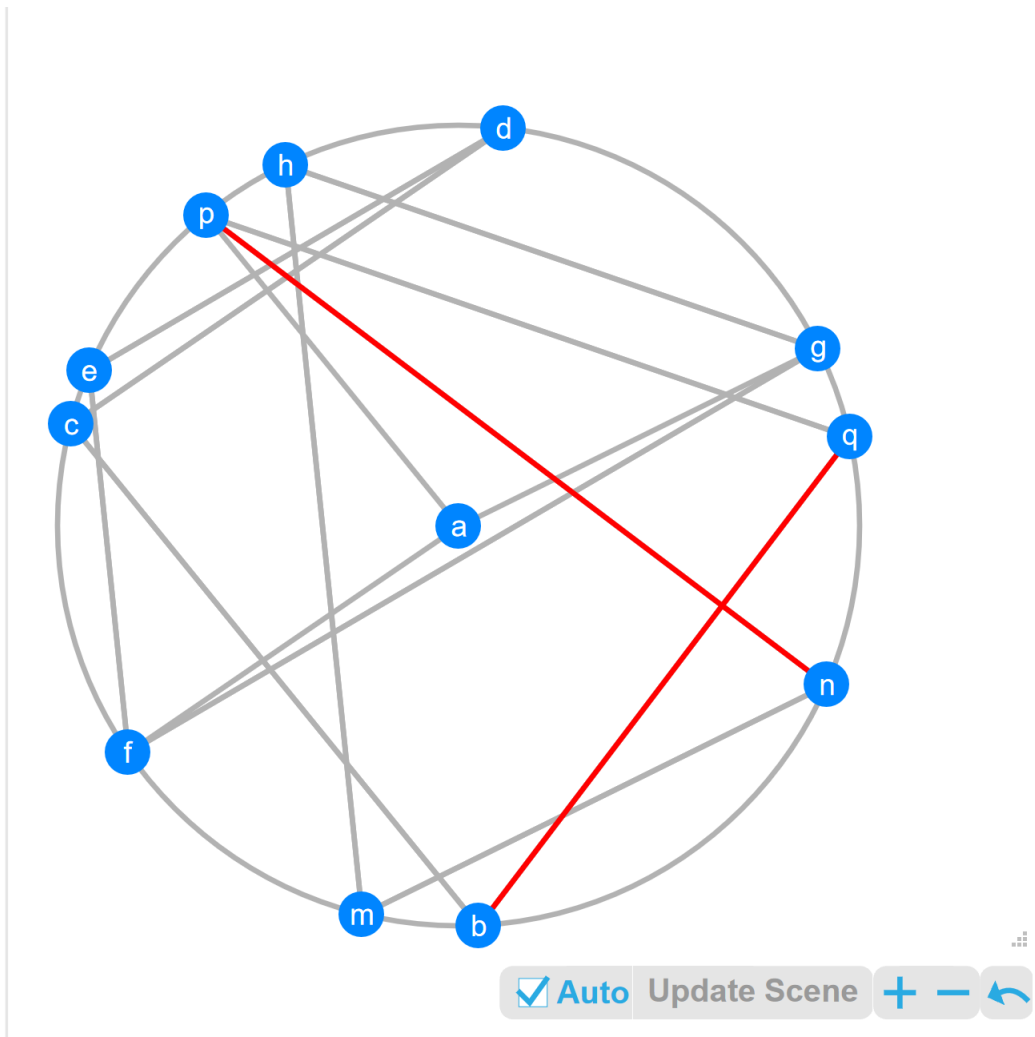
Let $bcpgf$ be a cyclic pentagon with centre a . Let ap be parallel to bf . Let pmn be a triangle with circumcentre g . Let bc be parallel to gm . Let crs be a triangle with circumcentre p . Let gn be parallel to cr . Let gf be parallel to pr . Let pms be collinear. Determine the angle between sc and mn . (157.541)



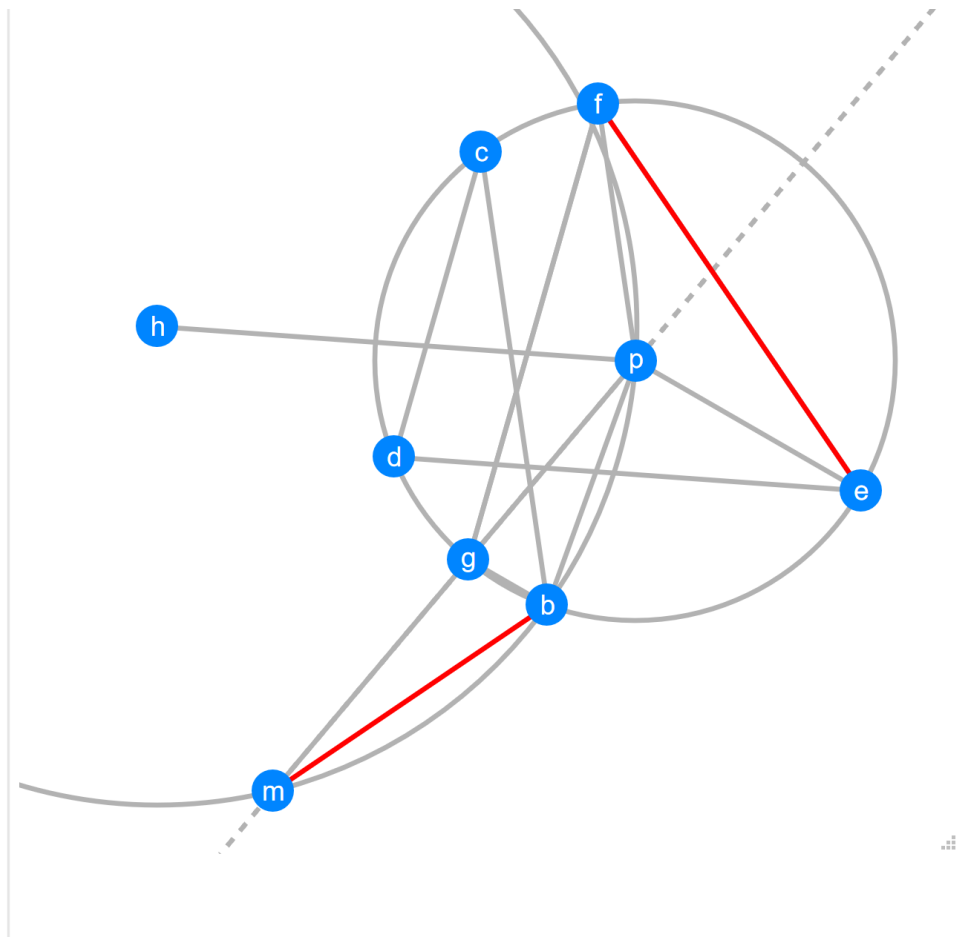
Let $bcdefghmn$ be a cyclic nonagon with centre a . Let ae be parallel to cb . Let an be parallel to dc . Let ed be parallel to gf . Let fe be parallel to hg . Let ag be parallel to nm . Prove bn is perpendicular to mh .



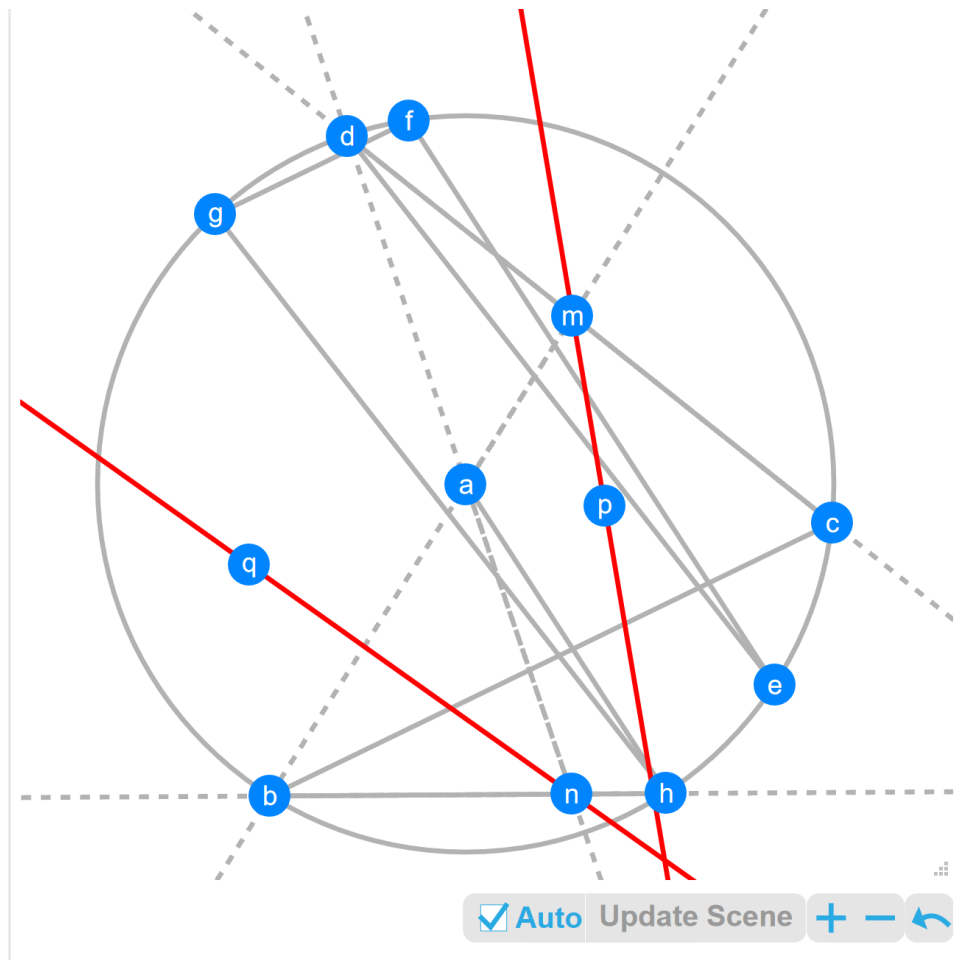
Let $bcdefg$ be a cyclic hexagon with centre a . Let bc be parallel to ed .
 Let L_1 be the reflection of bg in gf . Let L_2 be the angle bisector
 of gfe . Let bc be parallel to L_2 . Prove L_1 is parallel to dc .



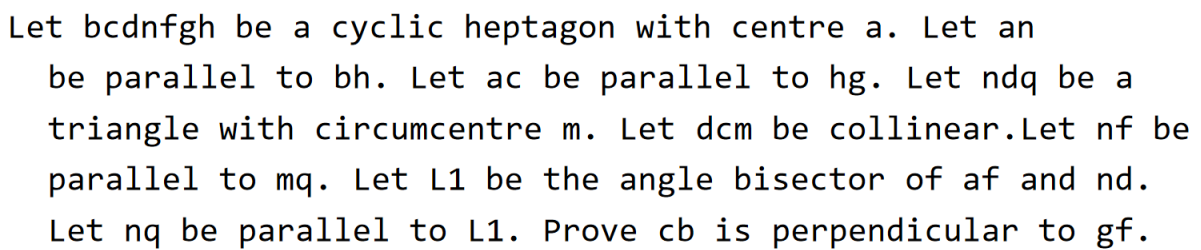
Let $bcdefghmnpq$ be a cyclic hendecagon with centre a . Let ap be parallel to cb . Let af be parallel to dc . Let ed be parallel to gf . Let fe be parallel to mh . Let ag be parallel to nm . Let hg be parallel to qp . Prove bq is perpendicular to pn .

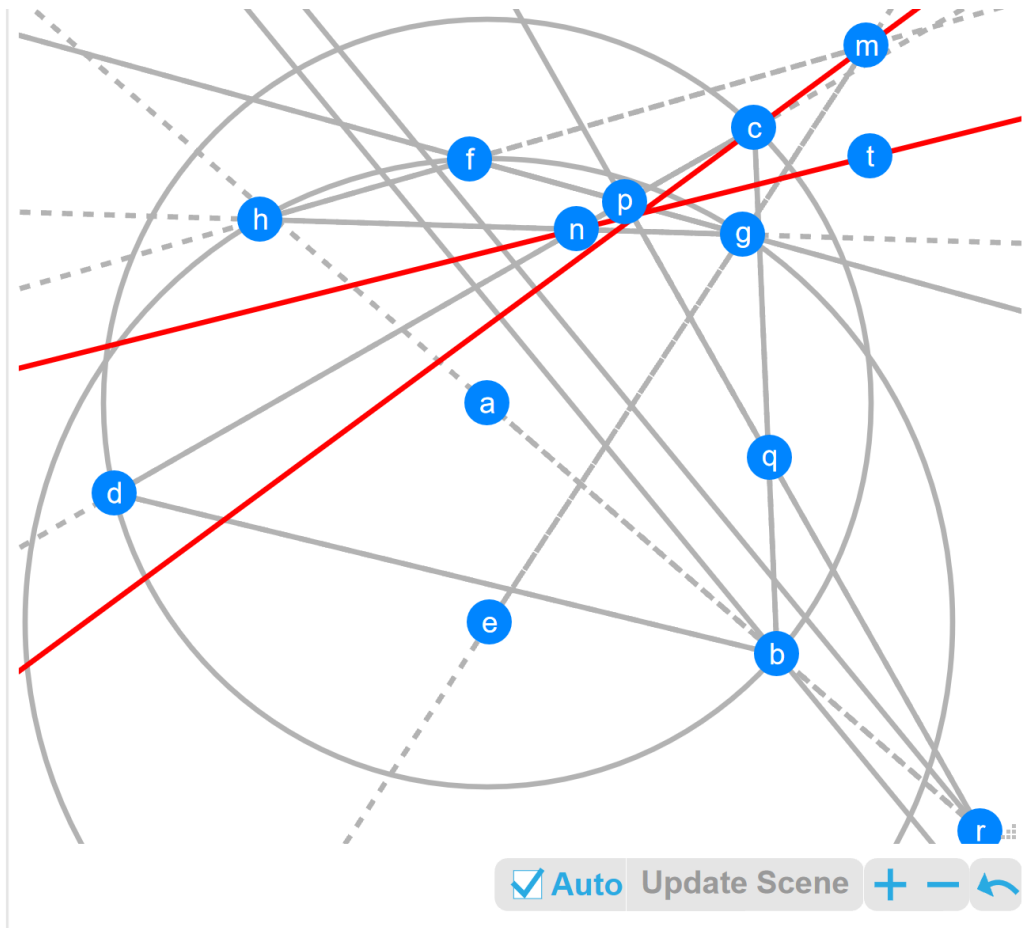


Let $bcdefg$ be a cyclic hexagon with centre p . Let pe be parallel to gb . Let pf be parallel to bc . Let cd be parallel to gf . Let mbp be a triangle with circumcentre h . Let pgm be collinear. Let de be parallel to hp . Prove mb is perpendicular to fe .

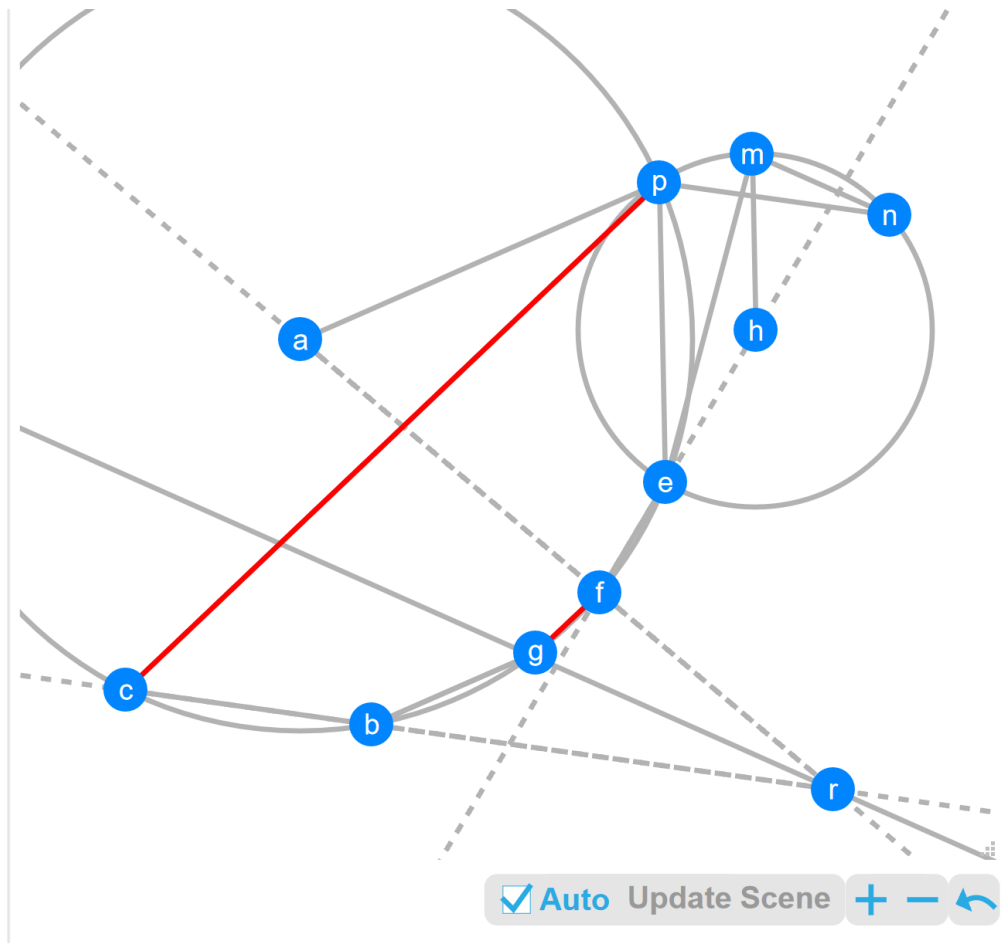


Let $bcdefgh$ be a cyclic heptagon with centre a . Let ah be parallel to ef . Let bc be parallel to fg . Let de be parallel to gh . Let $L1$ be the angle bisector of ab and cd . Let $L2$ be the angle bisector of hb and ad . Determine the angle between $L1$ and $L2$.

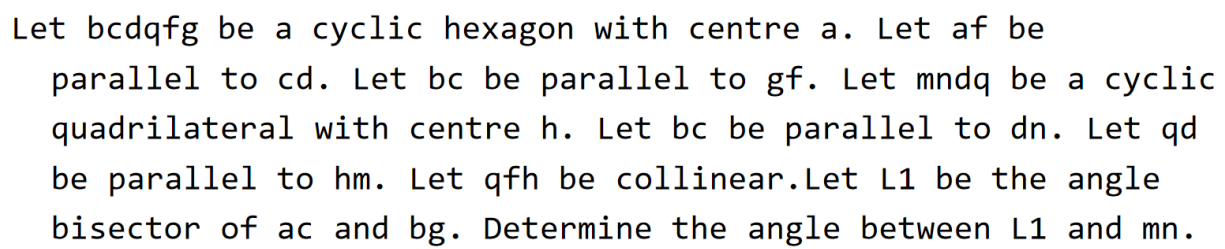


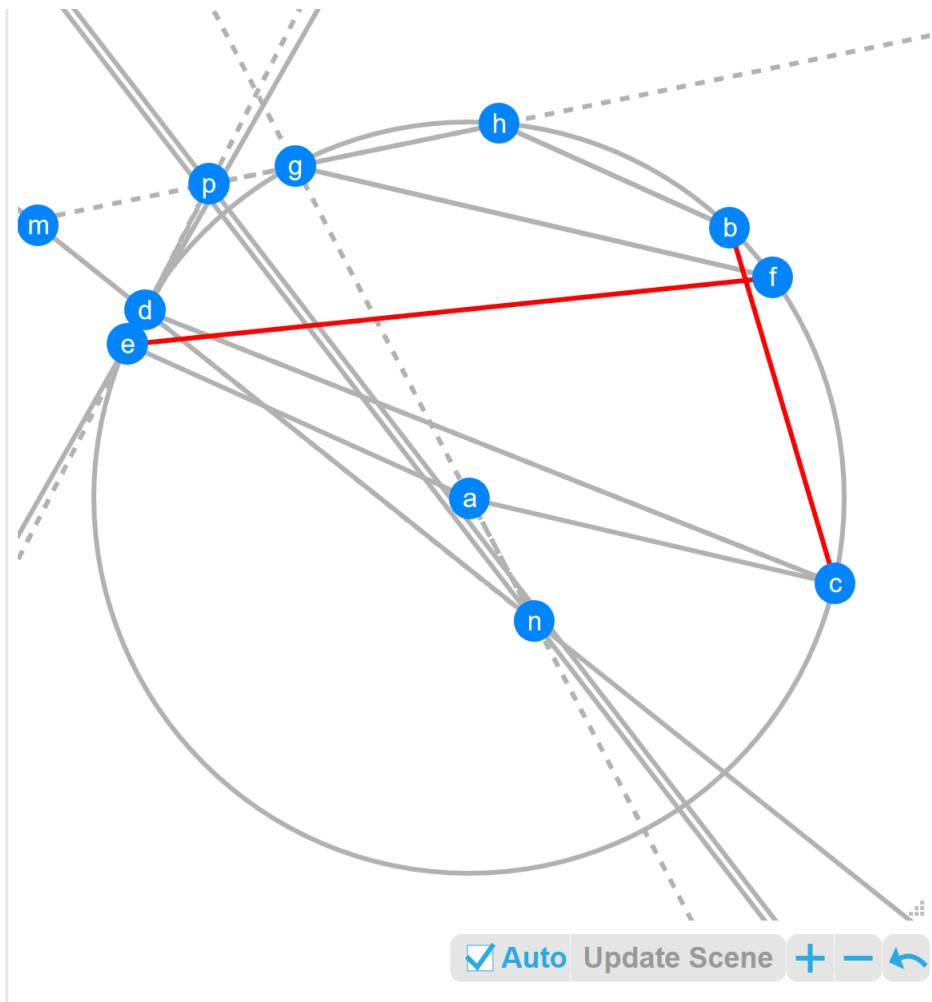


Let bcd be a triangle with circumcentre a . Let fgh be a triangle with circumcentre e . Let $L1$ be the angle bisector of eg and fh . Let $L2$ be the angle bisector of cd and hg . Let $L3$ be the angle bisector of dbc . Let $L4$ be the reflection of cd in fg . Let $L5$ be the angle bisector of $L4$ and ab . Let $L3$ be parallel to $L5$. Determine the angle between $L1$ and $L2$.

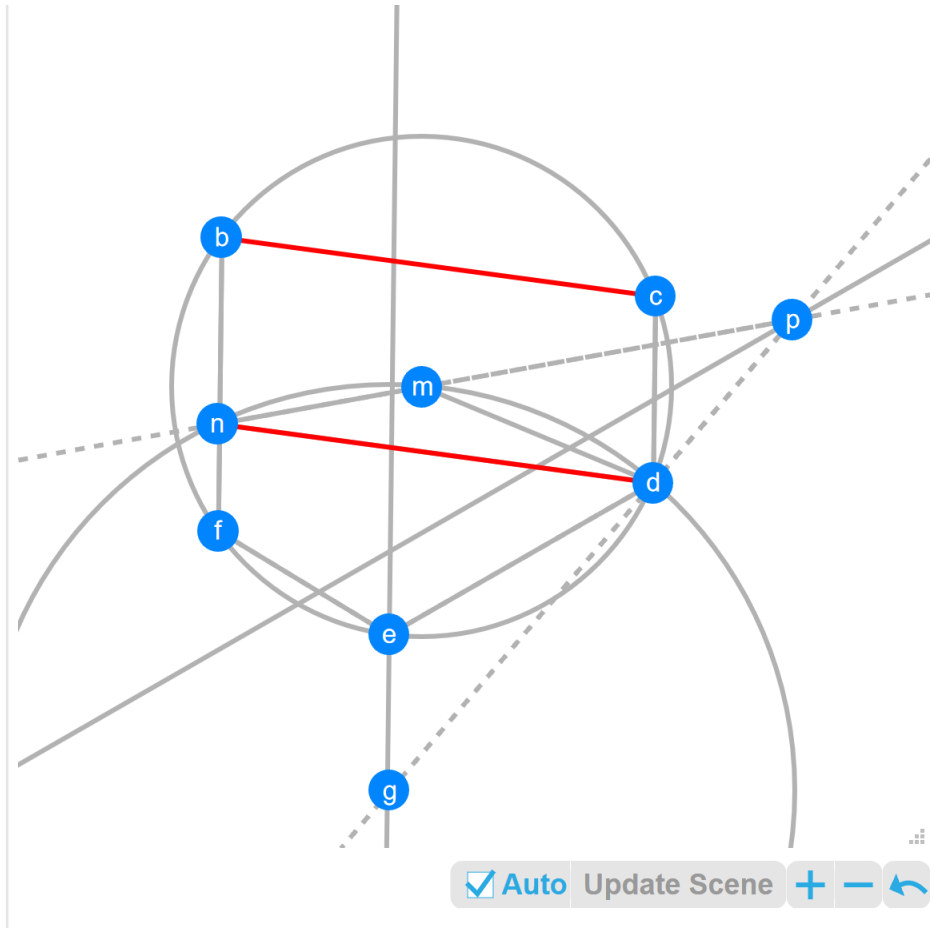


Let $bcpefg$ be a cyclic hexagon with centre a . Let ap be parallel to bg . Let $mnpe$ be a cyclic quadrilateral with centre h . Let bc be parallel to np . Let pe be parallel to hm . Let efh be collinear. Let $L1$ be the angle bisector of af and bc . Let mn be parallel to $L1$. Determine the angle between gf and pc . (174.844)

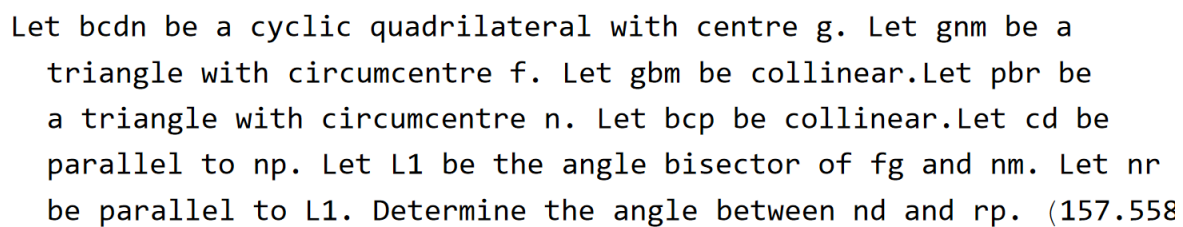


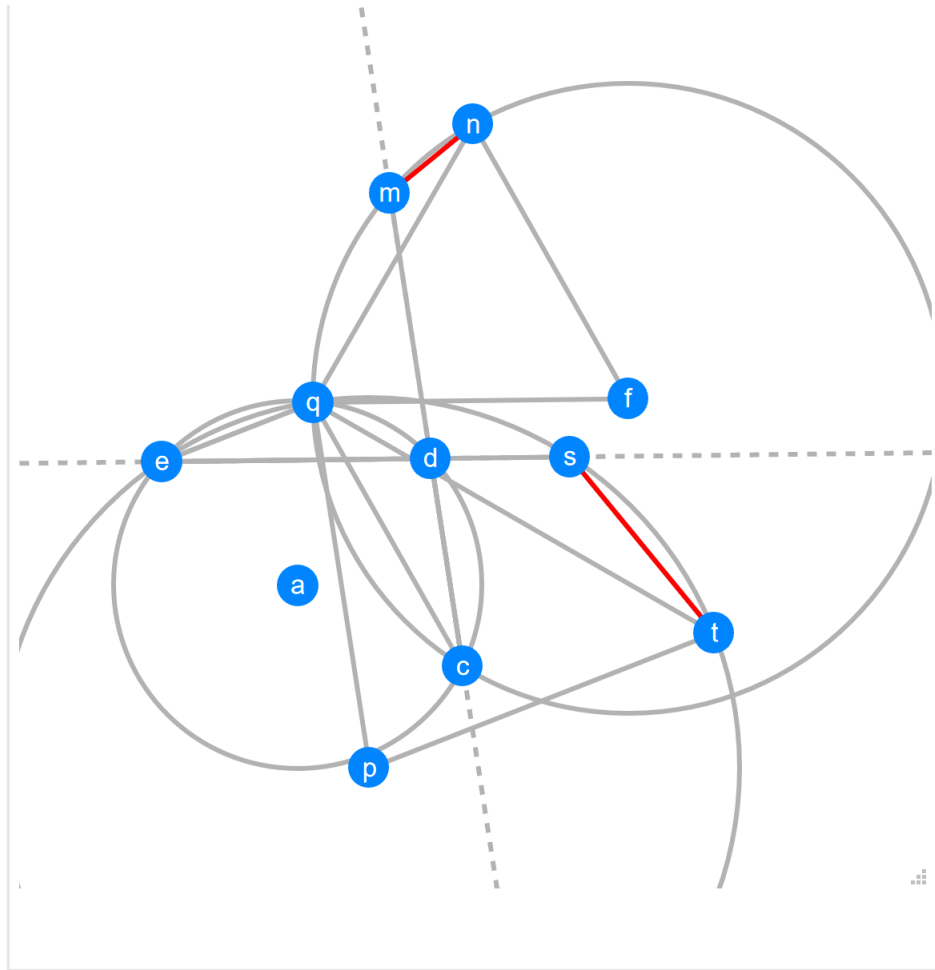


Let $bcdefgh$ be a cyclic heptagon with centre a . Let ae be parallel to bh . Let ac be parallel to gf . Let L_1 be the reflection of cd in ed . Let L_2 be the angle bisector of L_1 and ag . Let L_3 be the angle bisector of ed and hg . Let L_2 be parallel to L_3 . Prove ef is perpendicular to bc .

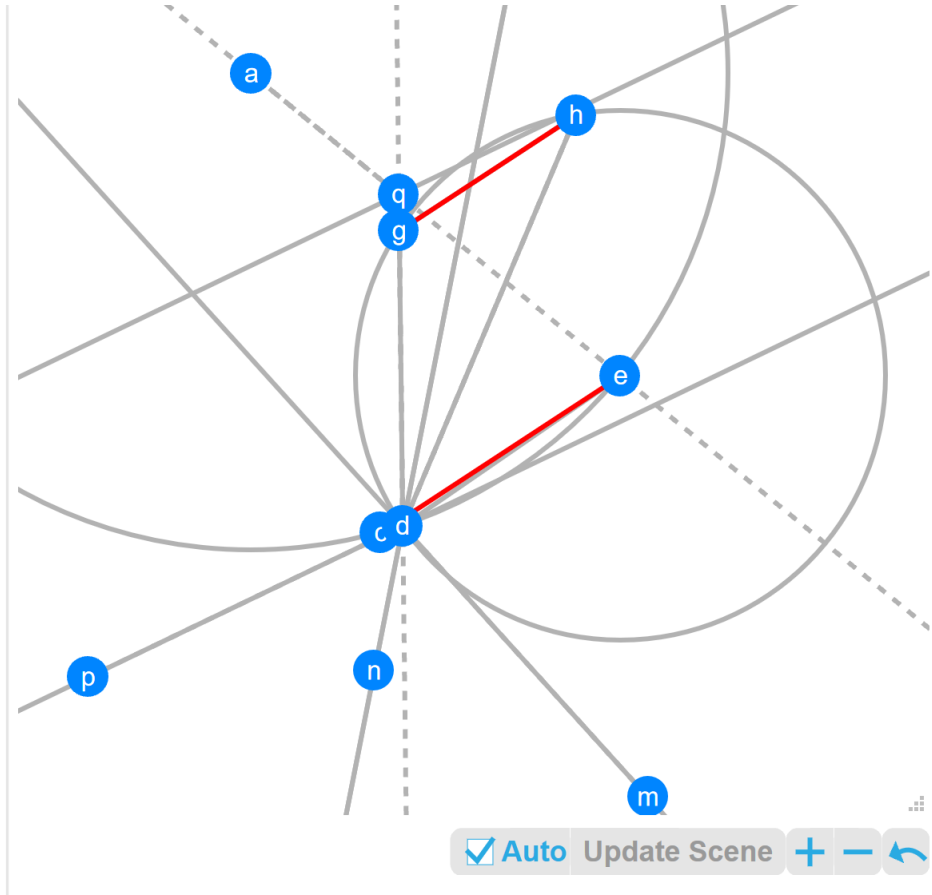


Let $bcdef$ be a cyclic pentagon with centre m . Let bf be parallel to dc . Let dmn be a triangle with circumcentre g . Let L_1 be the angle bisector of mn and gd . Let de be parallel to L_1 . Let L_2 be the angle bisector of fed . Let bf be parallel to L_2 . Prove dn is parallel to bc .

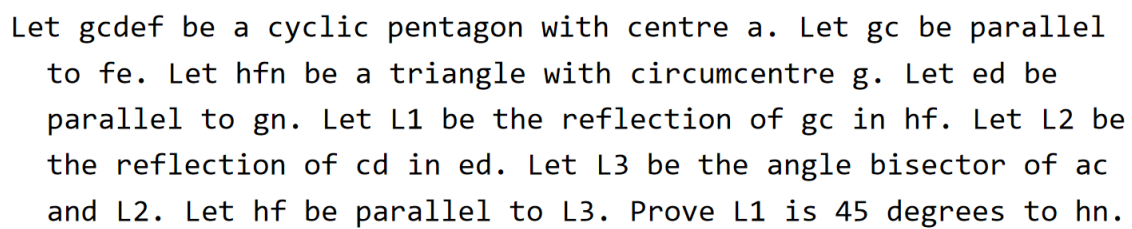




Let $qcde$ be a cyclic quadrilateral with centre a . Let $qcmn$ be a cyclic quadrilateral with centre f . Let cdm be collinear. Let ed be parallel to fq . Let qc be parallel to fn . Let $qest$ be a cyclic quadrilateral with centre p . Let eds be collinear. Let dc be parallel to pq . Let qe be parallel to pt . Prove ts is perpendicular to mn .

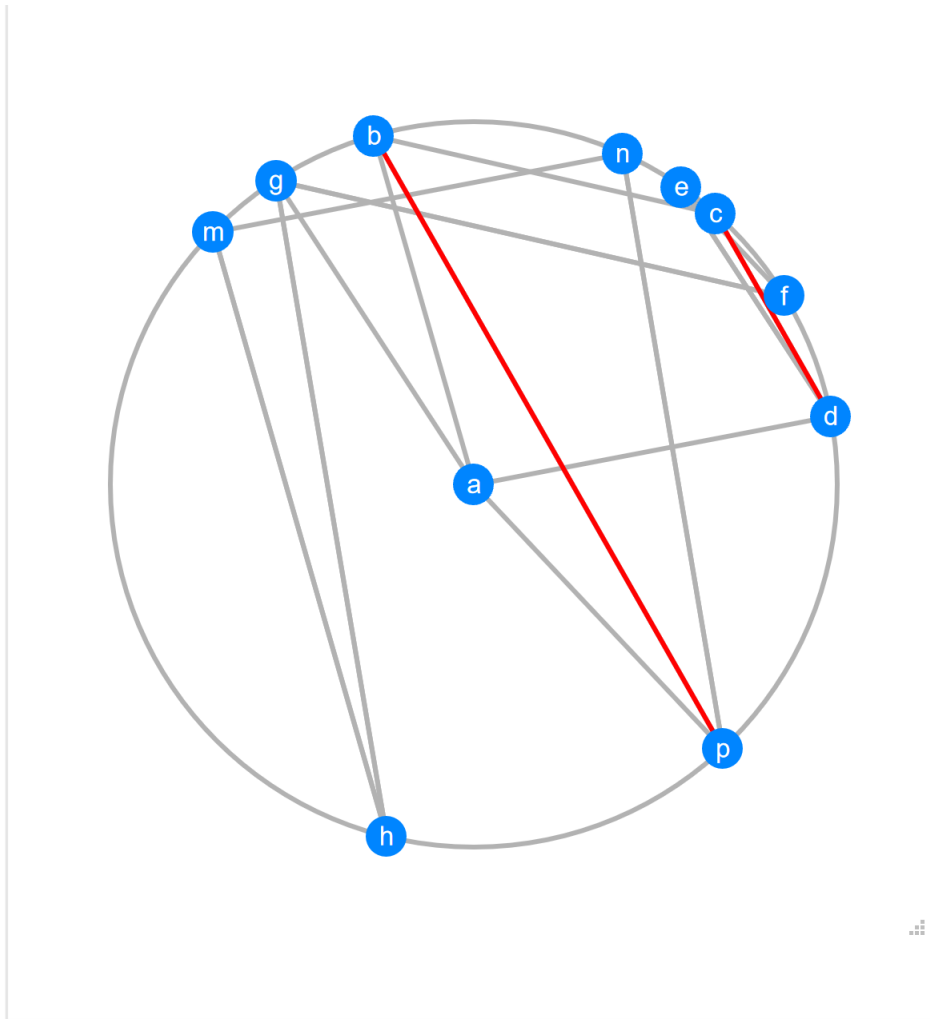


Let ecd be a triangle with circumcentre a . Let dgh be a triangle with circumcentre e . Let $L1$ be the angle bisector of cdh . Let $L2$ be the angle bisector of hdg . Let $L3$ be the reflection of $L1$ in $L2$. Let $L4$ be the angle bisector of dg and ae . Let $L3$ be parallel to $L4$. Prove hg is parallel to ec .

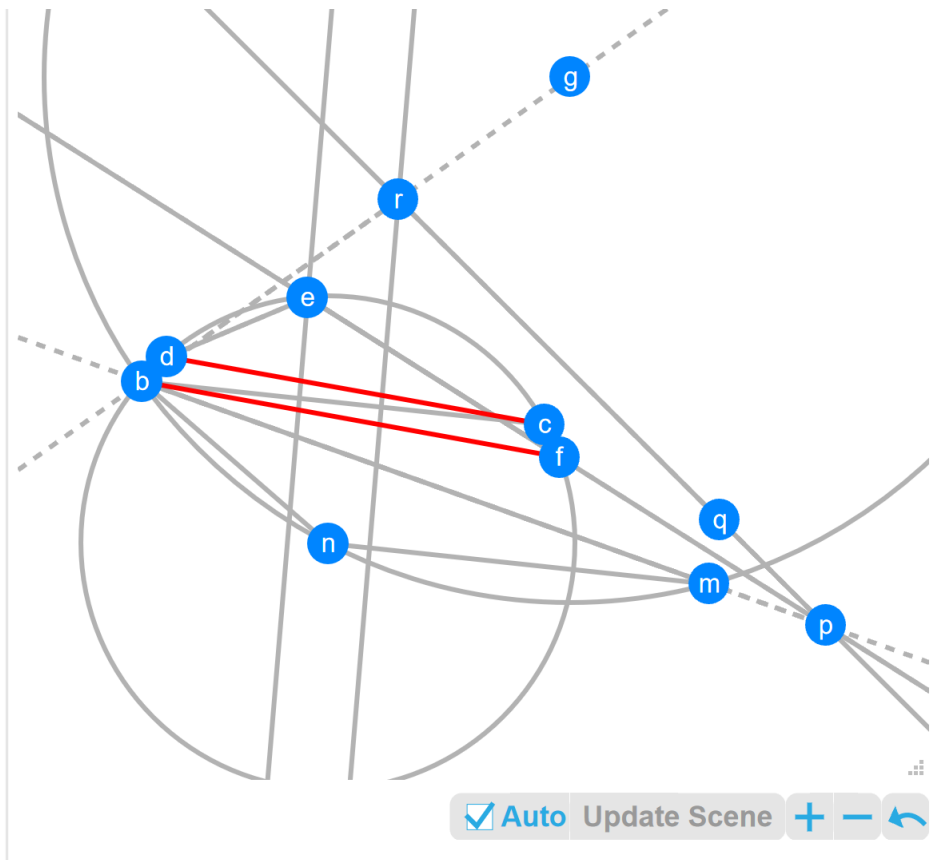




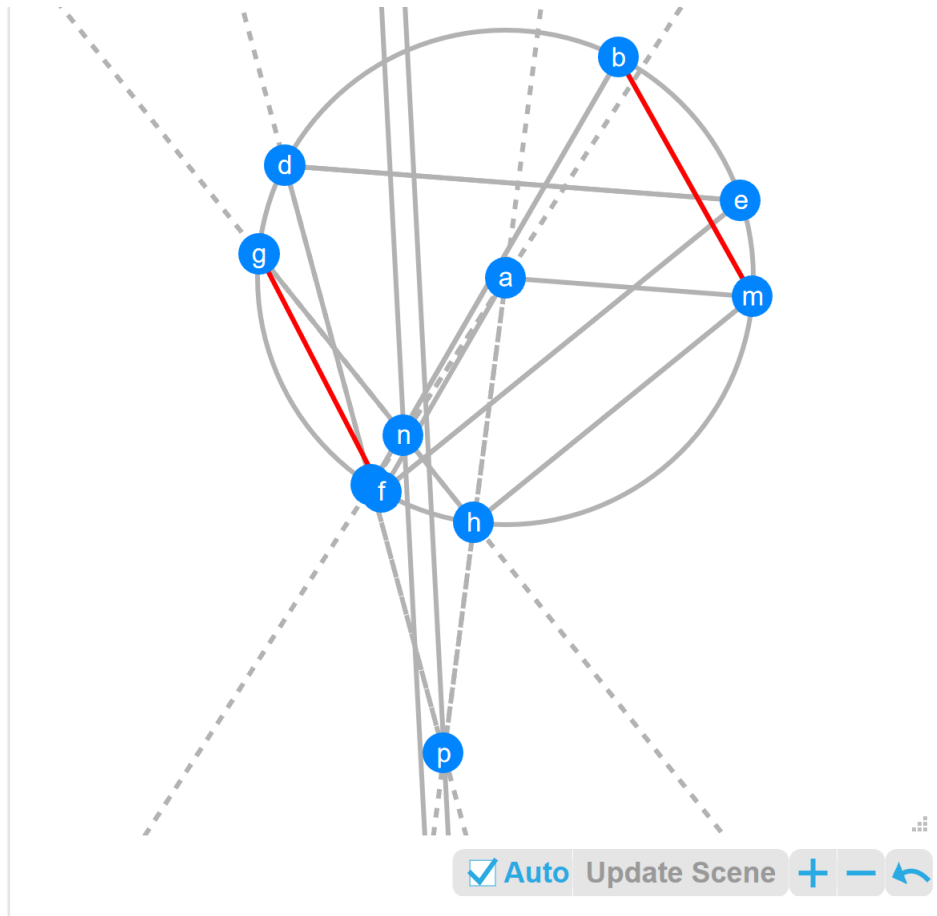
Let $pcde$ be a cyclic quadrilateral with centre a . Let pe be parallel to dc . Let pc be parallel to ed . Let $chmn$ be a cyclic quadrilateral with centre f . Let cn be parallel to mh . Let cns be a triangle with circumcentre p . Let ch be parallel to sn . Let pes be collinear. Prove ch is perpendicular to nm .



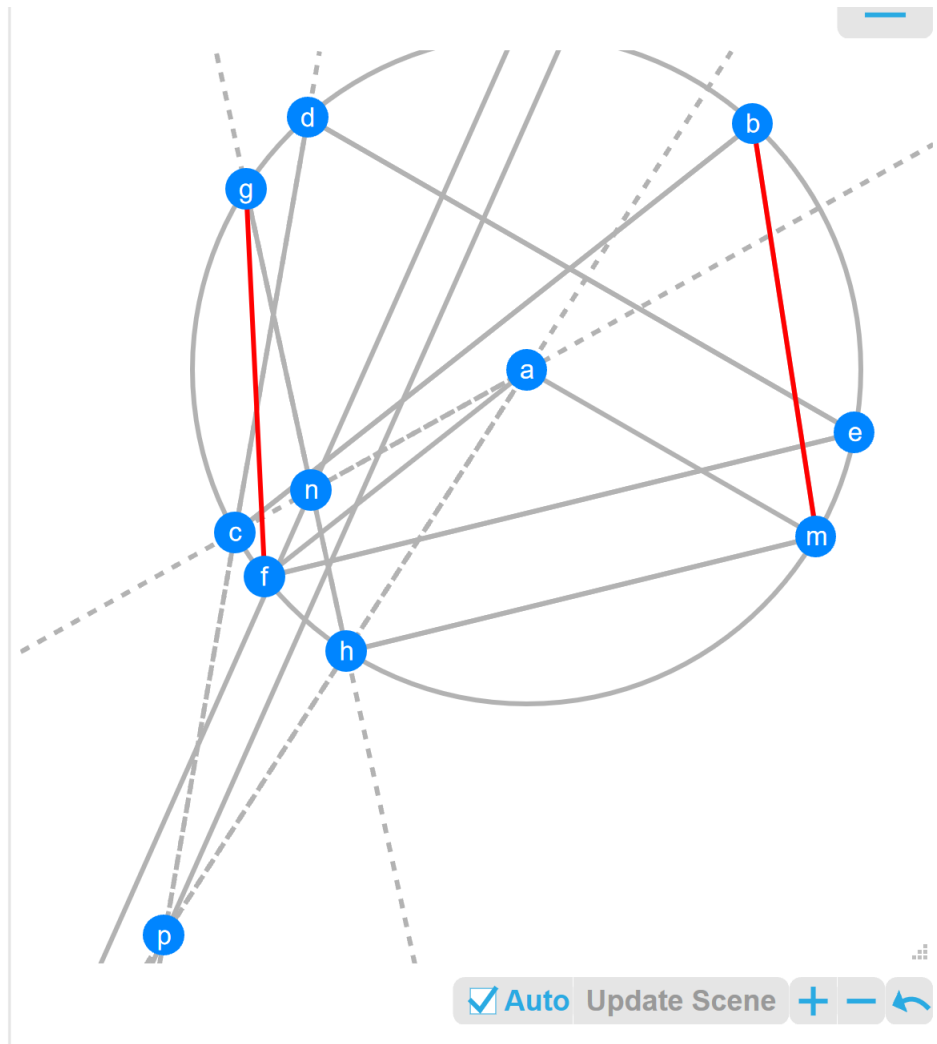
Let $bcdefghmnp$ be a cyclic decagon with centre a . Let ag be parallel to ed . Let ap be parallel to ef . Let bc be parallel to gf . Let ab be parallel to mh . Let ad be parallel to mn . Let hg be parallel to pn . Prove bp is parallel to dc .



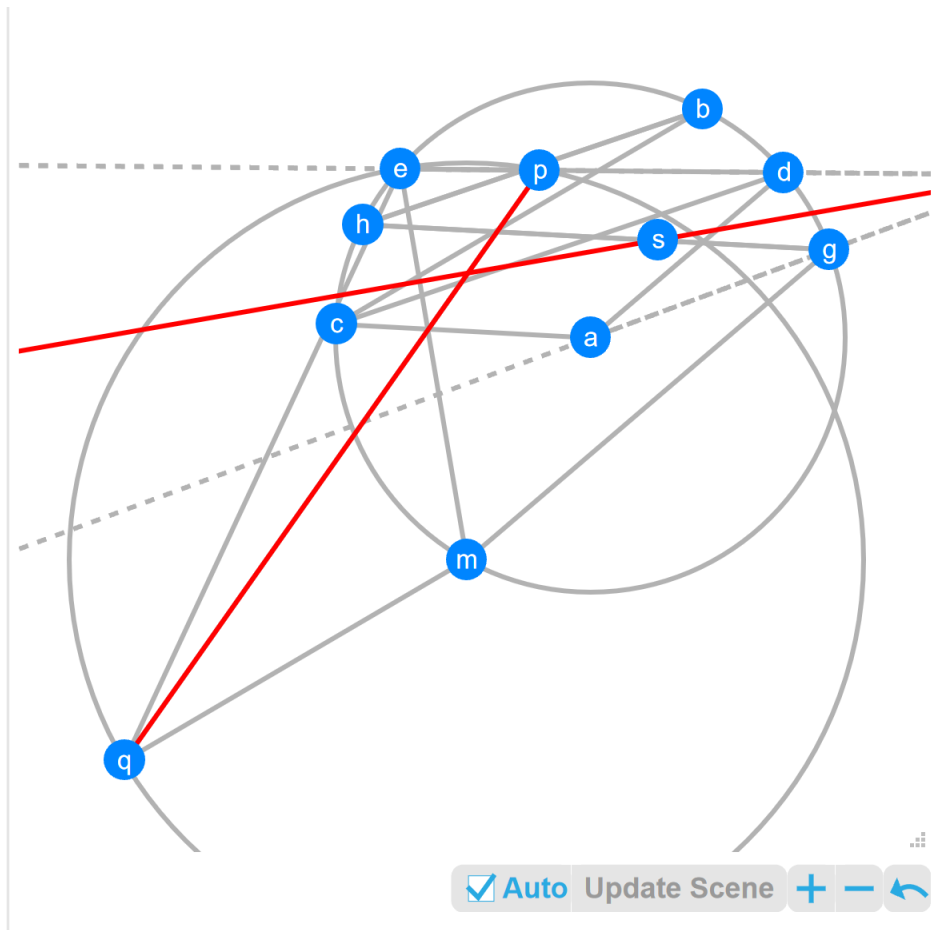
Let $bcdef$ be a cyclic pentagon with centre n . Let bmn be a triangle with circumcentre g . Let bc be parallel to mn . Let $L1$ be the reflection of bm in fe . Let $L2$ be the angle bisector of $L1$ and gb . Let $L3$ be the angle bisector of def . Let $L2$ be parallel to $L3$. Prove cd is parallel to fb .



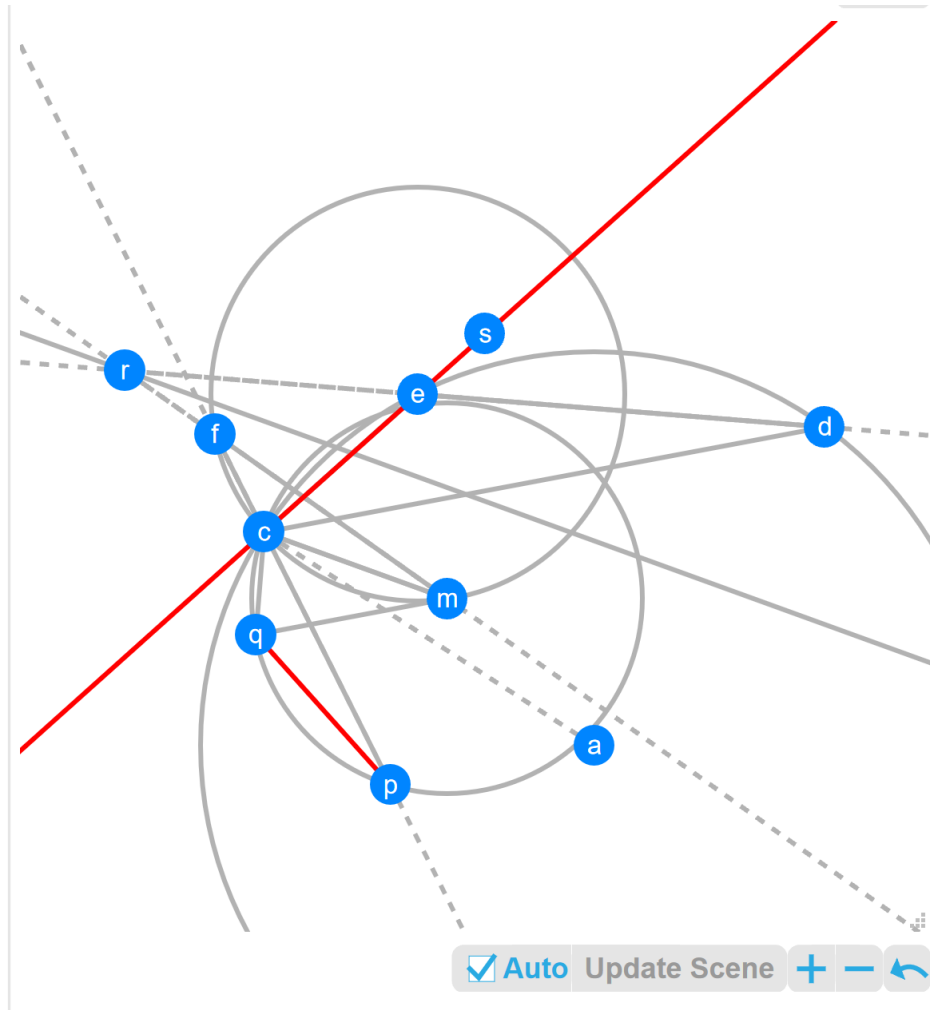
Let $bcdefghm$ be a cyclic octagon with centre a . Let af be parallel to cb . Let am be parallel to ed . Let fe be parallel to mh . Let L_1 be the angle bisector of hg and ac . Let L_2 be the angle bisector of cd and ah . Let L_1 be parallel to L_2 . Prove bm is parallel to fg .



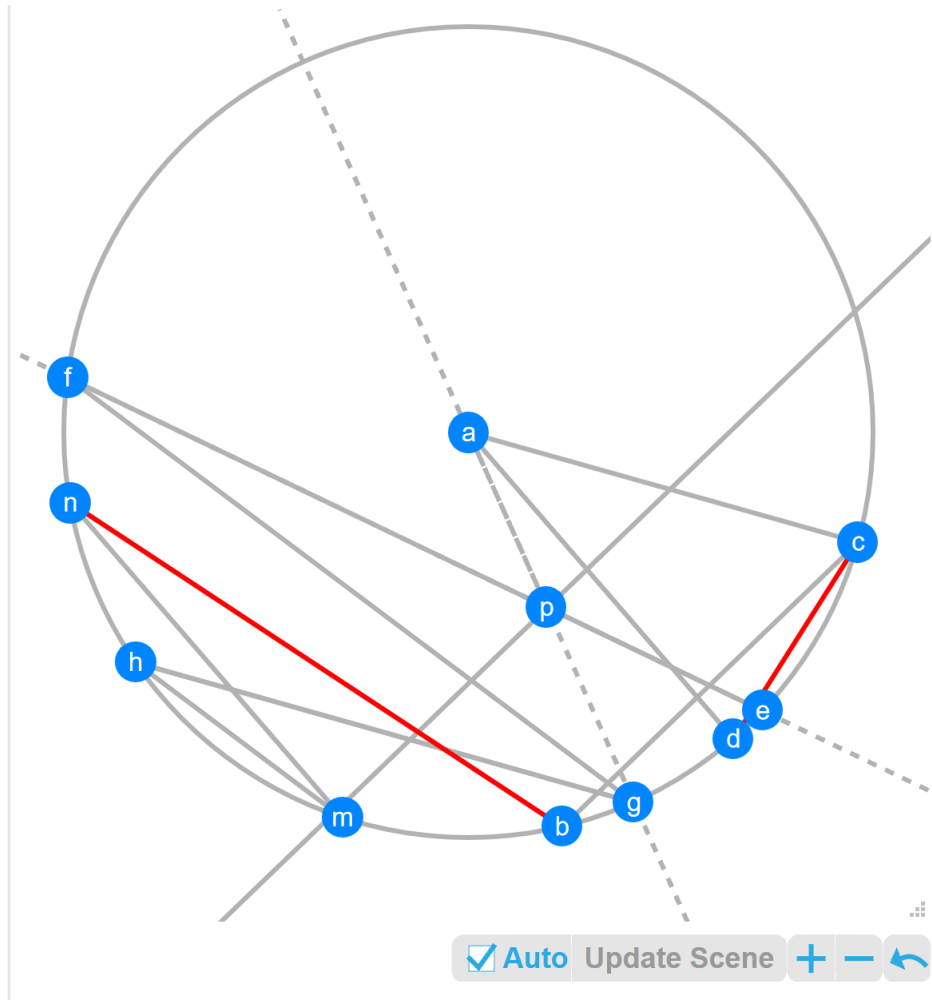
Let $bcdefghm$ be a cyclic octagon with centre a . Let af be parallel to cb . Let am be parallel to ed . Let fe be parallel to mh . Let L_1 be the angle bisector of hg and ac . Let L_2 be the angle bisector of cd and ah . Let L_1 be parallel to L_2 . Prove bm is parallel to fg .



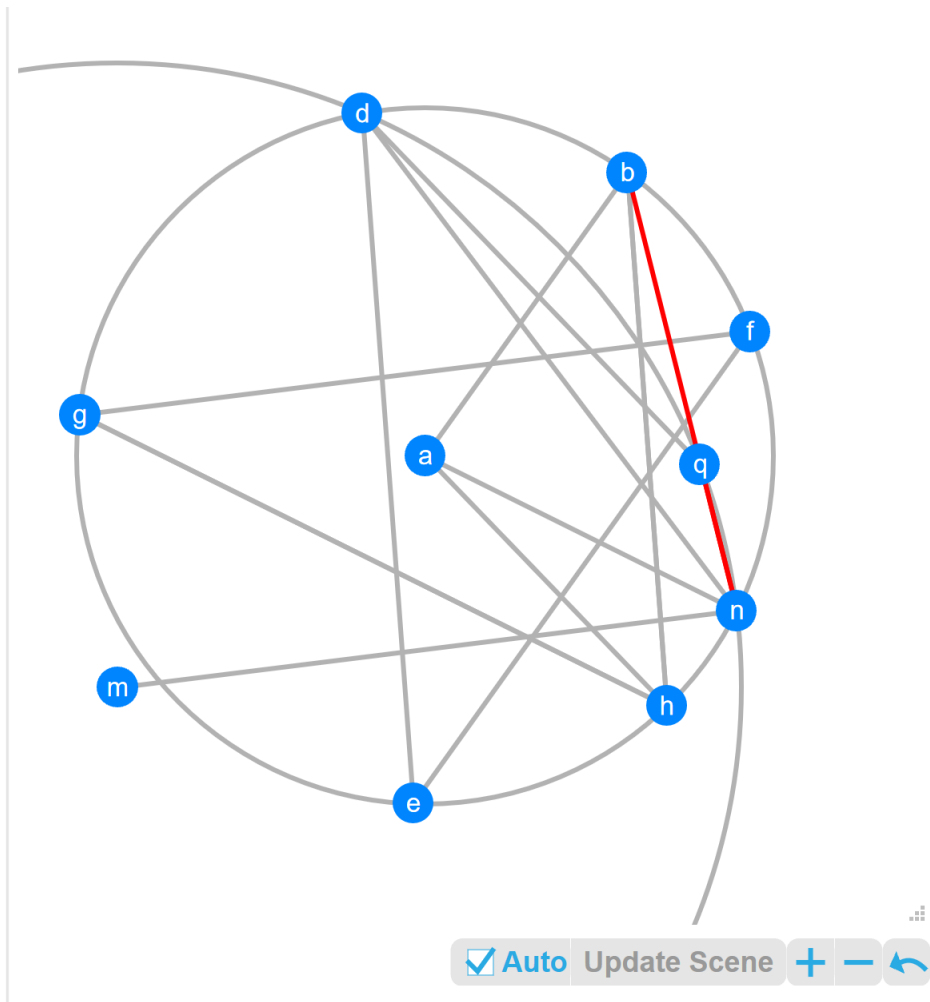
Let $bcdemgh$ be a cyclic heptagon with centre a . Let bh be parallel to cd . Let ad be parallel to mg . Let ac be parallel to hg . Let epq be a triangle with circumcentre m . Let edp be collinear. Let bc be parallel to mq . Let $L1$ be the angle bisector of ag and de . Determine the angle between $L1$ and qp .



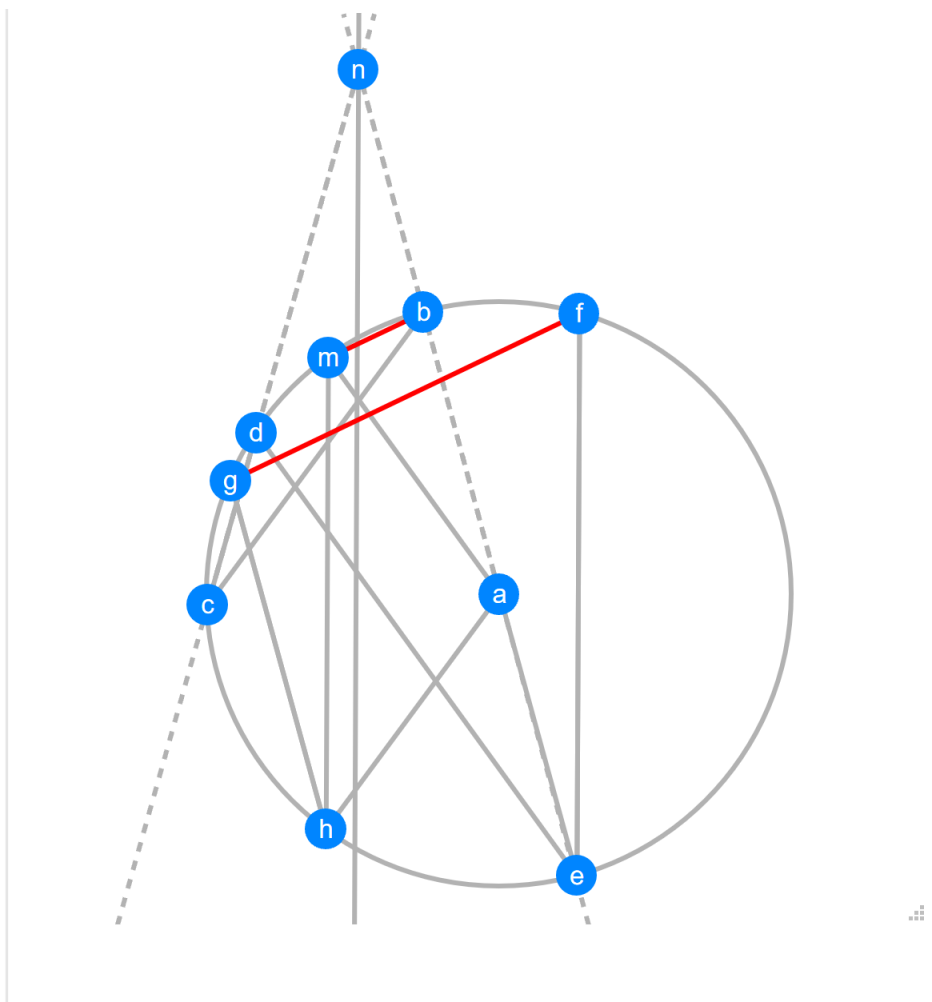
Let ecd be a triangle with circumcentre a . Let $fc m$ be a triangle with circumcentre e . Let cpq be a triangle with circumcentre m . Let cfp be collinear. Let cd be parallel to mq . Let $L1$ be the angle bisector of ed and fm . Let mc be parallel to $L1$. Let $L2$ be the angle bisector of acf . Determine the angle between pq and $L2$.



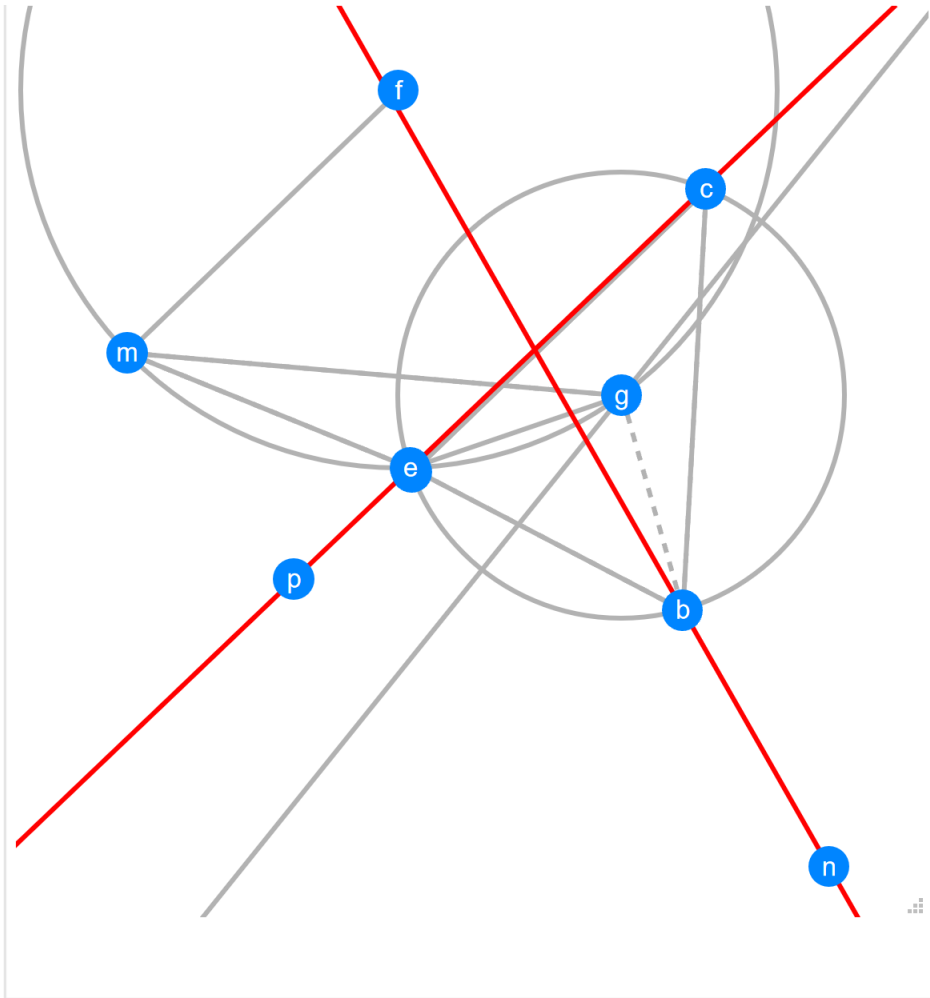
Let $bcdefghmn$ be a cyclic nonagon with centre a . Let bc be parallel to de . Let ac be parallel to hg . Let fg be parallel to hm . Let ad be parallel to mn . Let L_1 be the angle bisector of ag and ef . Let bc be parallel to L_1 . Prove bn is perpendicular to cd .



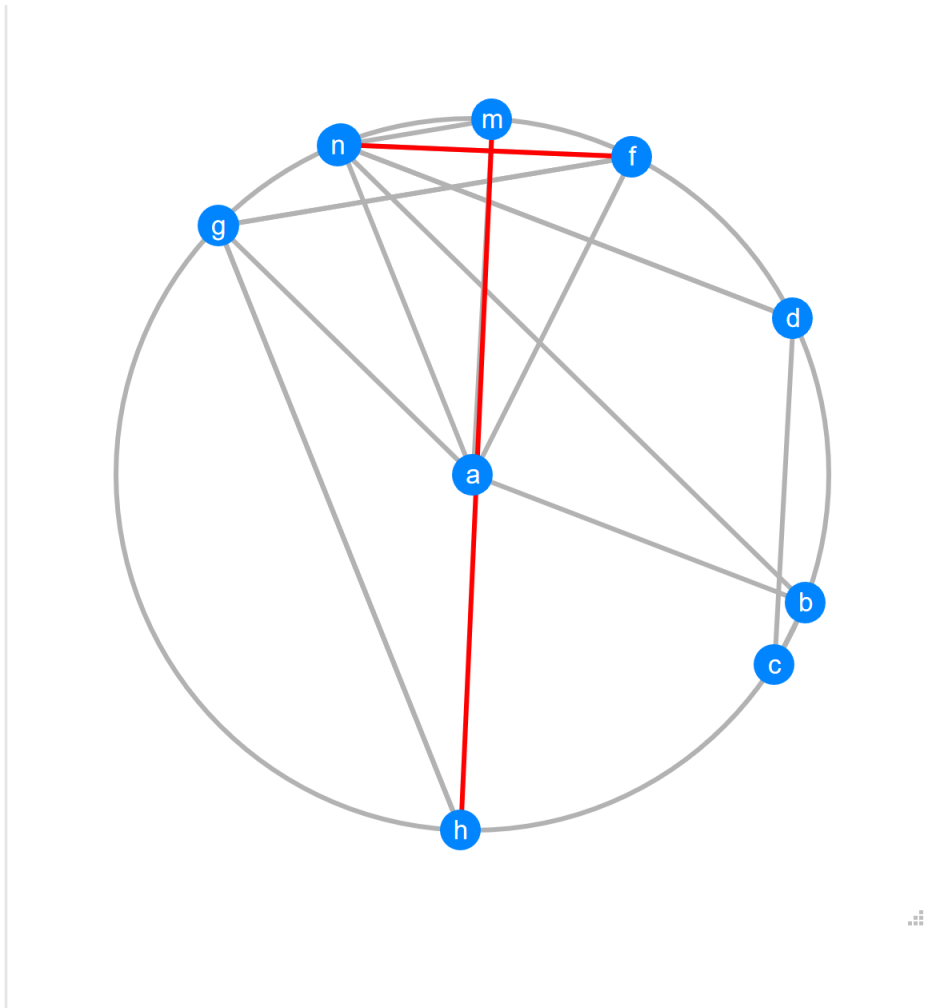
Let $bncdefgh$ be a cyclic heptagon with centre a . Let bh be parallel to de . Let ab be parallel to ef . Let an be parallel to hg . Let ndq be a triangle with circumcentre m . Let ah be parallel to dq . Let fg be parallel to mn . Prove qn is parallel to bn .



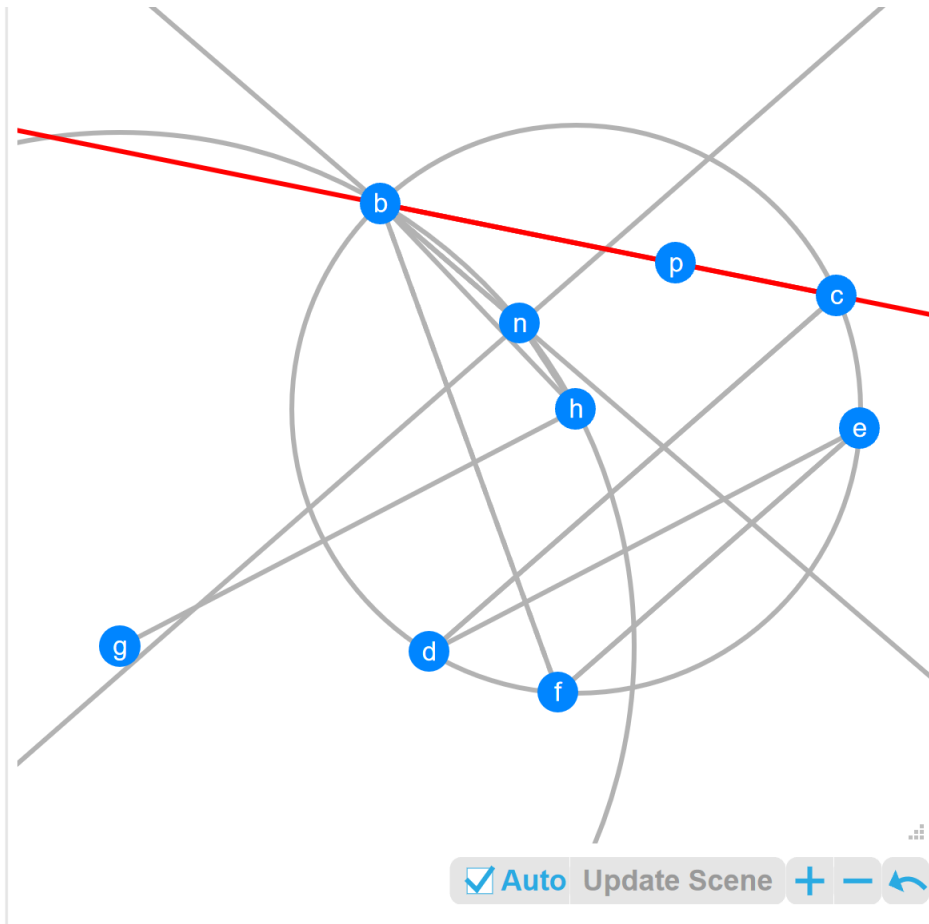
Let $bcdefghm$ be a cyclic octagon with centre a . Let ah be parallel to bc . Let am be parallel to de . Let ae be parallel to hg . Let fe be parallel to hm . Let $L1$ be the angle bisector of ab and cd . Let fe be parallel to $L1$. Prove mb is parallel to fg .



Let $bcde$ be a cyclic quadrilateral with centre g . Let gem be a triangle with circumcentre f . Let dc be parallel to fm . Let L_1 be the angle bisector of cbe . Let L_2 be the angle bisector of mgb . Let de be parallel to L_2 . Let L_3 be the angle bisector of med . Determine the angle between L_1 and L_3 .

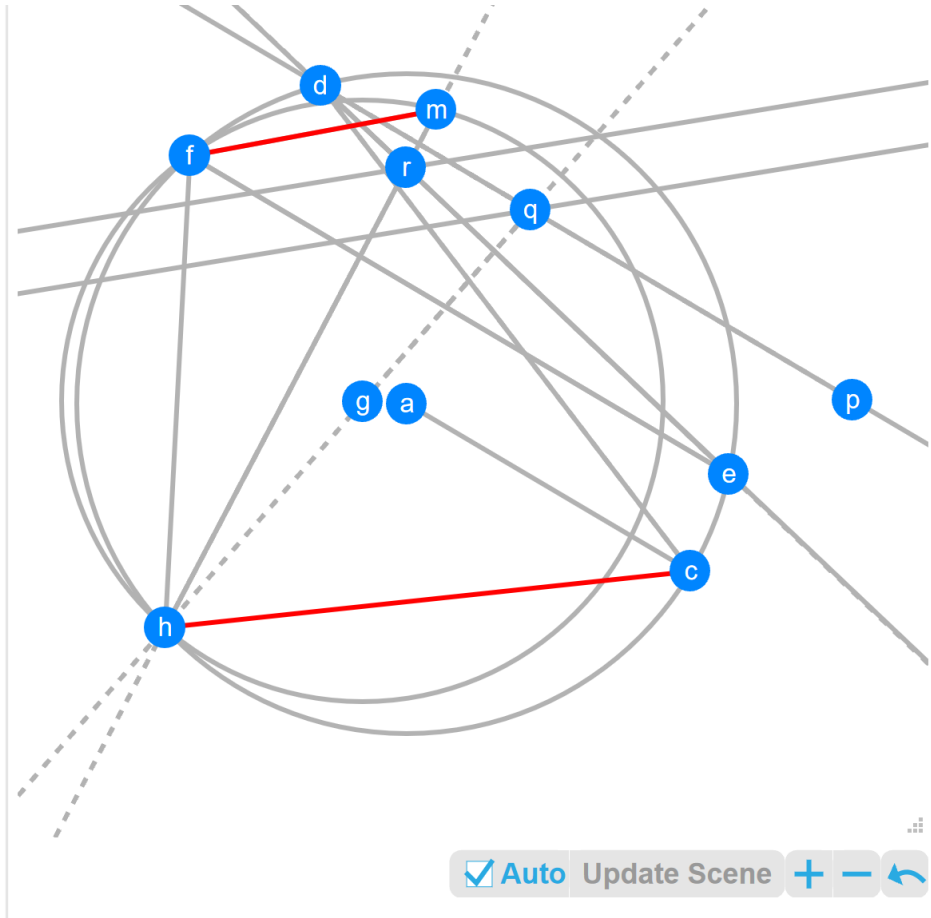


Let $bcdefghmn$ be a cyclic nonagon with centre a . Let ag be parallel to nb . Let af be parallel to bc . Let am be parallel to cd . Let ab be parallel to ed . Let ae be parallel to hg . Let gf be parallel to mn . Prove fe is perpendicular to hm .

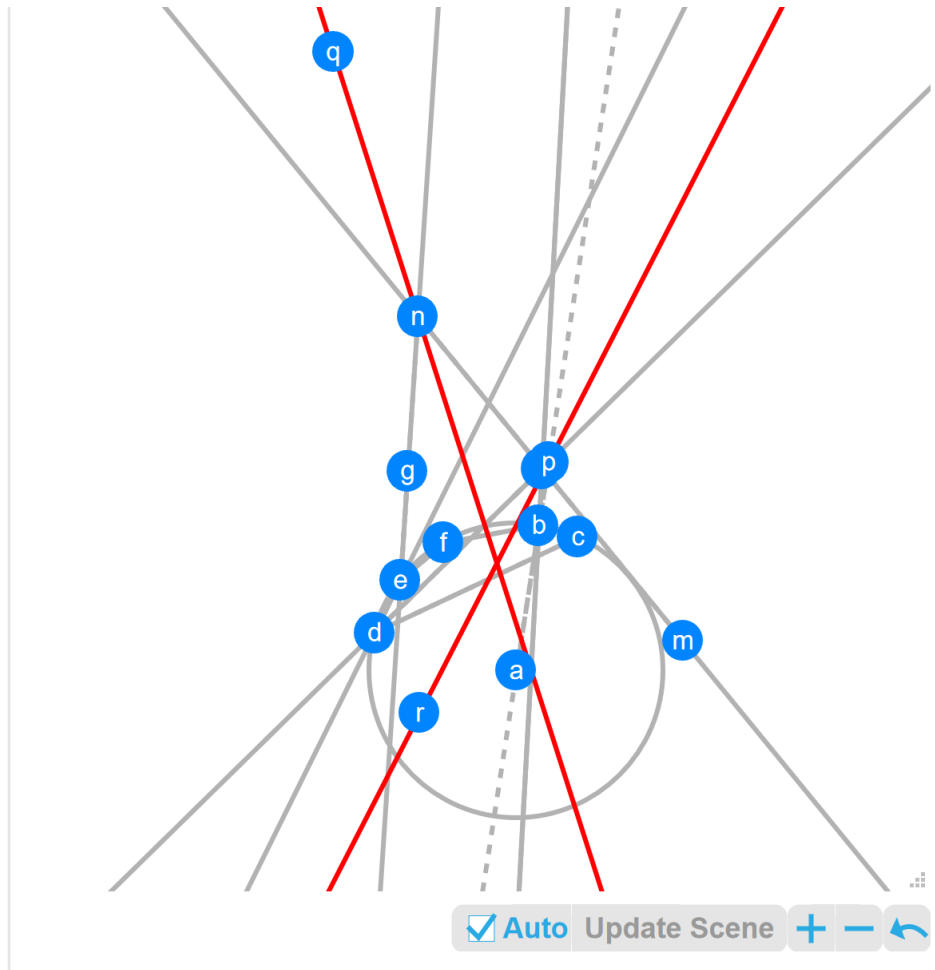


Let $bcdef$ be a cyclic pentagon with centre h .

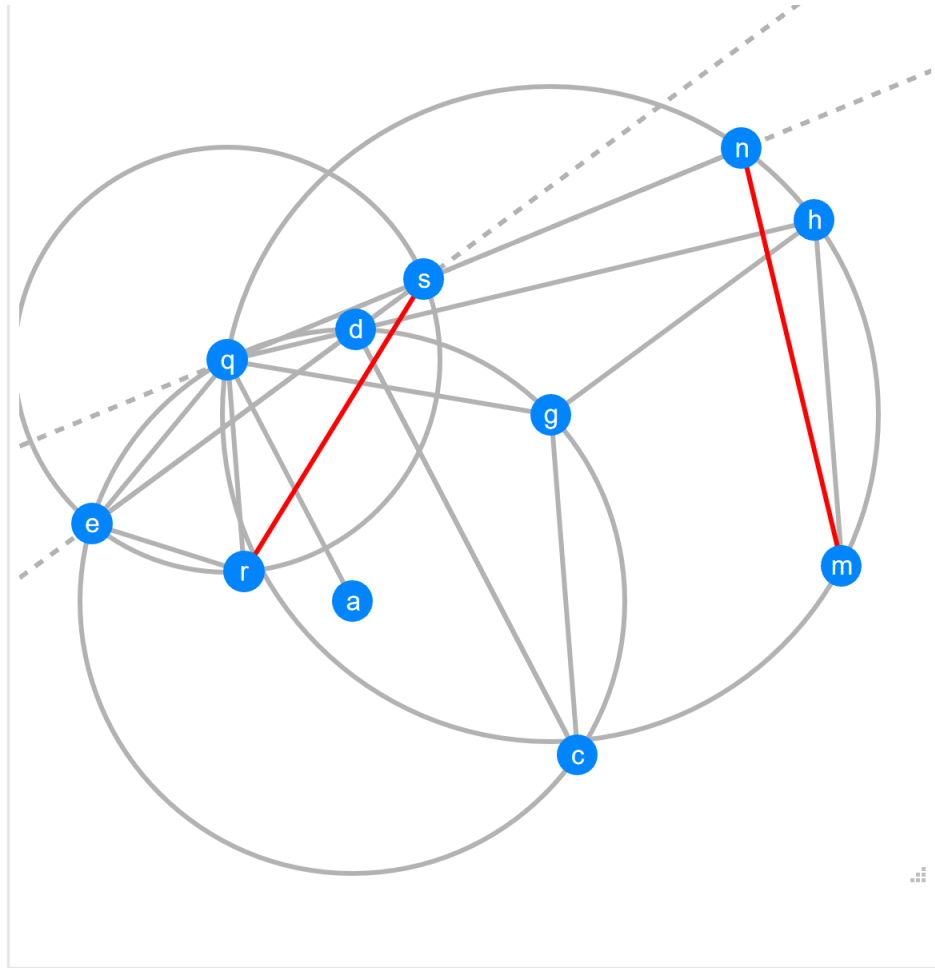
Let dc be parallel to fe . Let hbn be a triangle with circumcentre g . Let de be parallel to gh . Let L_1 be the reflection of bf in bn . Let L_2 be the angle bisector of hnb . Let dc be parallel to L_2 . Prove L_1 is parallel to bc .



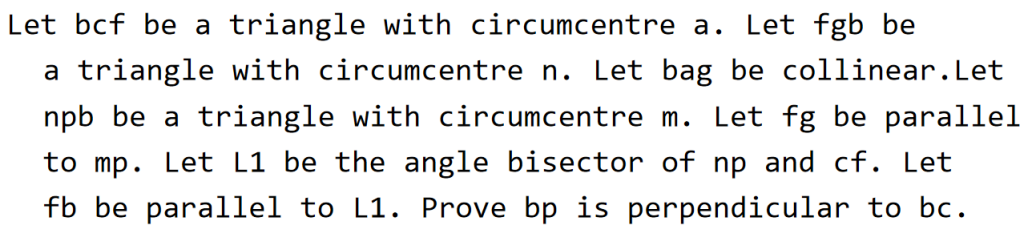
Let $h c d e f$ be a cyclic pentagon with centre a . Let ac be parallel to fe . Let $h m f$ be a triangle with circumcentre g . Let L_1 be the reflection of cd in de . Let L_2 be the angle bisector of L_1 and gh . Let L_3 be the angle bisector of hm and de . Let L_2 be parallel to L_3 . Prove fm is parallel to hc .

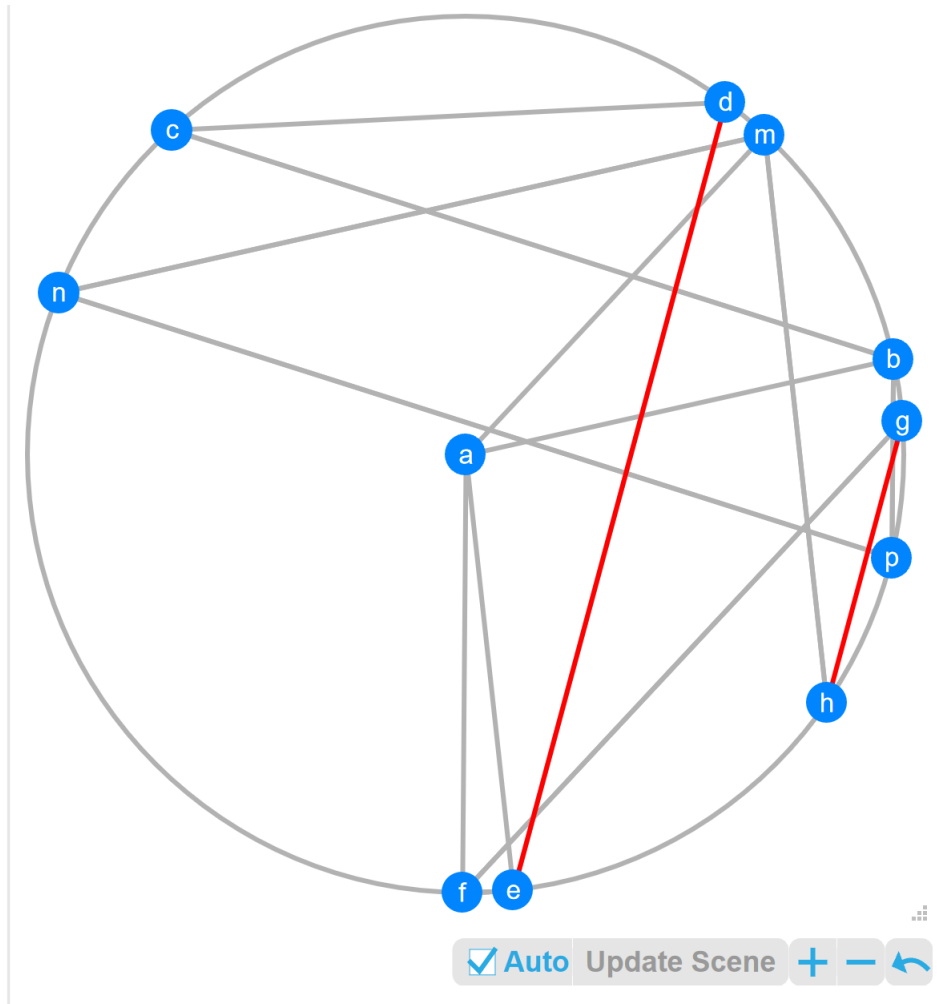


Let $bcdef$ be a cyclic pentagon with centre a . Let $L1$ be the angle bisector of cbf . Let $L2$ be the reflection of fe in de . Let $L3$ be the angle bisector of cde . Let $L4$ be the reflection of $L3$ in $L1$. Let $L5$ be the angle bisector of $L4$ and $L2$. Let $L6$ be the angle bisector of ab and $L3$. Determine the angle between $L5$ and $L6$.

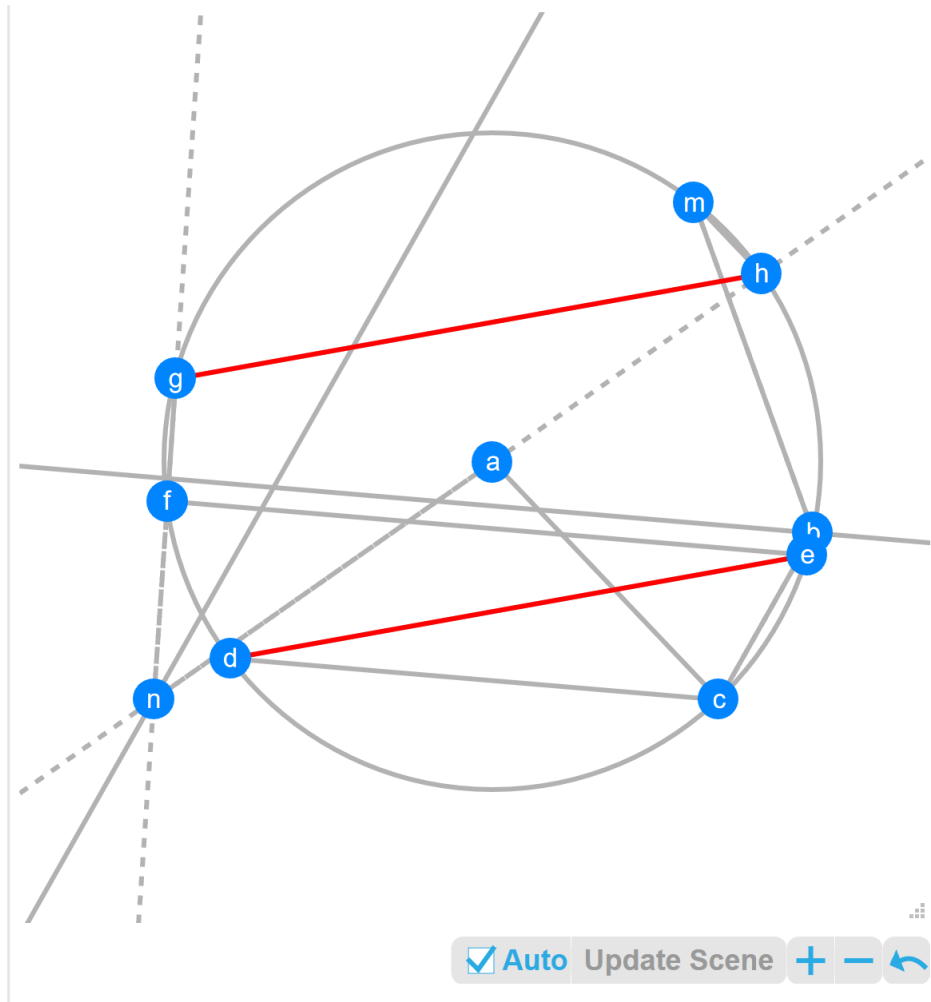


Let $gcdeq$ be a cyclic pentagon with centre a . Let aq be parallel to dc . Let $hmnq$ be a cyclic quadrilateral with centre g . Let gc be parallel to hm . Let de be parallel to gh . Let rse be a triangle with circumcentre q . Let eds be collinear. Let gc be parallel to qr . Let qns be collinear. Prove mn is 45 degrees to rs .

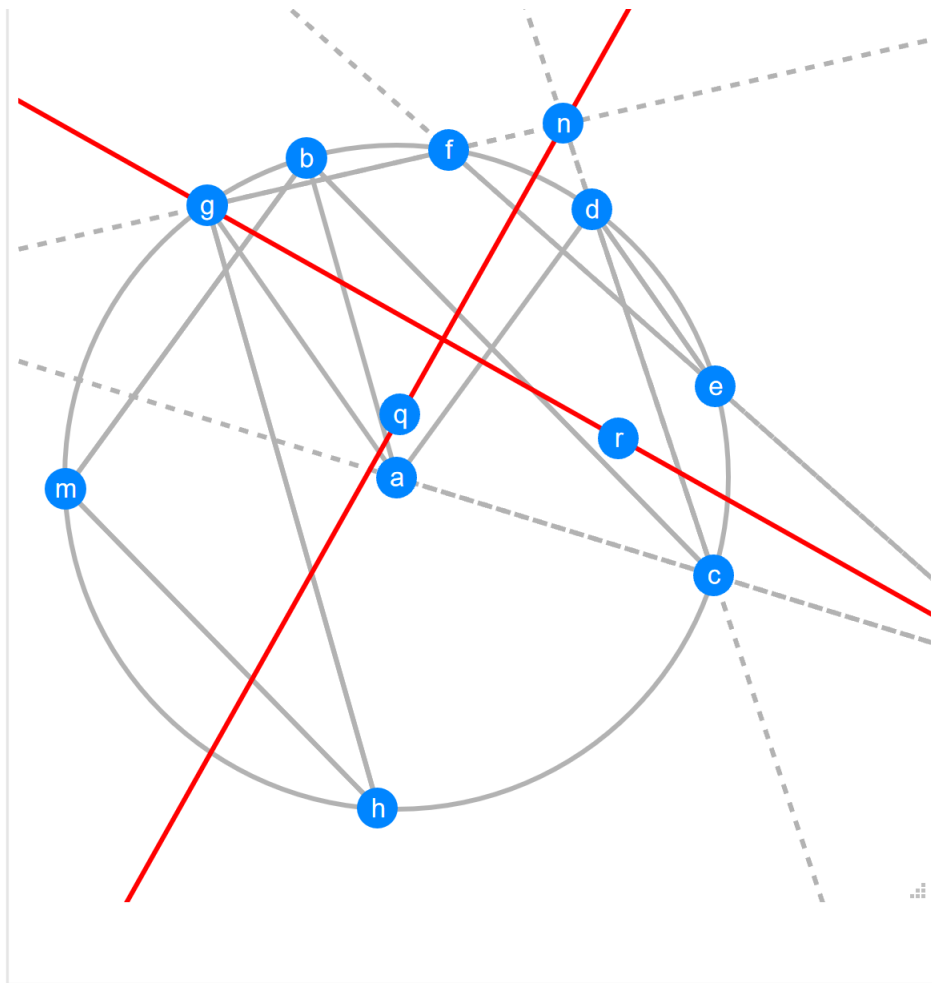




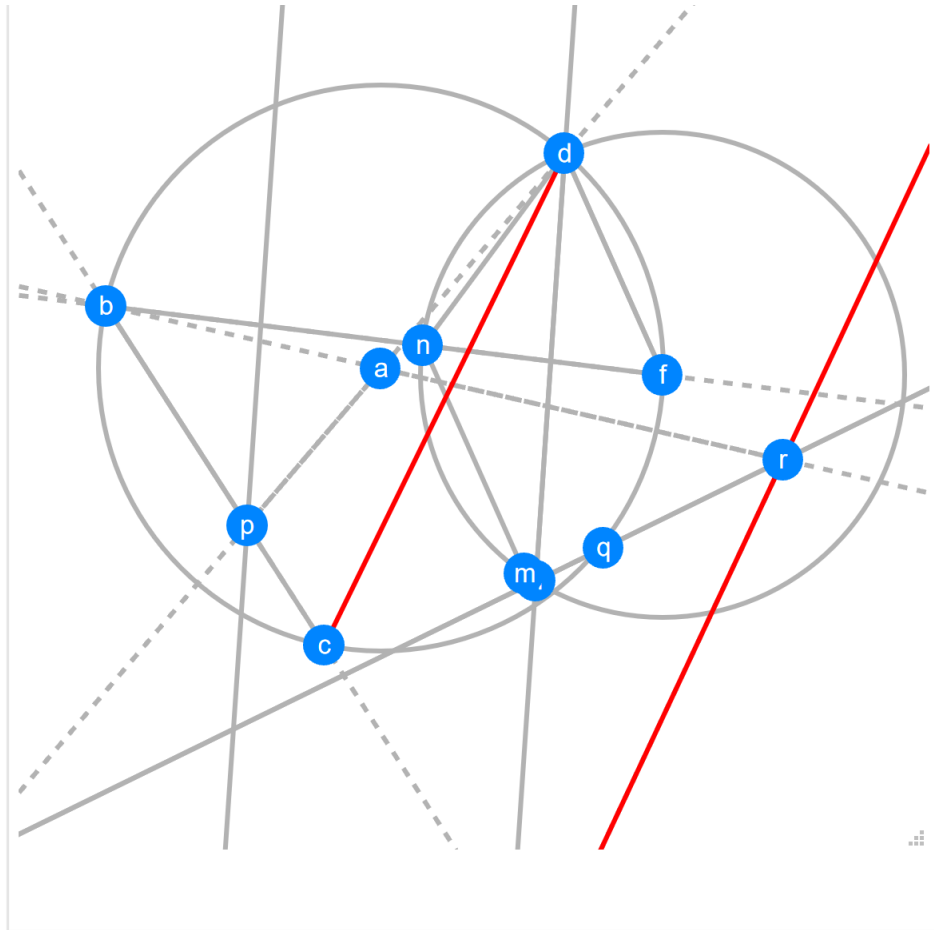
Let $bcdefghmnp$ be a cyclic decagon with centre a . Let af be parallel to bp . Let cd be parallel to fe . Let am be parallel to gf . Let ae be parallel to mh . Let ab be parallel to nm . Let cb be parallel to pn . Determine the angle between ed and gh . (177.611)



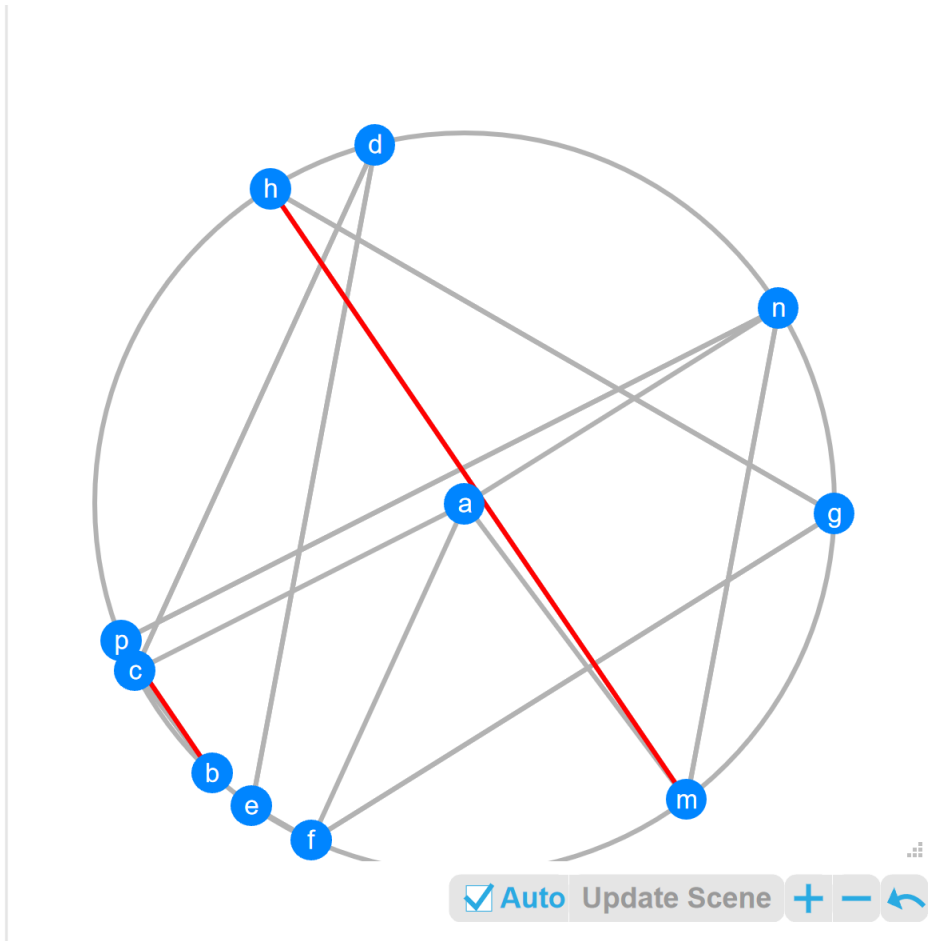
Let $bcdefghm$ be a cyclic octagon with centre a . Let cd be parallel to ef . Let ac be parallel to hm . Let L_1 be the angle bisector of mbc . Let cd be parallel to L_1 . Let L_2 be the angle bisector of fg and ah . Let bc be parallel to L_2 . Prove hg is parallel to ed .



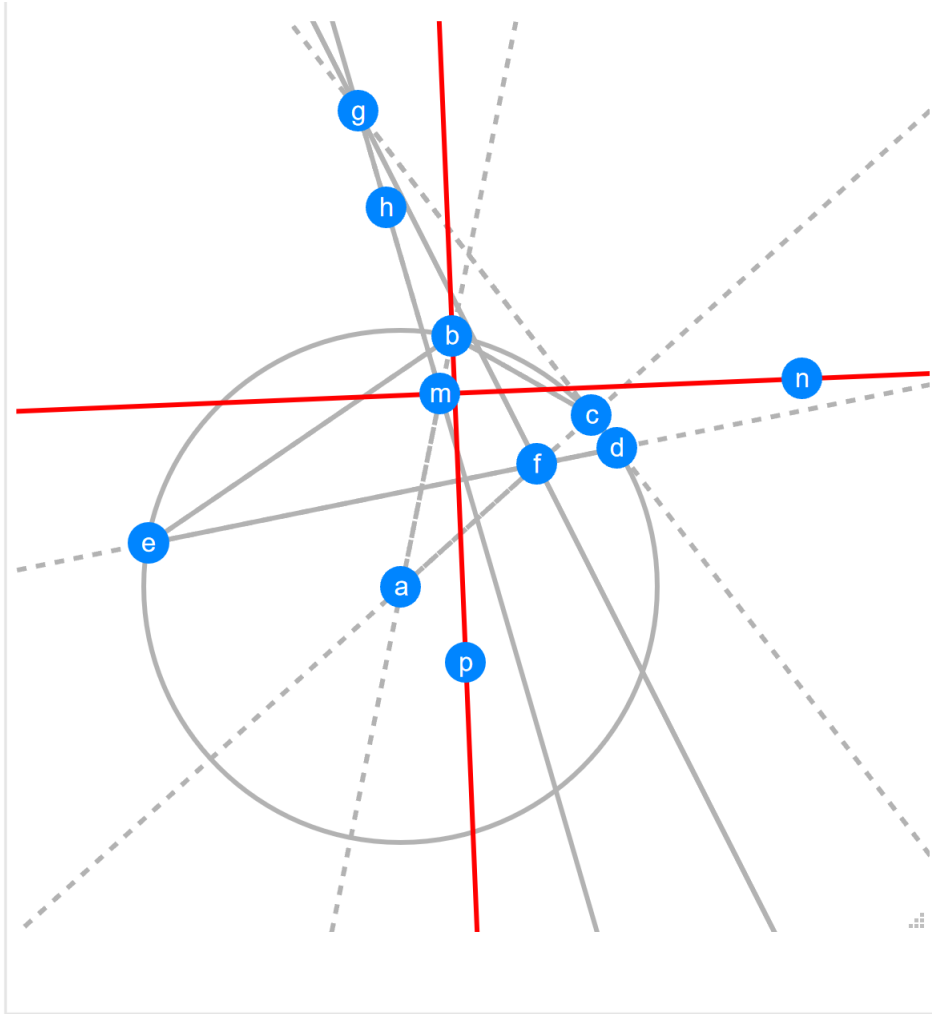
Let $bcdefghm$ be a cyclic octagon with centre a . Let ad be parallel to bm . Let ag be parallel to ed . Let ab be parallel to hg . Let cb be parallel to mh . Let $L1$ be the angle bisector of gf and dc . Let $L2$ be the angle bisector of ef and ac . Determine the angle between $L1$ and $L2$.



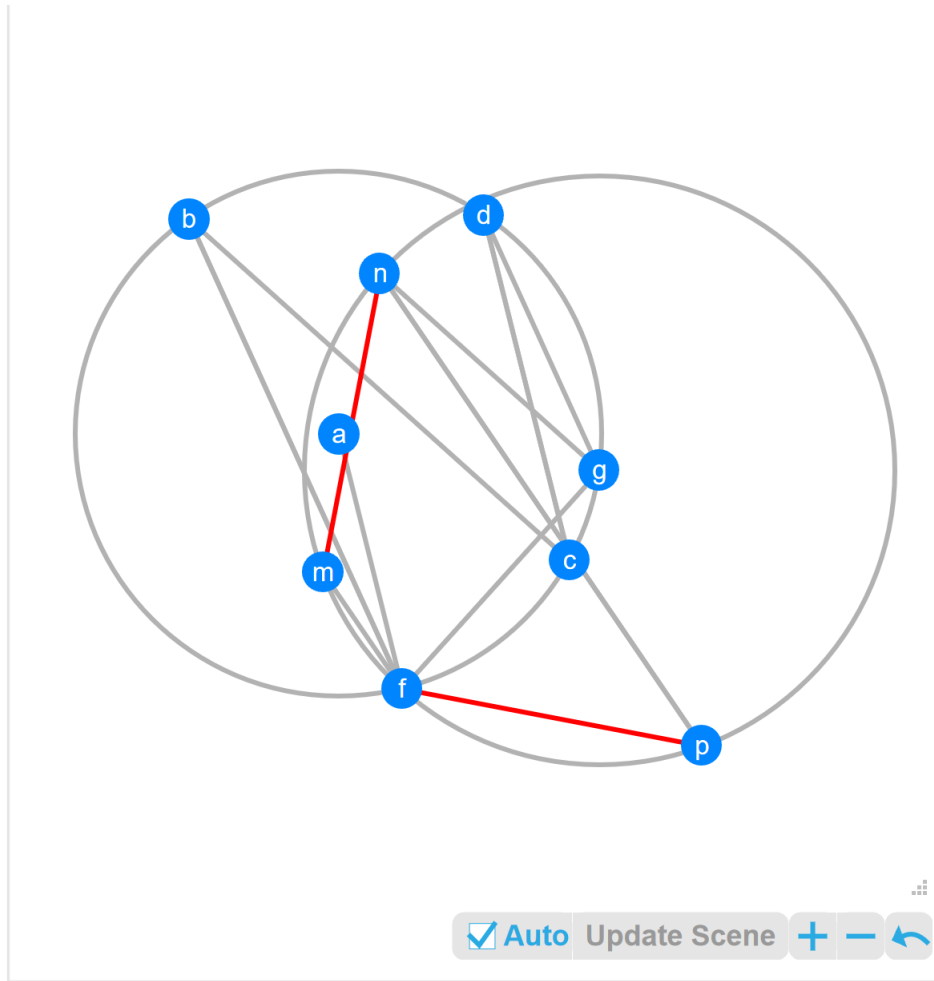
Let bcd be a cyclic quadrilateral with centre a . Let dhn be a cyclic quadrilateral with centre f . Let fd be parallel to mn . Let fbn be collinear. Let $L1$ be the angle bisector of ad and cb . Let dh be parallel to $L1$. Let $L2$ be the reflection of mh in dh . Let $L3$ be the reflection of ab in $L2$. Prove $L3$ is parallel to cd .



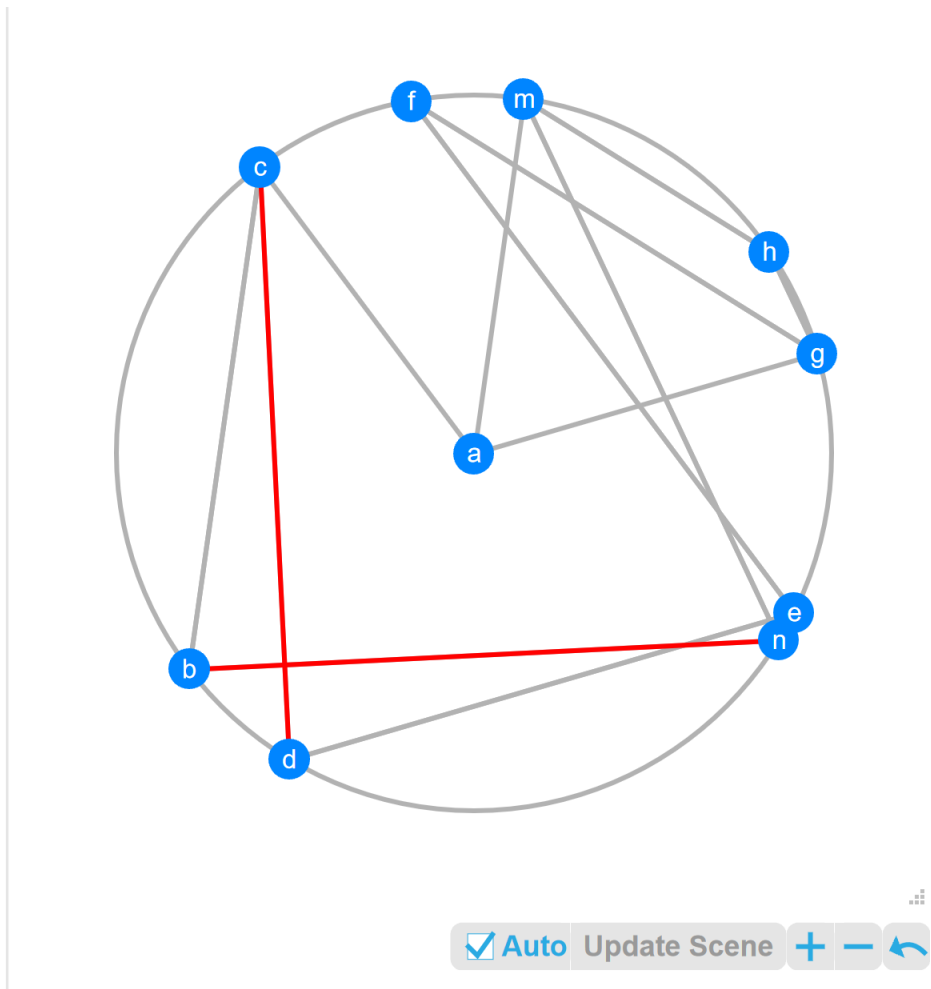
Let $bcdefghmnp$ be a cyclic decagon with centre a . Let am be parallel to cb . Let af be parallel to dc . Let an be parallel to gf . Let fe be parallel to hg . Let ed be parallel to nm . Let ac be parallel to pn . Prove bp is parallel to mh .



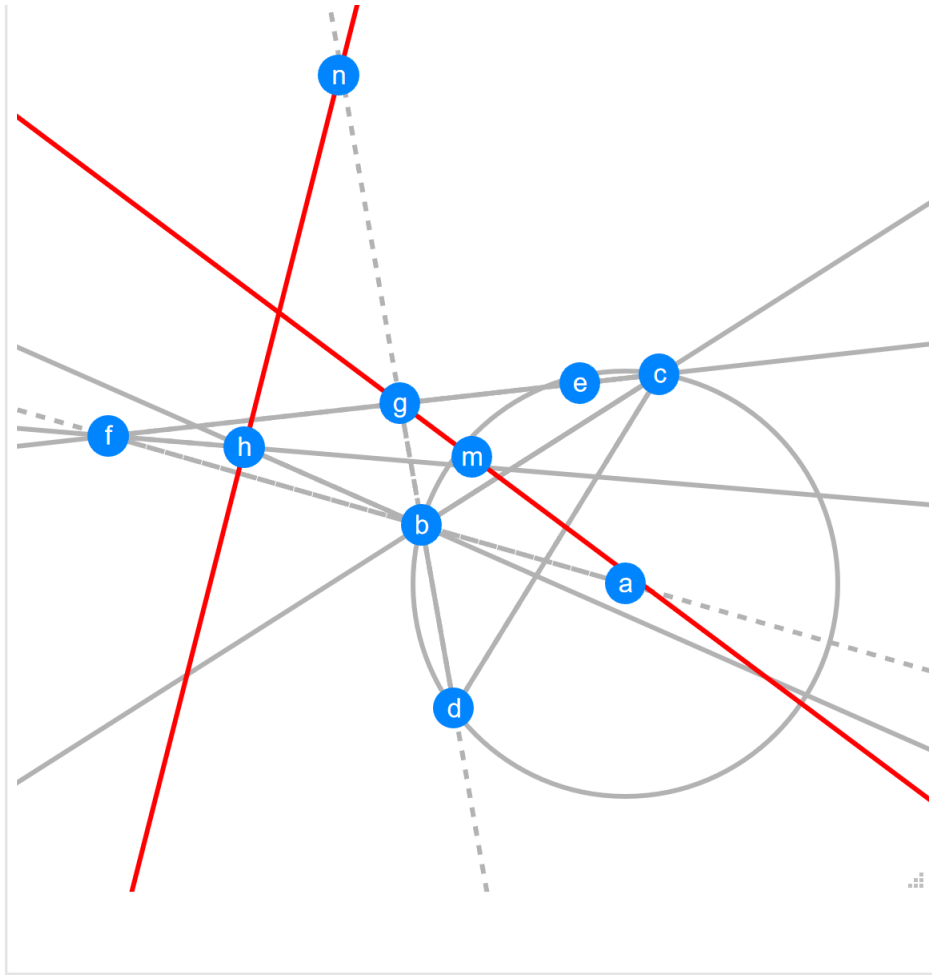
Let $bcde$ be a cyclic quadrilateral with centre a . Let L_1 be the angle bisector of ebc . Let L_2 be the angle bisector of eda and ac . Let L_3 be the reflection of cd in L_2 . Let L_4 be the angle bisector of ab and L_3 . Determine the angle between L_4 and L_1 .



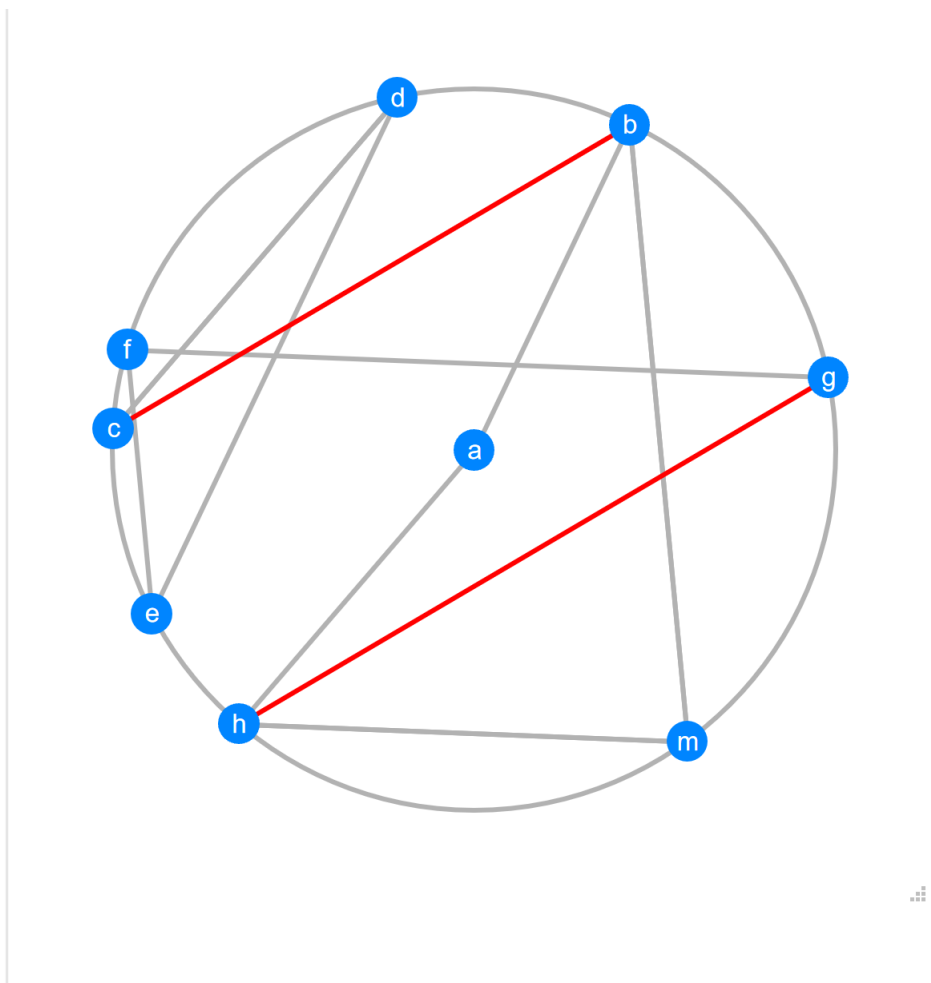
Let $bcdfg$ be a cyclic pentagon with centre a . Let af be parallel to dc . Let bf be parallel to dg . Let $fmnp$ be a cyclic quadrilateral with centre g . Let fm be parallel to pn . Let bc be parallel to gn . Prove mn is perpendicular to pf .



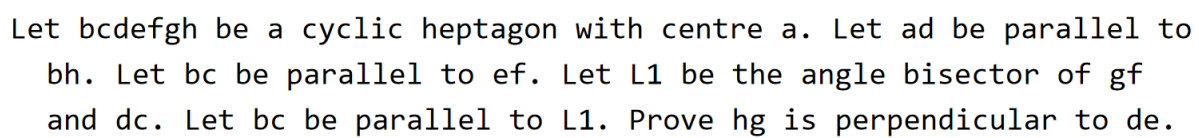
Let $bcdefghmn$ be a cyclic nonagon with centre a . Let am be parallel to cb . Let ag be parallel to ed . Let ac be parallel to fe . Let gf be parallel to mh . Let hg be parallel to nm . Prove bn is perpendicular to dc .



Let bcd be a triangle with circumcentre a . Let $L1$ be the angle bisector of dbc . Let $L2$ be the reflection of cd in bc . Let $L3$ be the angle bisector of ab and $L2$. Let $L4$ be the angle bisector of $L2$ and db . Let $L5$ be the angle bisector of $L3$ and $L1$. Determine the angle between $L4$ and $L5$.



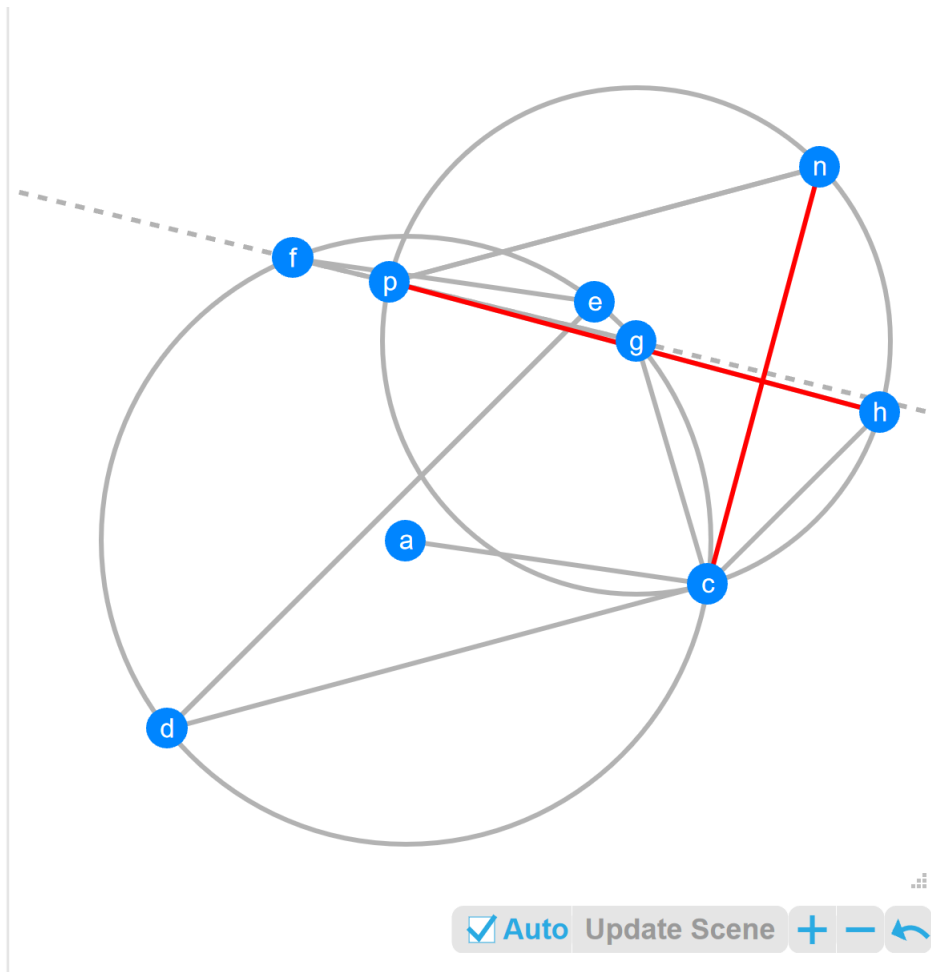
Let $bcdefghm$ be a cyclic octagon with centre a . Let ah be parallel to dc . Let ab be parallel to de . Let bm be parallel to ef . Let fg be parallel to mh . Prove bc is parallel to gh .



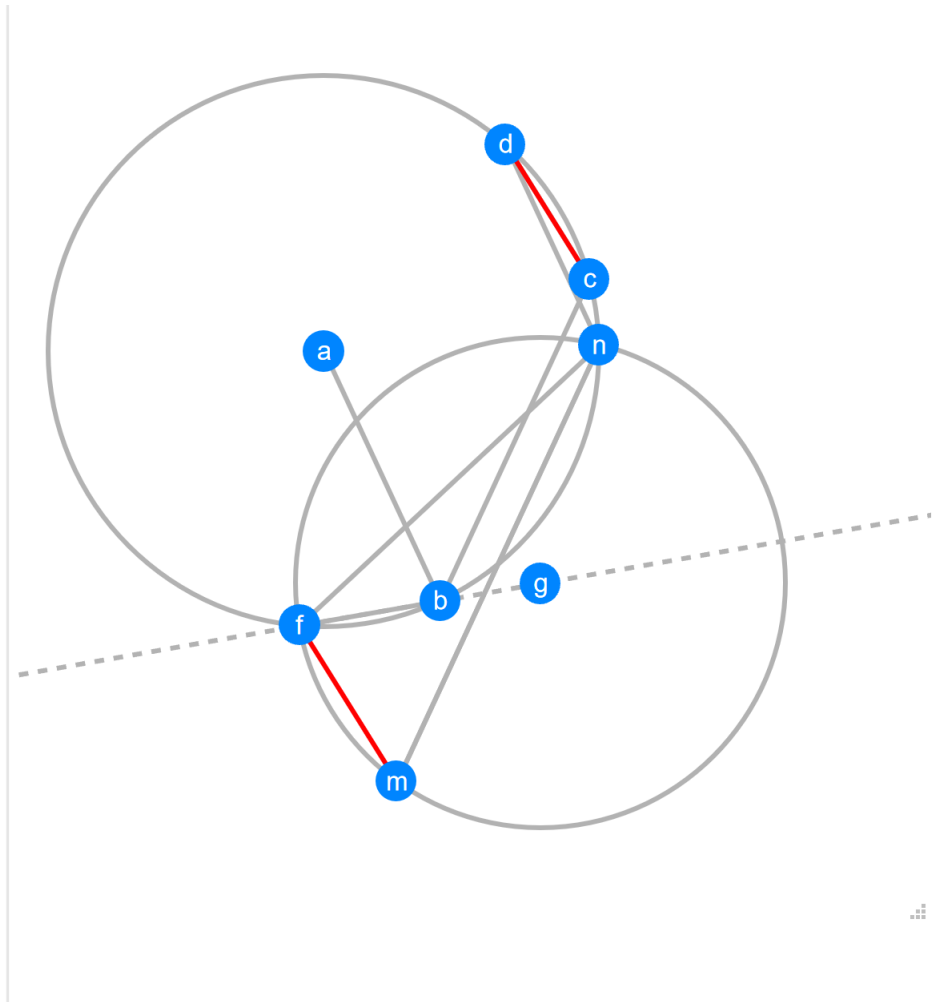
Let $bcdefgh$ be a cyclic heptagon with centre a . Let ad be parallel to bh . Let bc be parallel to ef . Let L_1 be the angle bisector of gf and dc . Let bc be parallel to L_1 . Prove hg is perpendicular to de .



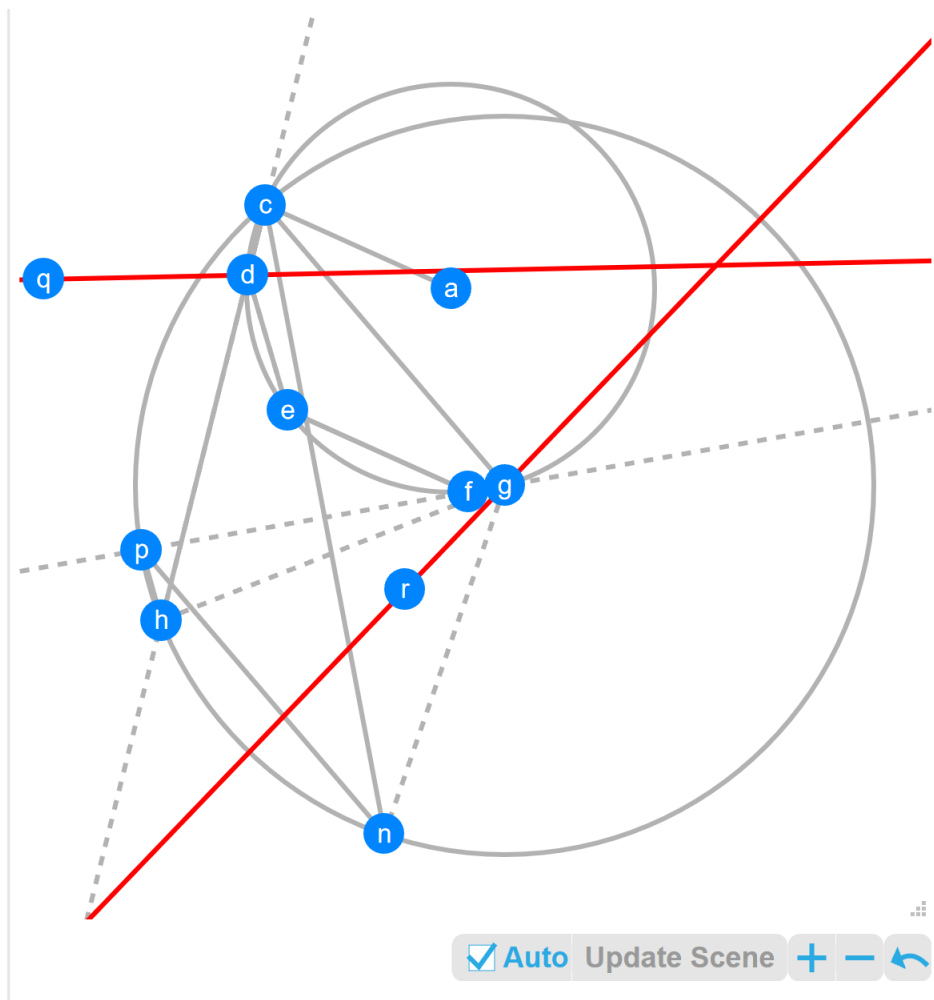
Let $bche$ be a cyclic quadrilateral with centre a . Let $ghen$ be a cyclic quadrilateral with centre f . Let ab be parallel to hg . Let ac be parallel to en . Let hcf be collinear. Let ebf be collinear. Determine the angle between gn and bc . (2.7192)



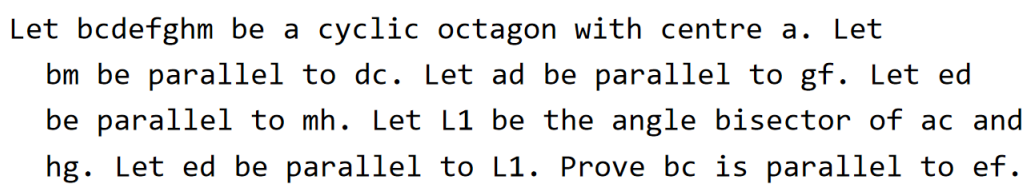
Let $gcdef$ be a cyclic pentagon with centre a . Let ac be parallel to ef . Let $hcnp$ be a cyclic quadrilateral with centre g . Let ed be parallel to hc . Let cd be parallel to pn . Let gfp be collinear. Prove hp is perpendicular to cn .

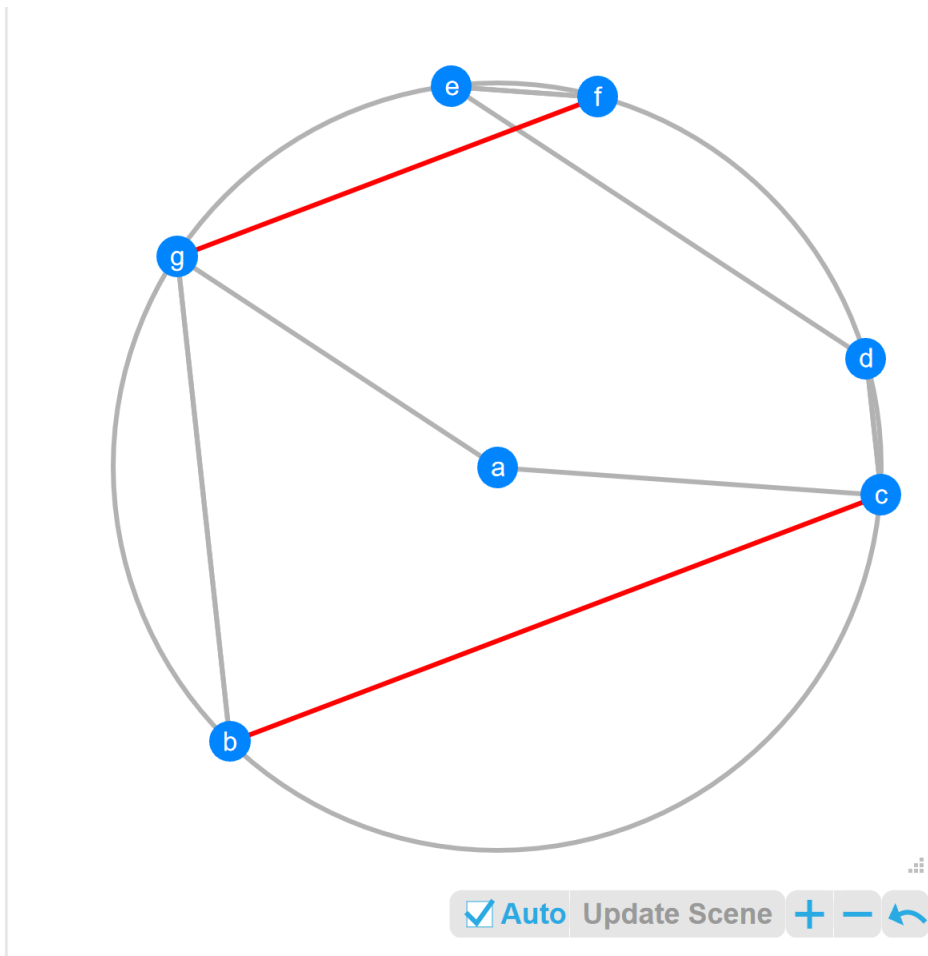


Let $bcdnf$ be a cyclic pentagon with centre a . Let ab be parallel to dn . Let fmn be a triangle with circumcentre g . Let bc be parallel to nm . Let fbg be collinear. Prove fm is parallel to dc .



Let $gcdef$ be a cyclic pentagon with centre a . Let ac be parallel to fe . Let $hcnp$ be a cyclic quadrilateral with centre g . Let cdh be collinear. Let gc be parallel to np . Let gfp be collinear. Let $L1$ be the angle bisector of edc . Let $L2$ be the angle bisector of hgn . Determine the angle between $L1$ and $L2$.

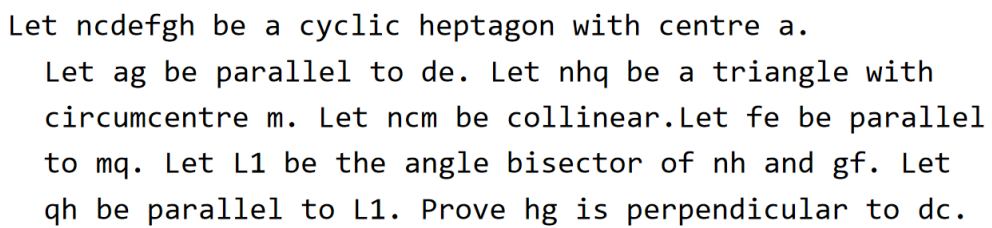


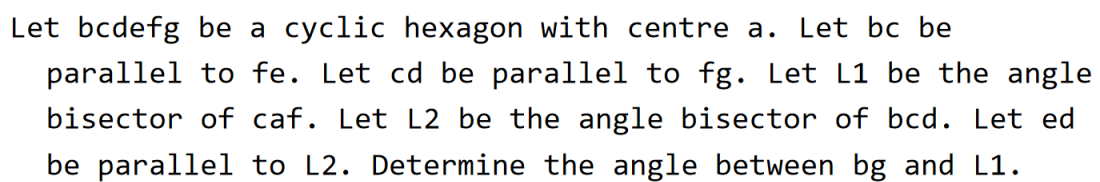


Let $bcdefg$ be a cyclic hexagon with centre a .

Let bg be parallel to dc . Let ag be parallel to de .

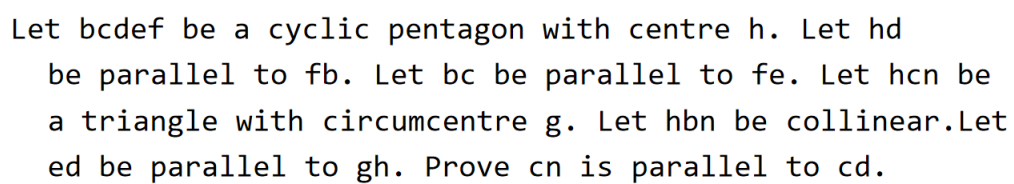
Let ac be parallel to fe . Prove bc is parallel to fg .

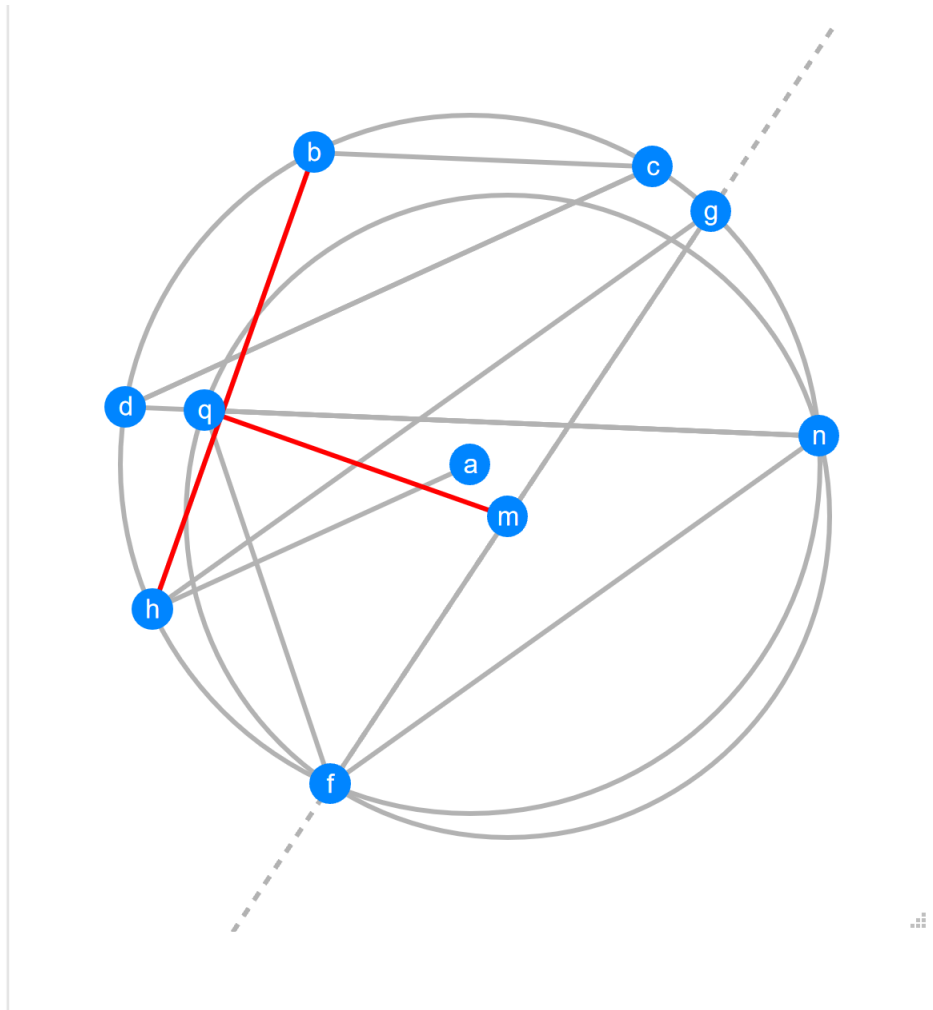




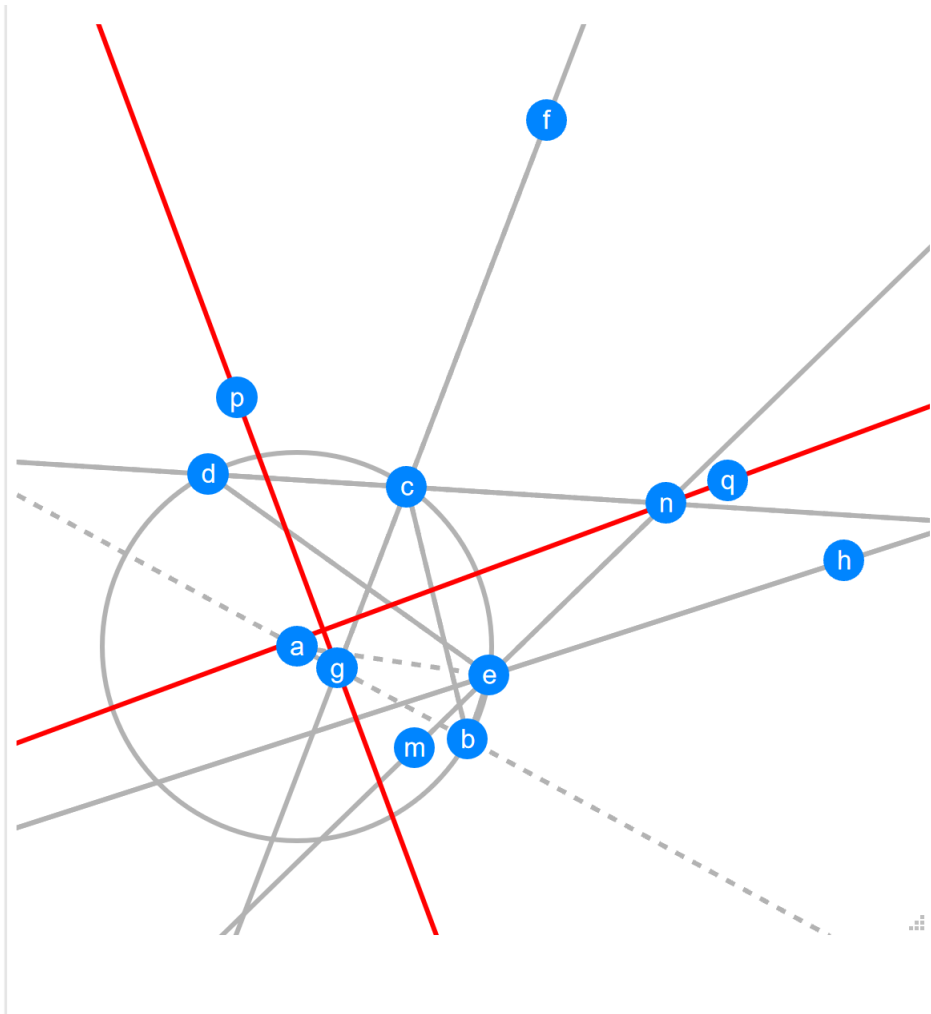


Let $bcdefghmn$ be a cyclic nonagon with centre a . Let ae be parallel to bn . Let ah be parallel to ed . Let ac be parallel to gf . Let dc be parallel to mh . Let fe be parallel to nm . Determine the angle between cb and hg . (87.8366)

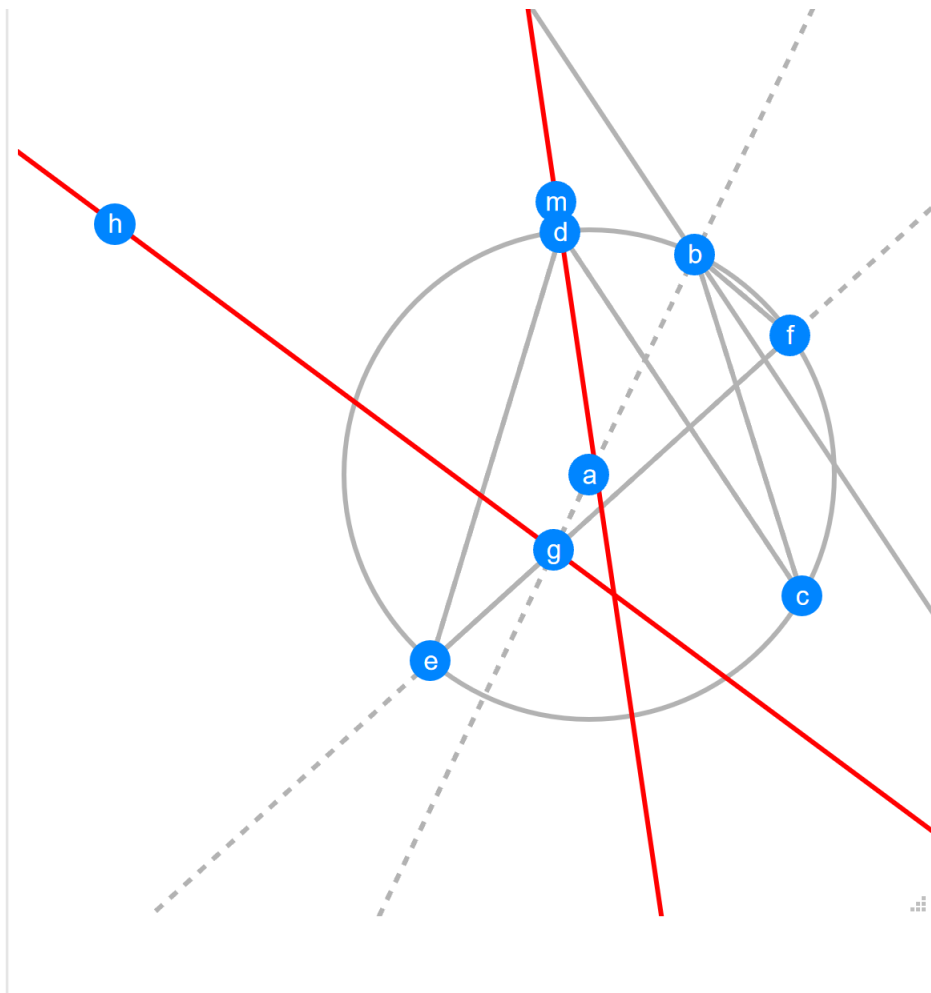




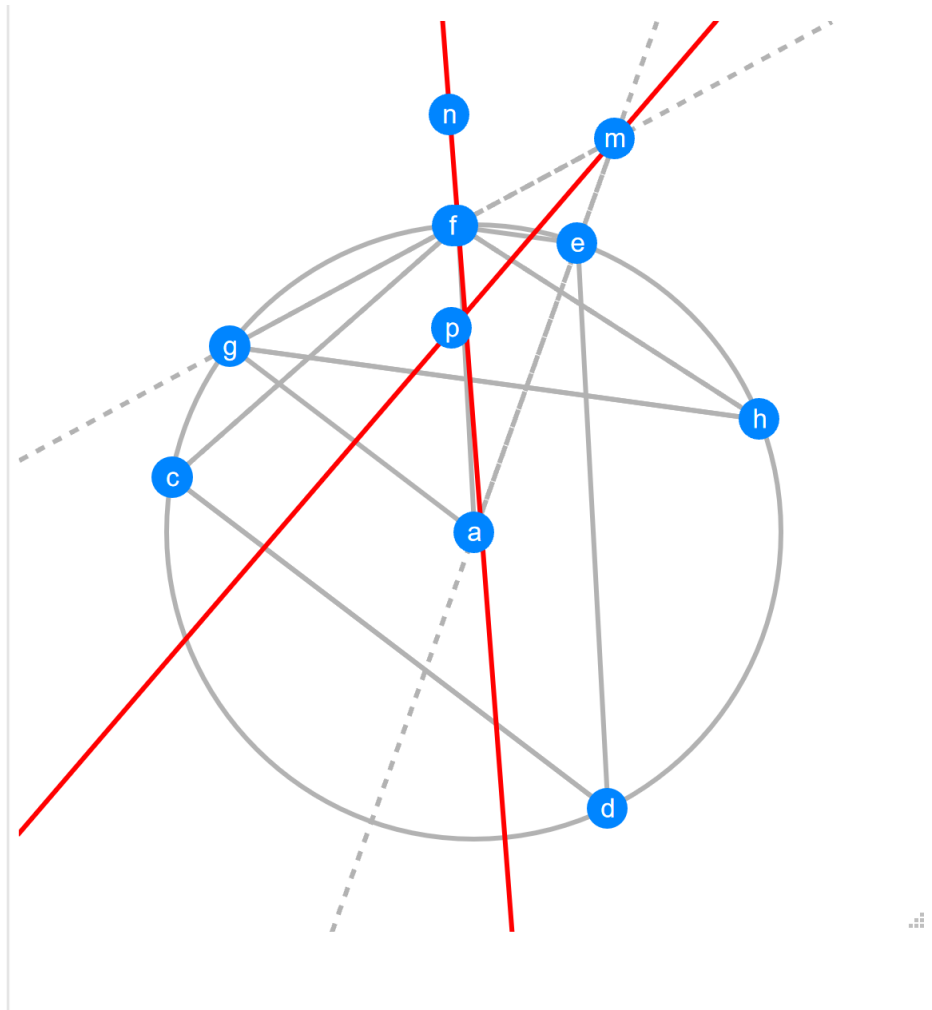
Let $bcdnfhg$ be a cyclic heptagon with centre a . Let ah be parallel to dc . Let bc be parallel to dn . Let nf be parallel to gh . Let nfq be a triangle with circumcentre m . Let bc be parallel to nq . Let fgm be collinear. Prove mq is perpendicular to bh .



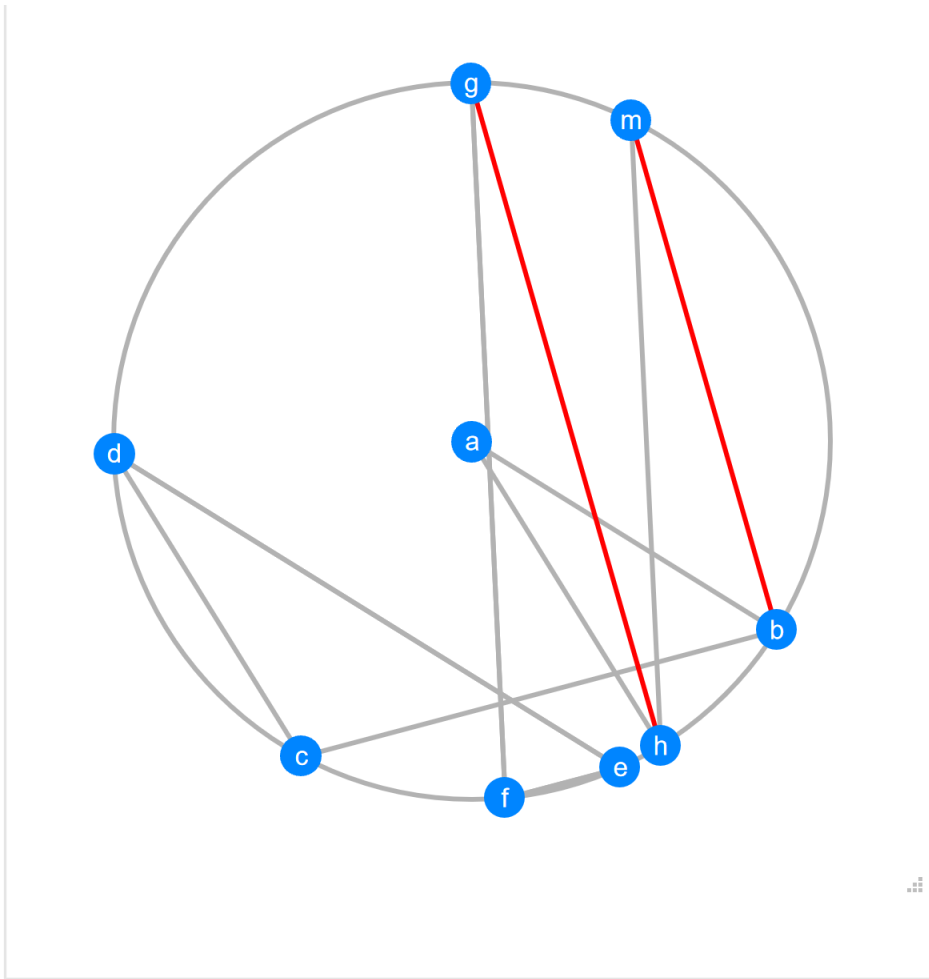
Let $bcde$ be a cyclic quadrilateral with centre a . Let $L1$ be the reflection of bc in dc . Let $L2$ be the angle bisector of ab and $L1$. Let $L3$ be the angle bisector of bed . Let $L4$ be the reflection of ae in $L3$. Let $L5$ be the angle bisector of $L4$ and dc . Determine the angle between $L2$ and $L5$.



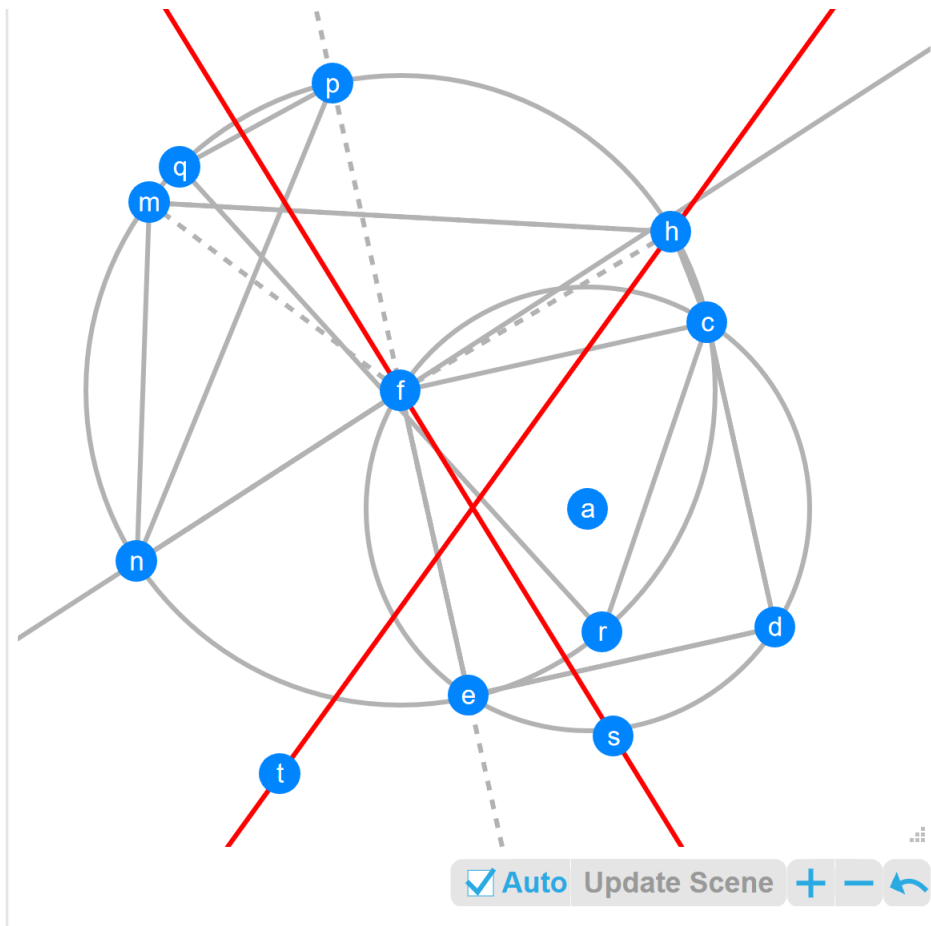
Let $bcdef$ be a cyclic pentagon with centre a . Let $L1$ be the angle bisector of ab and ef . Let $L2$ be the angle bisector of fb . Let cd be parallel to $L2$. Let $L3$ be the angle bisector of cde . Determine the angle between $L1$ and $L3$.



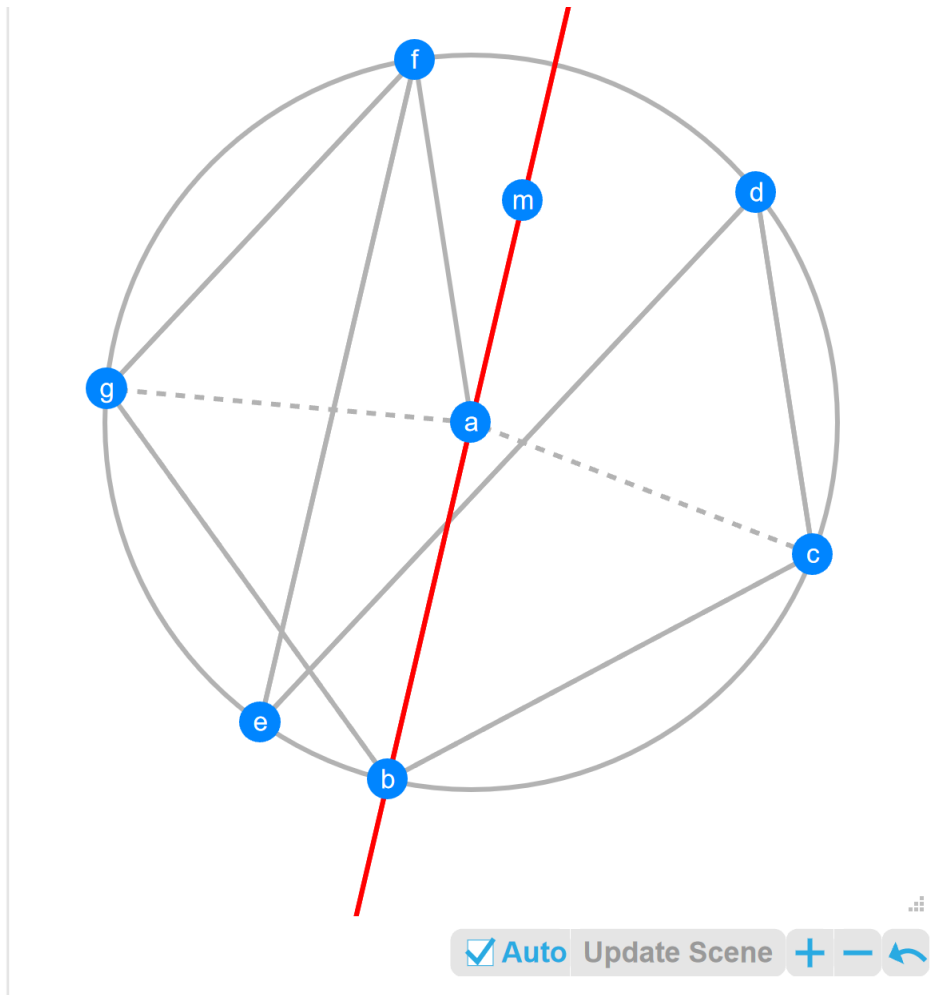
Let $bcdefgh$ be a cyclic heptagon with centre a . Let ag be parallel to dc . Let ab be parallel to de . Let ef be parallel to hg . Let $L1$ be the angle bisector of cbh . Let $L2$ be the angle bisector of fga . Determine the angle between $L1$ and $L2$.



Let $bcdefghm$ be a cyclic octagon with centre a . Let ah be parallel to cd . Let ab be parallel to ed . Let bc be parallel to fe . Let gf be parallel to hm . Prove mb is parallel to gh .



Let $fcde$ be a cyclic quadrilateral with centre a . Let fe be parallel to dc . Let fc be parallel to ed . Let $chmnpqr$ be a cyclic heptagon with centre f . Let fep be collinear. Let $L1$ be the angle bisector of efm . Let fn be parallel to $L1$. Let $L2$ be the angle bisector of hfn . Let $L3$ be the angle bisector of chm . Determine the angle between $L2$ and $L3$.



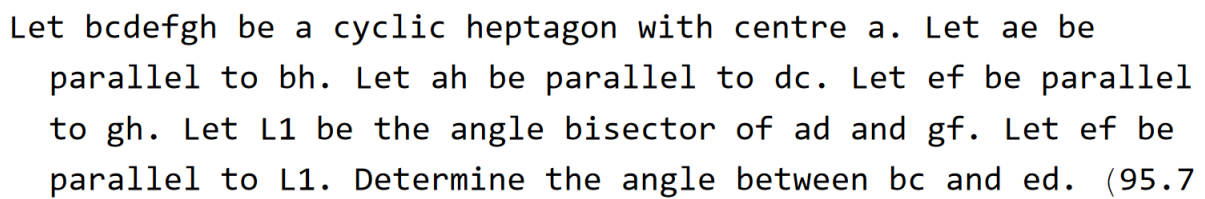
Let $bcdefg$ be a cyclic hexagon with centre a . Let af be parallel to dc . Let ab be parallel to fe . Let ed be parallel to gf . Let L_1 be the angle bisector of cbg . Let L_2 be the angle bisector of cag . Determine the angle between L_1 and L_2 .

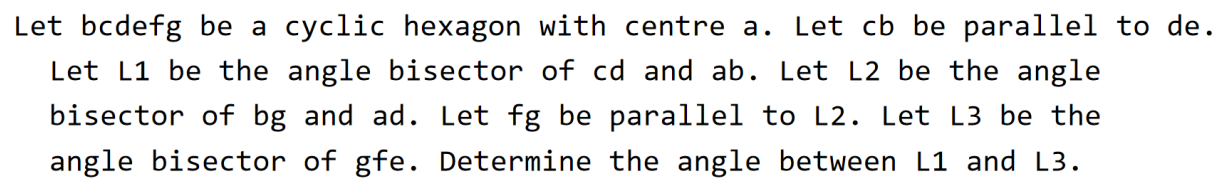


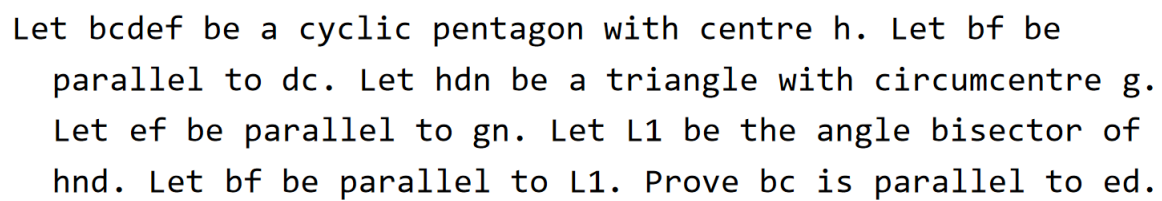
Let $bcdefgh$ be a cyclic heptagon with centre a . Let ae be parallel to cb . Let ah be parallel to ed . Let ef be parallel to gh . Let L_1 be the angle bisector of cd and ab . Let ef be parallel to L_1 . Prove bh is perpendicular to fg .

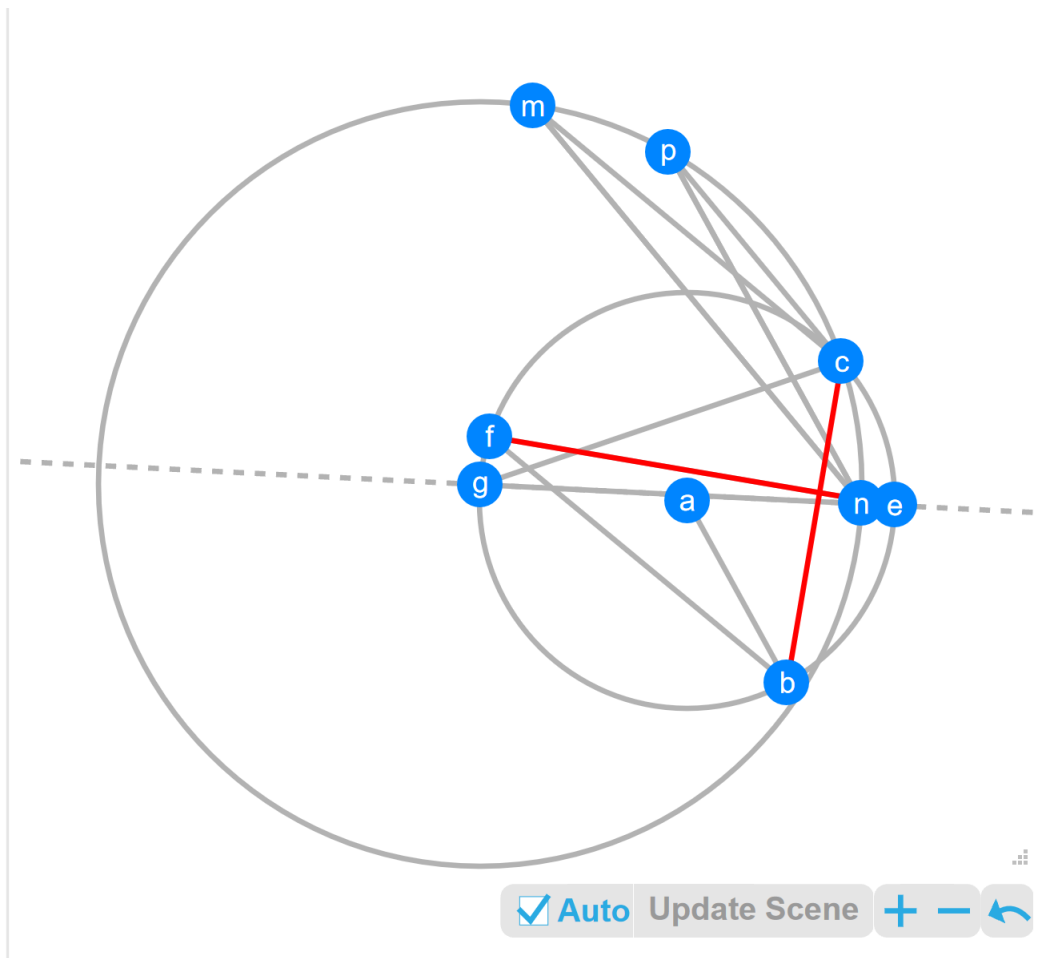


Let bce be a triangle with circumcentre a . Let $fghb$ be a cyclic quadrilateral with centre e . Let fg be parallel to hb . Let L_1 be the angle bisector of ab and hg . Let L_2 be the angle bisector of ec and hg . Let L_3 be the angle bisector of L_2 and L_1 . Let fg be parallel to L_3 . Prove ef is perpendicular to bc .

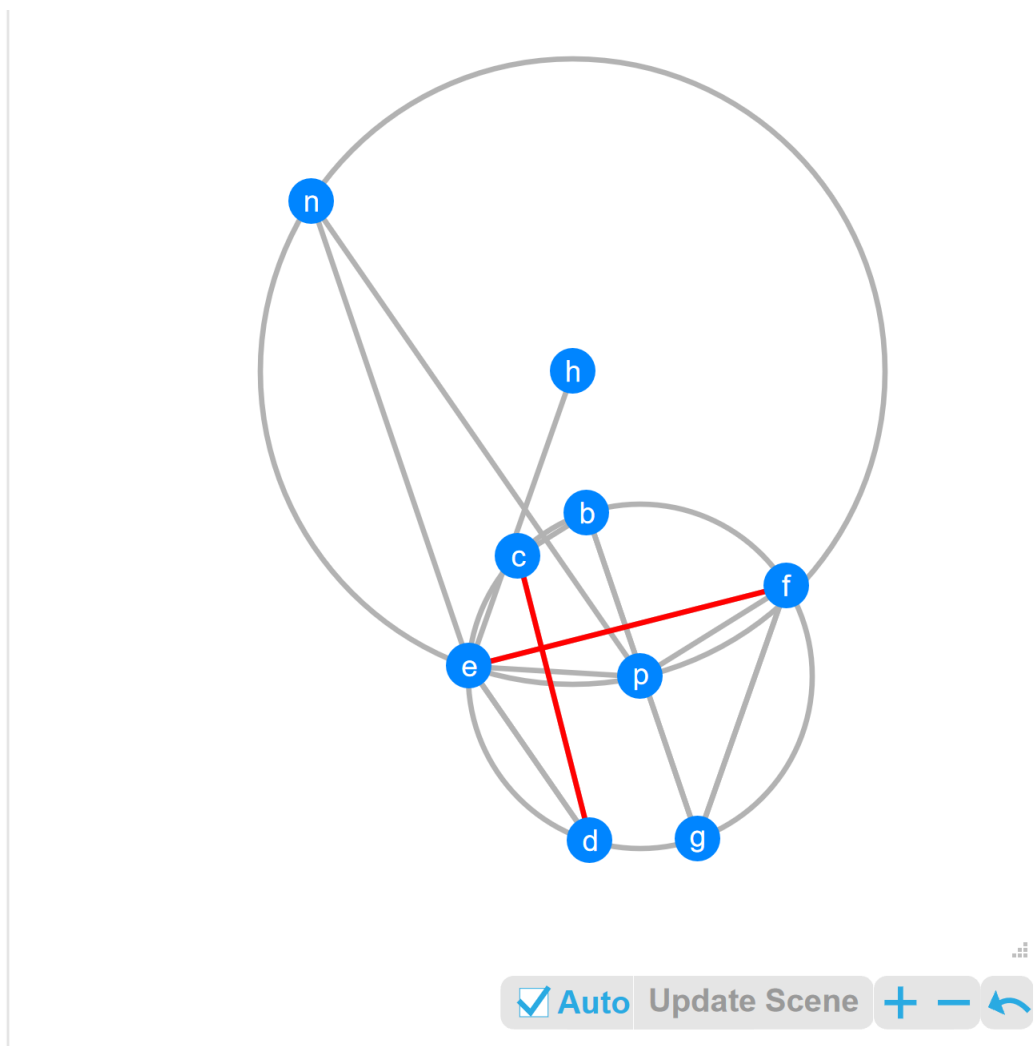




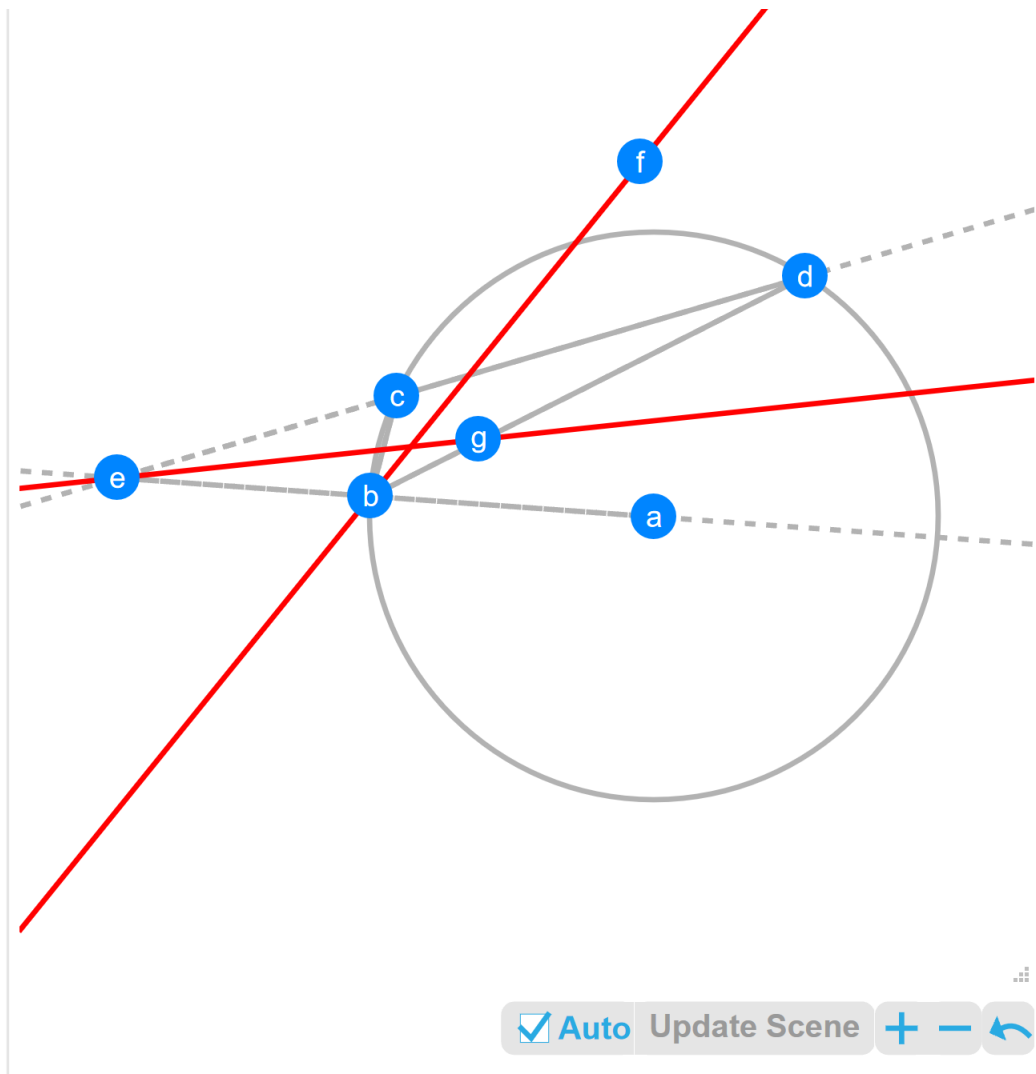




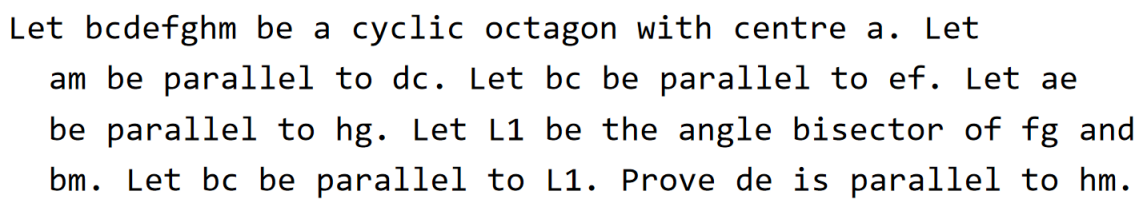
Let $bcgef$ be a cyclic pentagon with centre a . Let $cmnp$ be a cyclic quadrilateral with centre g . Let fb be parallel to cm . Let pc be parallel to nm . Let ab be parallel to pn . Let gen be collinear. Prove bc is perpendicular to fe .

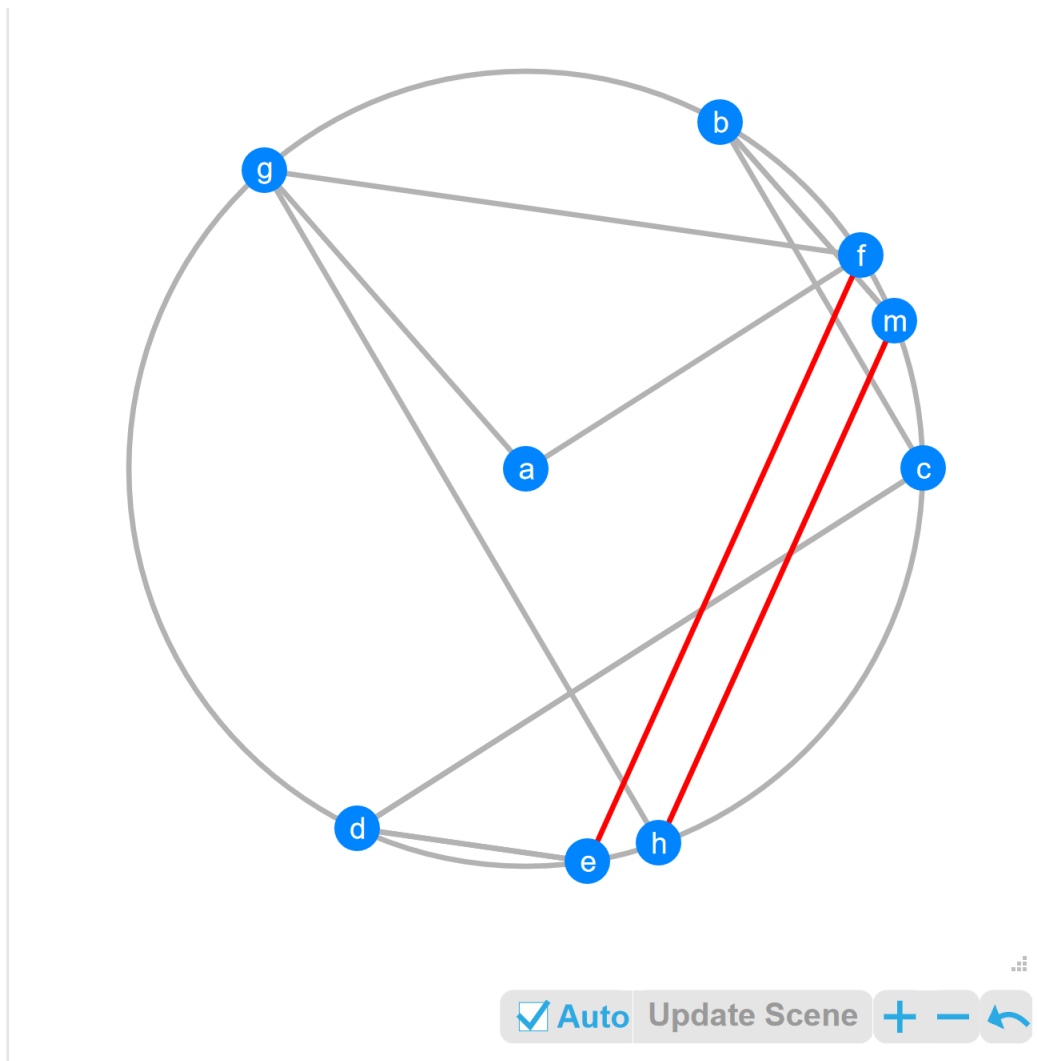


Let $bcdefg$ be a cyclic hexagon with centre p . Let pf be parallel to bc . Let enp be a triangle with circumcentre h . Let bg be parallel to en . Let ed be parallel to np . Let gf be parallel to he . Prove dc is perpendicular to fe .

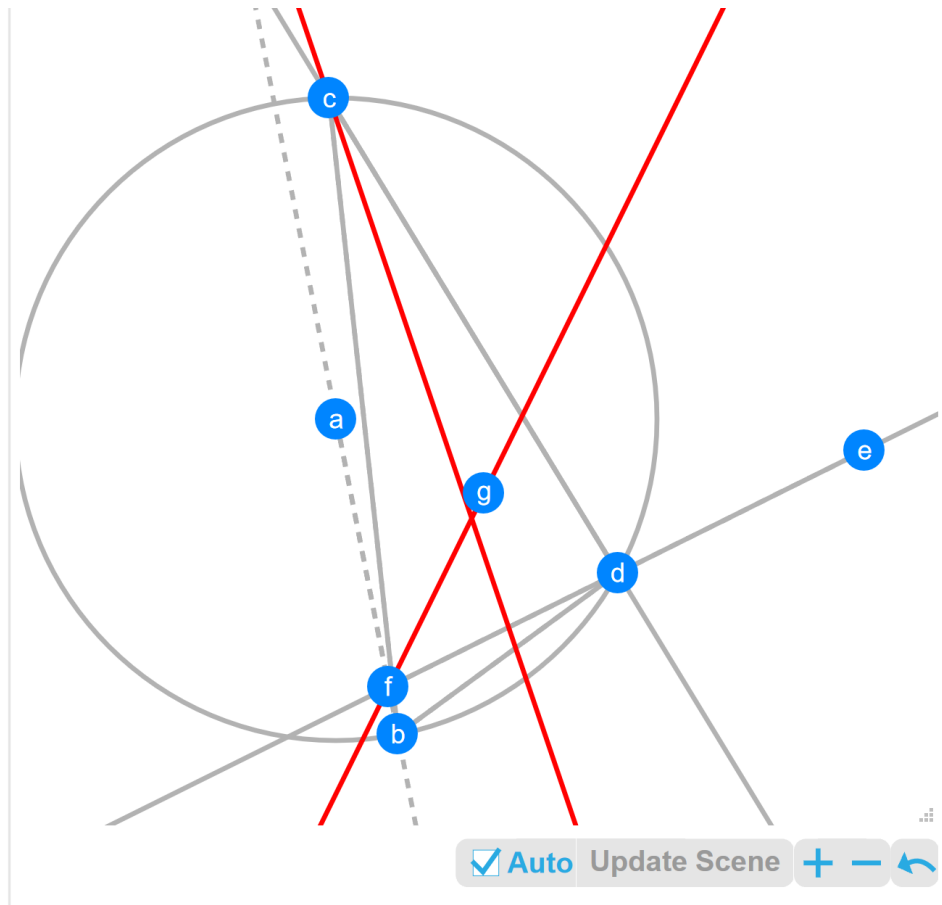


Let bcd be a triangle with circumcentre a . Let $L1$ be the angle bisector of cbd . Let $L2$ be the angle bisector of dc and ab . Determine the angle between $L1$ and $L2$.

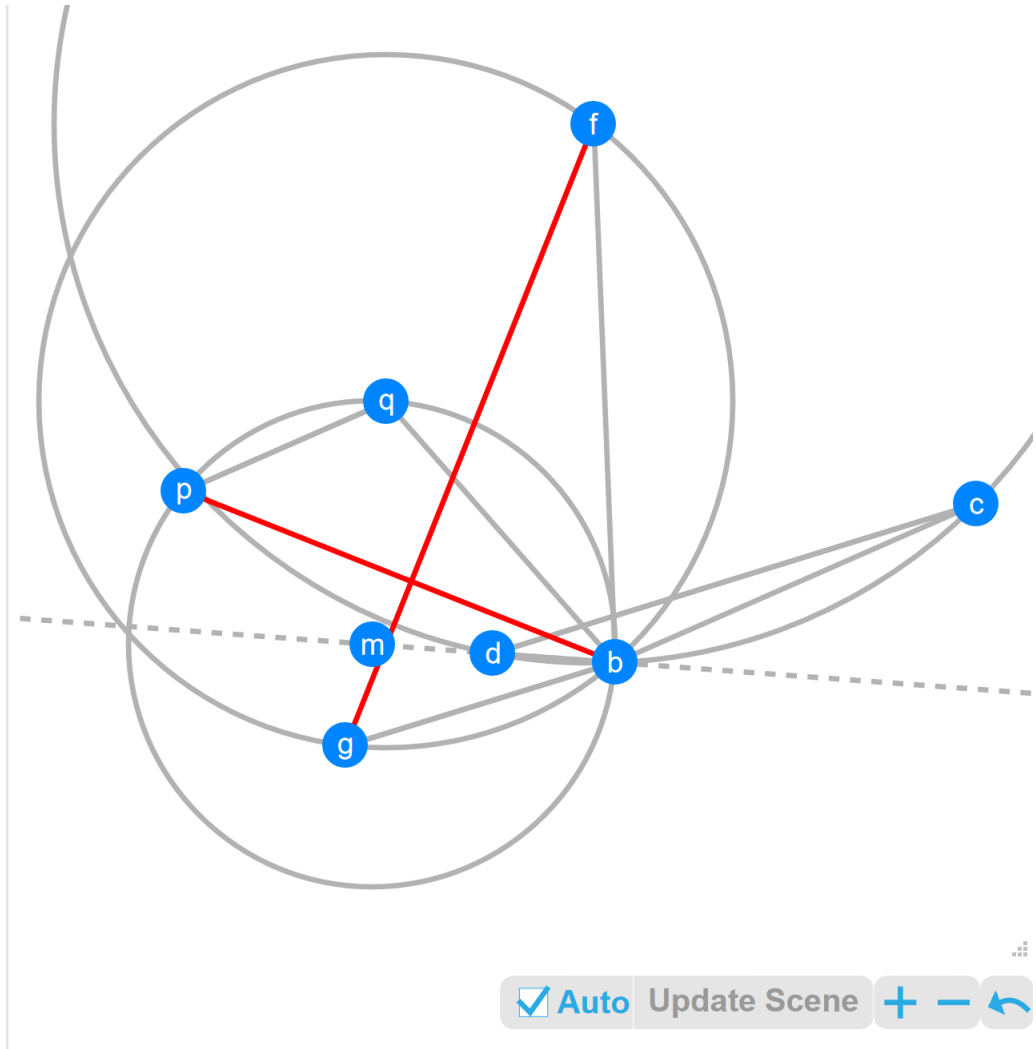




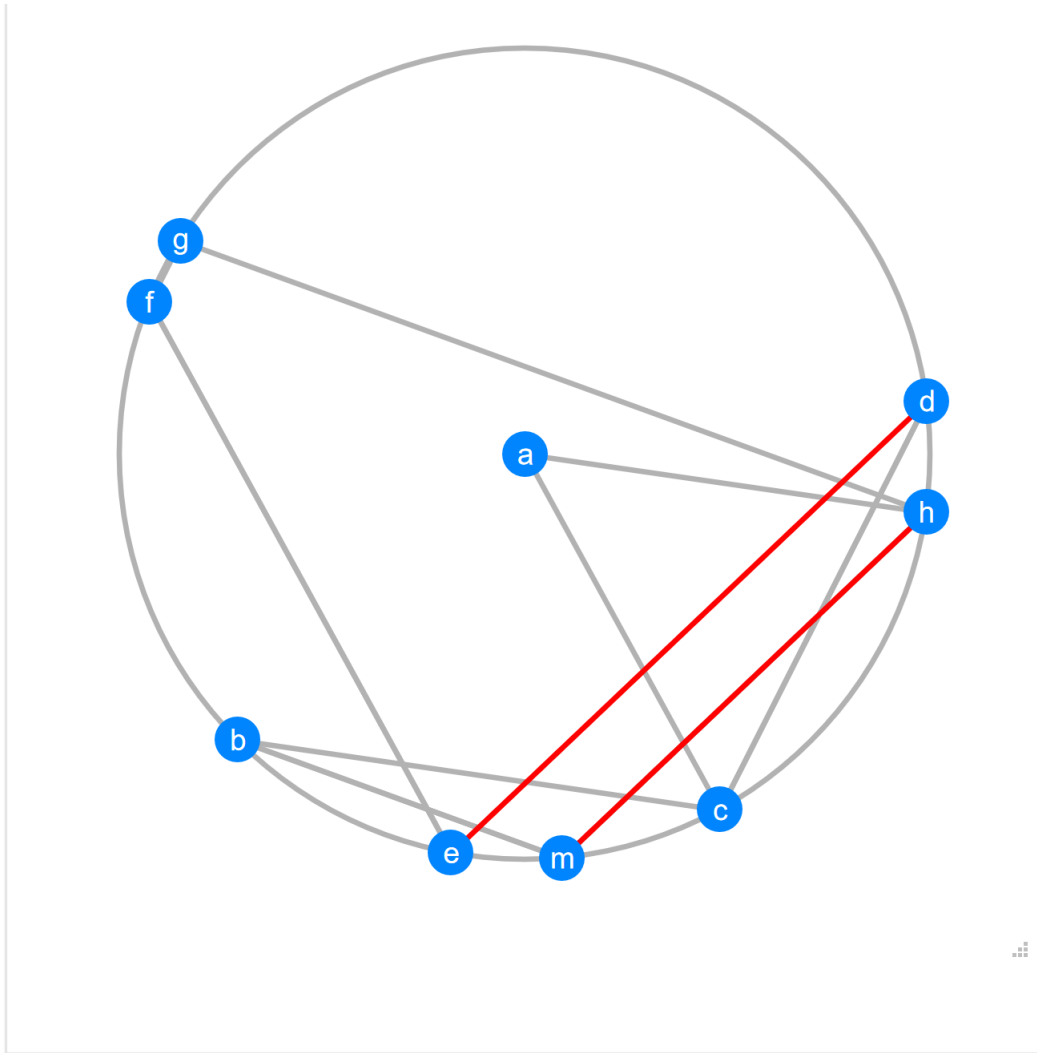
Let $bcdefghm$ be a cyclic octagon with centre a . Let ag be parallel to bm . Let af be parallel to dc . Let ed be parallel to fg . Let bc be parallel to gh . Prove mh is parallel to ef .



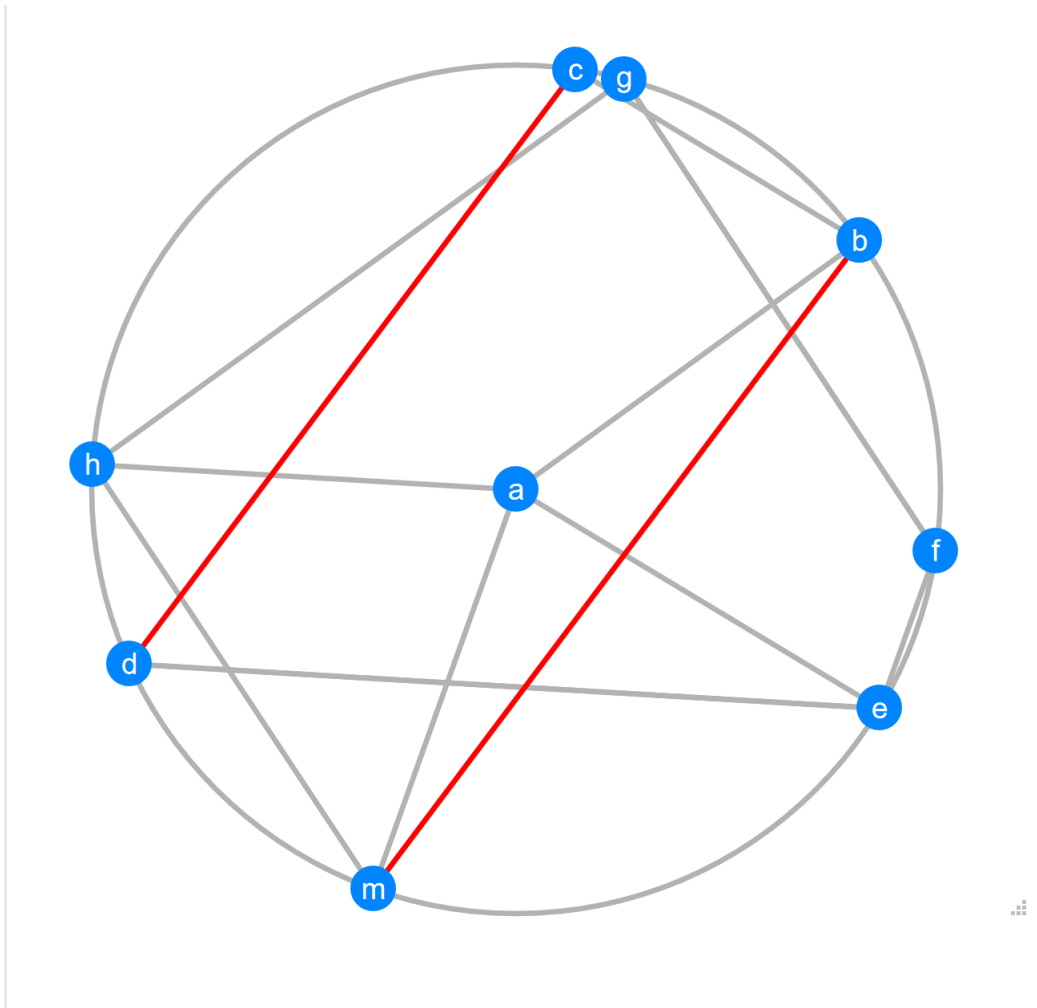
Let bcd be a triangle with circumcentre a . Let $L1$ be the reflection of db in cd . Let $L2$ be the angle bisector of ab and $L1$. Let $L3$ be the angle bisector of dcb . Determine the angle between $L2$ and $L3$.



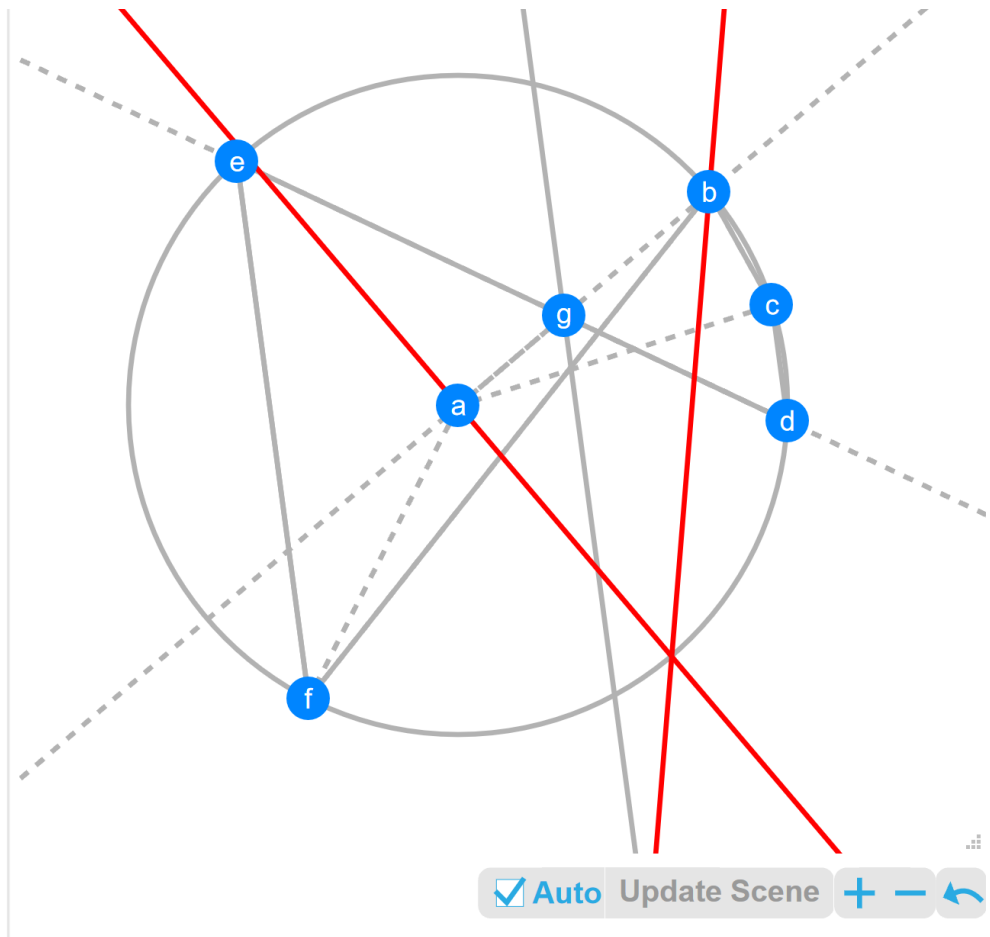
Let bcd be a triangle with circumcentre f . Let fgb be a triangle with circumcentre q . Let dc be parallel to bg . Let bpq be a triangle with circumcentre m . Let bc be parallel to qp . Let bdm be collinear. Prove bp is perpendicular to fg .



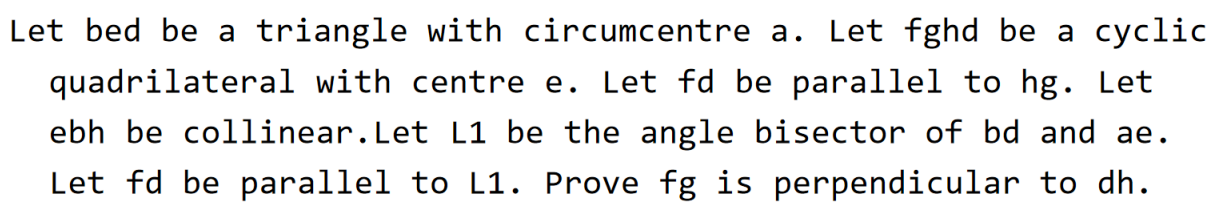
Let $bcdefghm$ be a cyclic octagon with centre a . Let ah be parallel to bc . Let ac be parallel to fe . Let dc be parallel to fg . Let bm be parallel to gh . Prove mh is parallel to de .

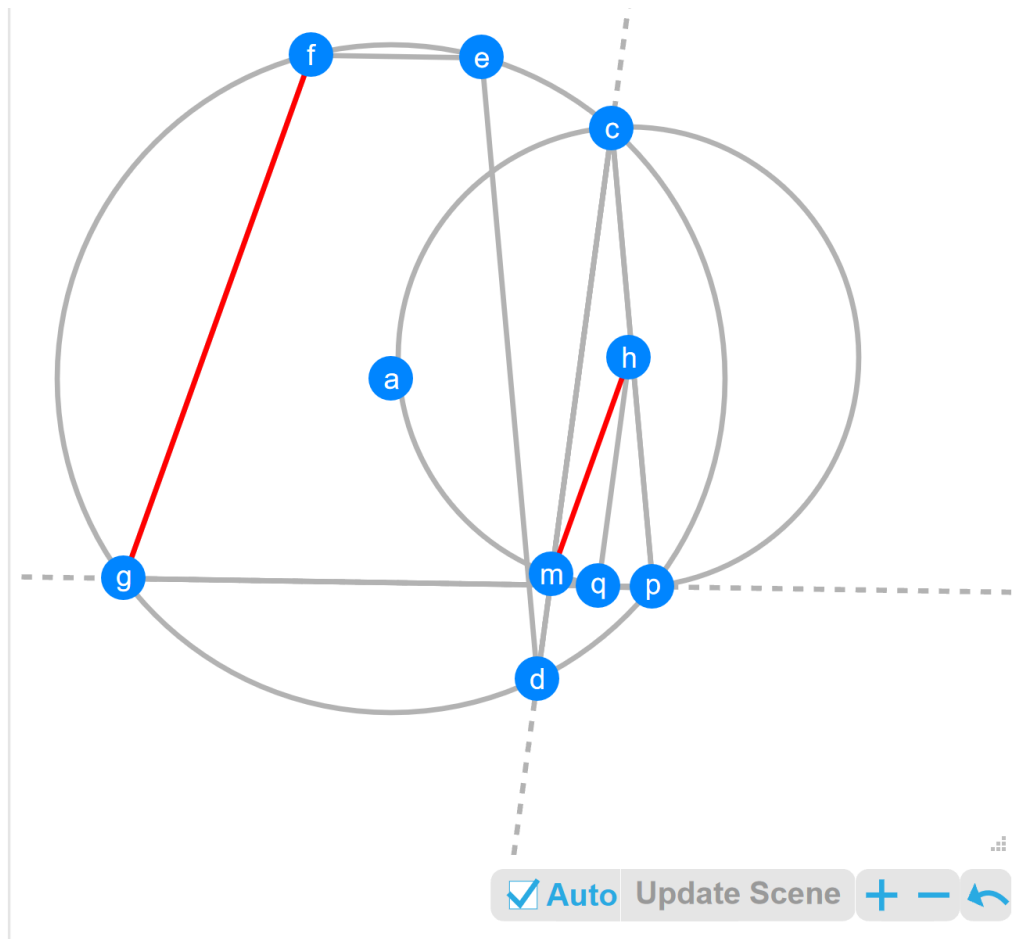


Let $bcdefghm$ be a cyclic octagon with centre a . Let ae be parallel to bc . Let ah be parallel to ed . Let am be parallel to ef . Let ab be parallel to gh . Let gf be parallel to hm . Prove cd is parallel to mb .

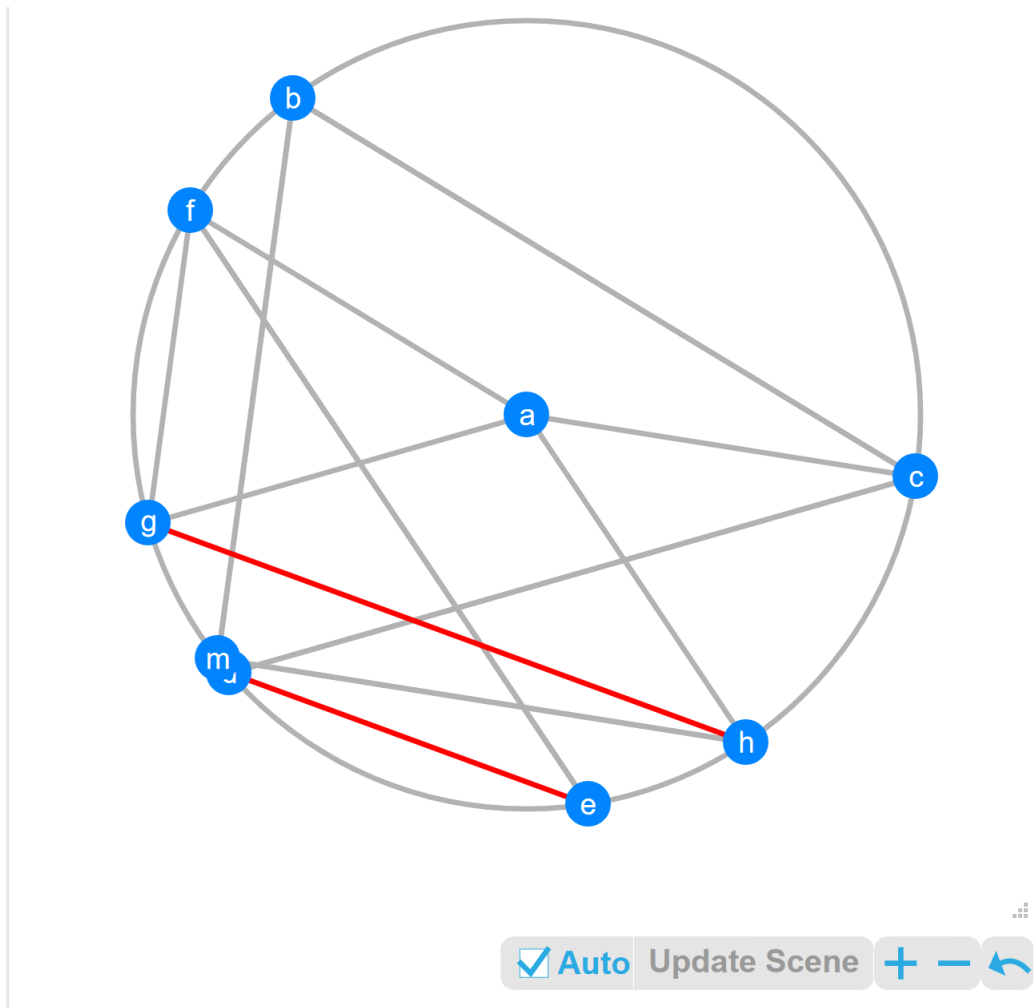


Let $bcdef$ be a cyclic pentagon with centre a . Let cd be parallel to fe . Let L_1 be the angle bisector of cbf . Let L_2 be the angle bisector of ed and ab . Let cd be parallel to L_2 . Let L_3 be the angle bisector of caf . Determine the angle between L_1 and L_3 .

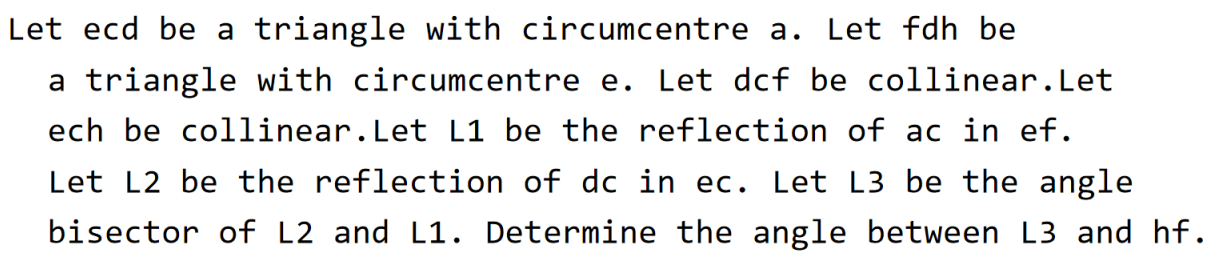


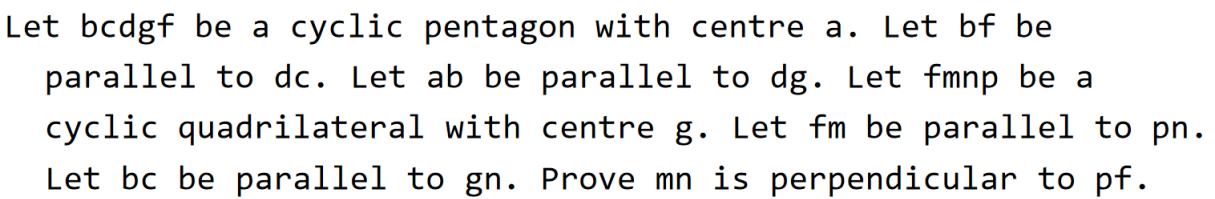


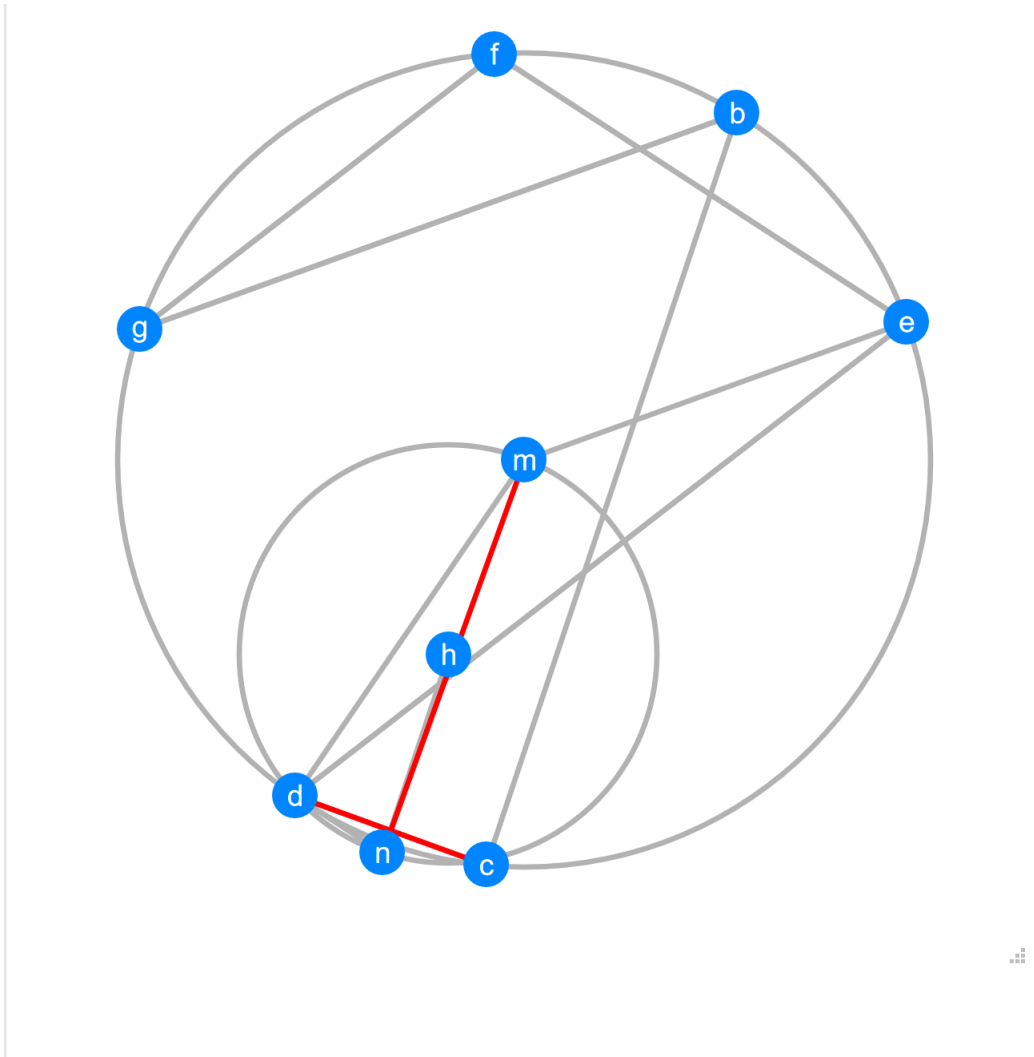
Let $pcdefg$ be a cyclic hexagon with centre a . Let pc be parallel to de . Let pg be parallel to ef . Let $mcpq$ be a cyclic quadrilateral with centre h . Let cdm be collinear. Let pgq be collinear. Let dc be parallel to hq . Prove hm is parallel to gf .



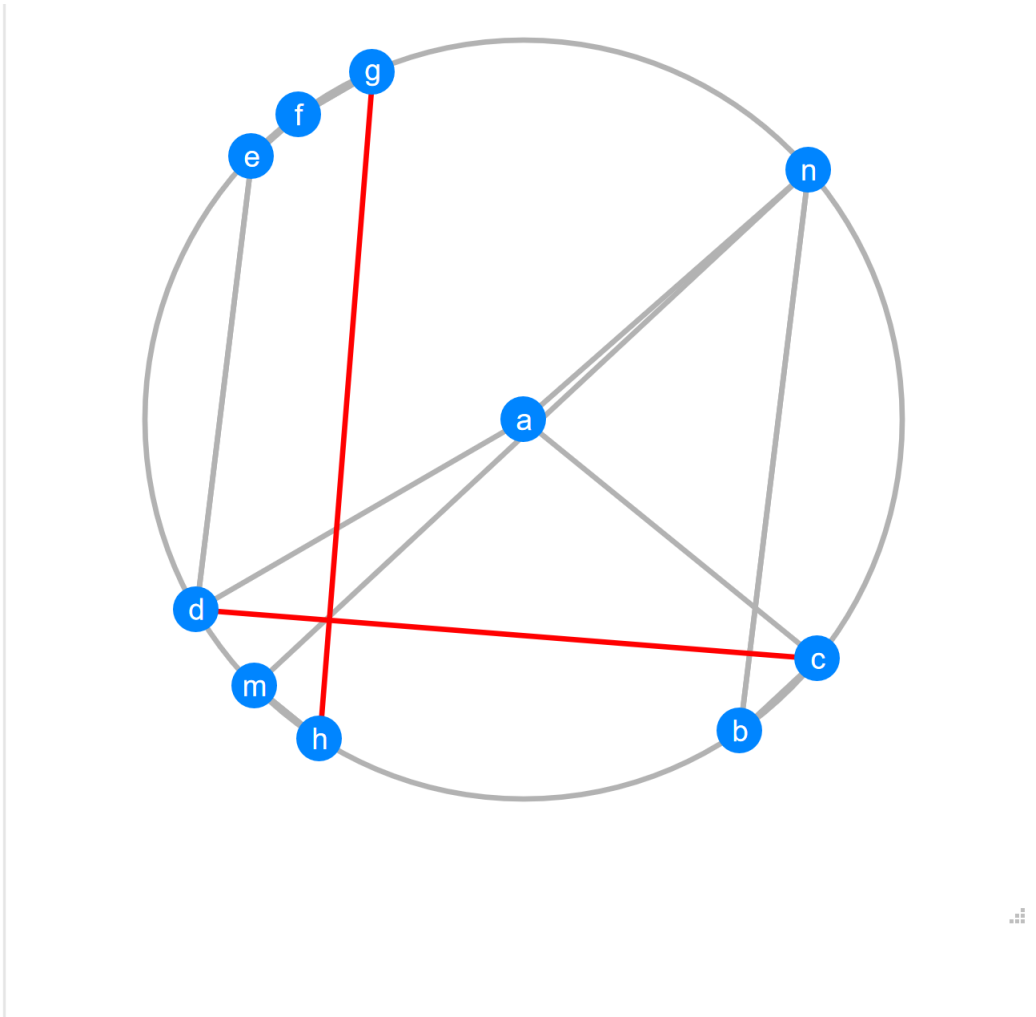
Let $bcdefghm$ be a cyclic octagon with centre a . Let af be parallel to cb . Let ag be parallel to dc . Let ah be parallel to fe . Let bm be parallel to fg . Let ac be parallel to mh . Prove gh is parallel to de .



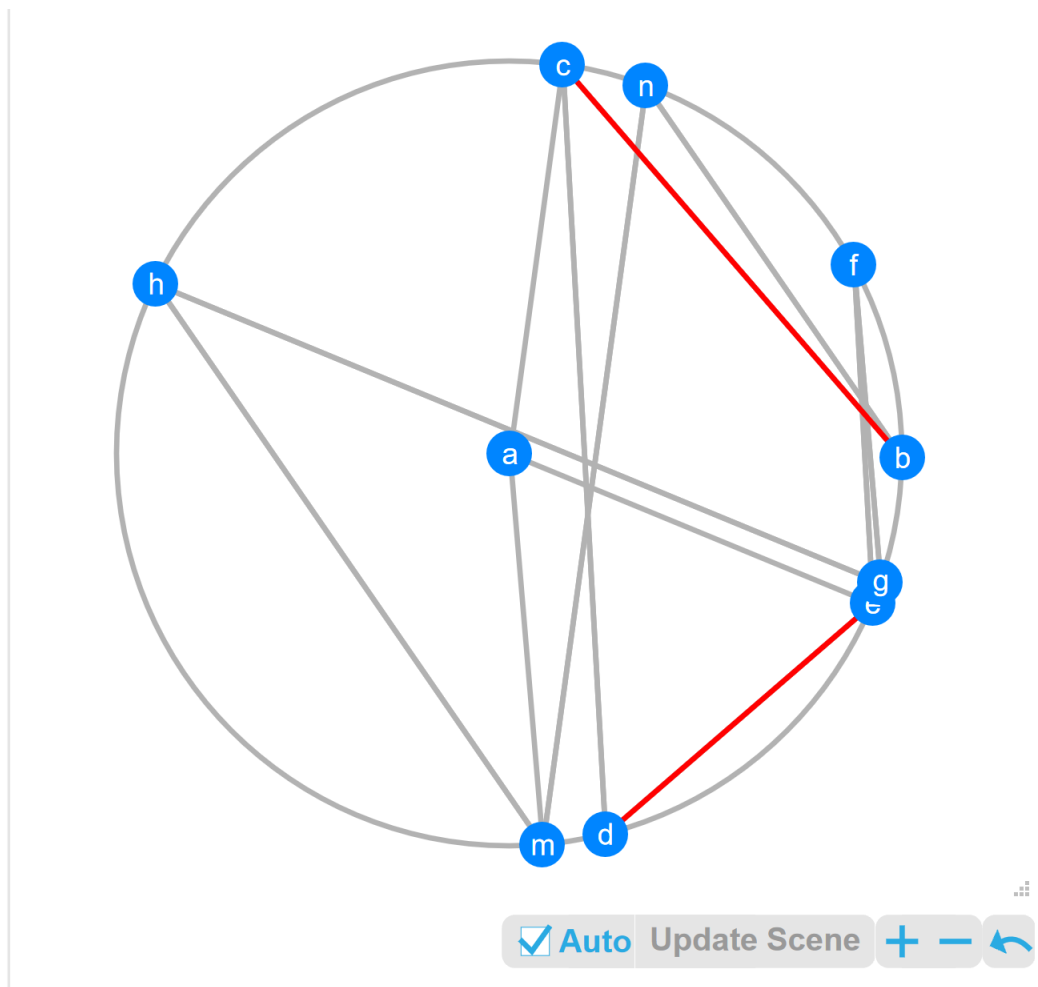




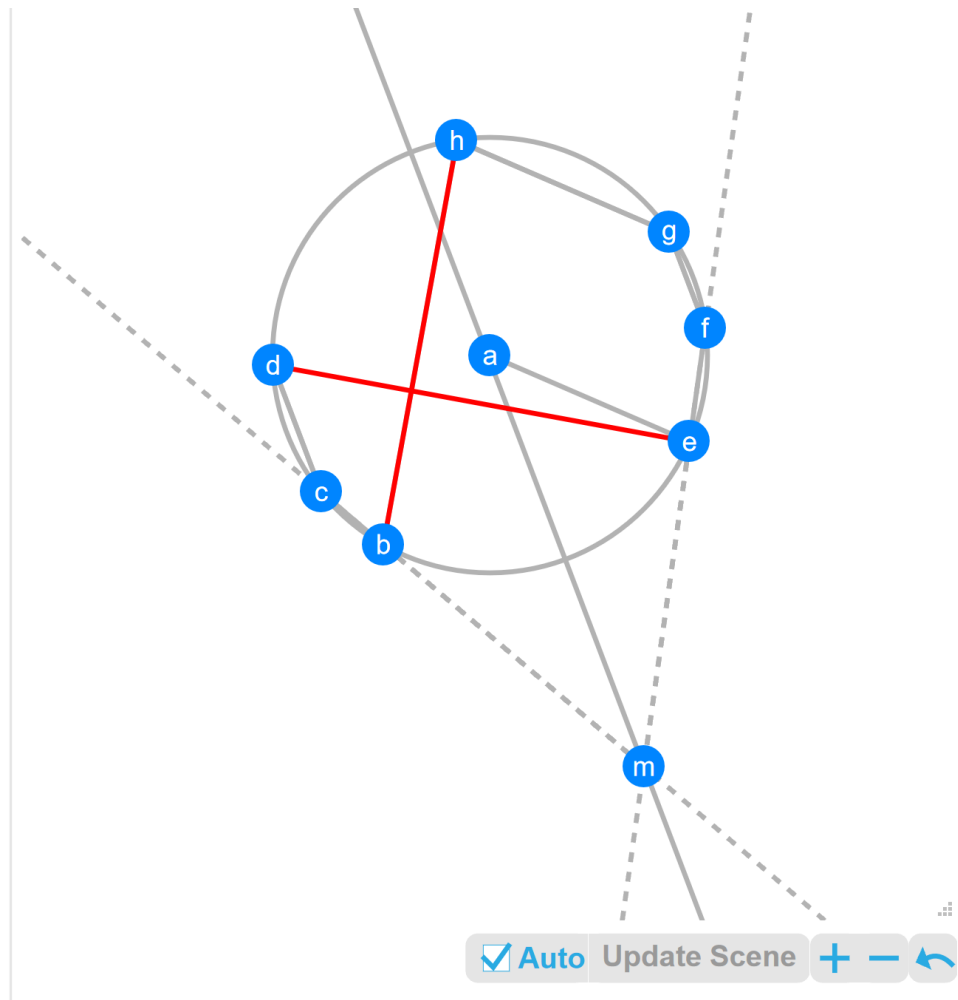
Let $bcdefg$ be a cyclic hexagon with centre m . Let me be parallel to bg . Let ed be parallel to gf . Let mnd be a triangle with circumcentre h . Let fe be parallel to dn . Let bc be parallel to hn . Prove mn is perpendicular to dc .



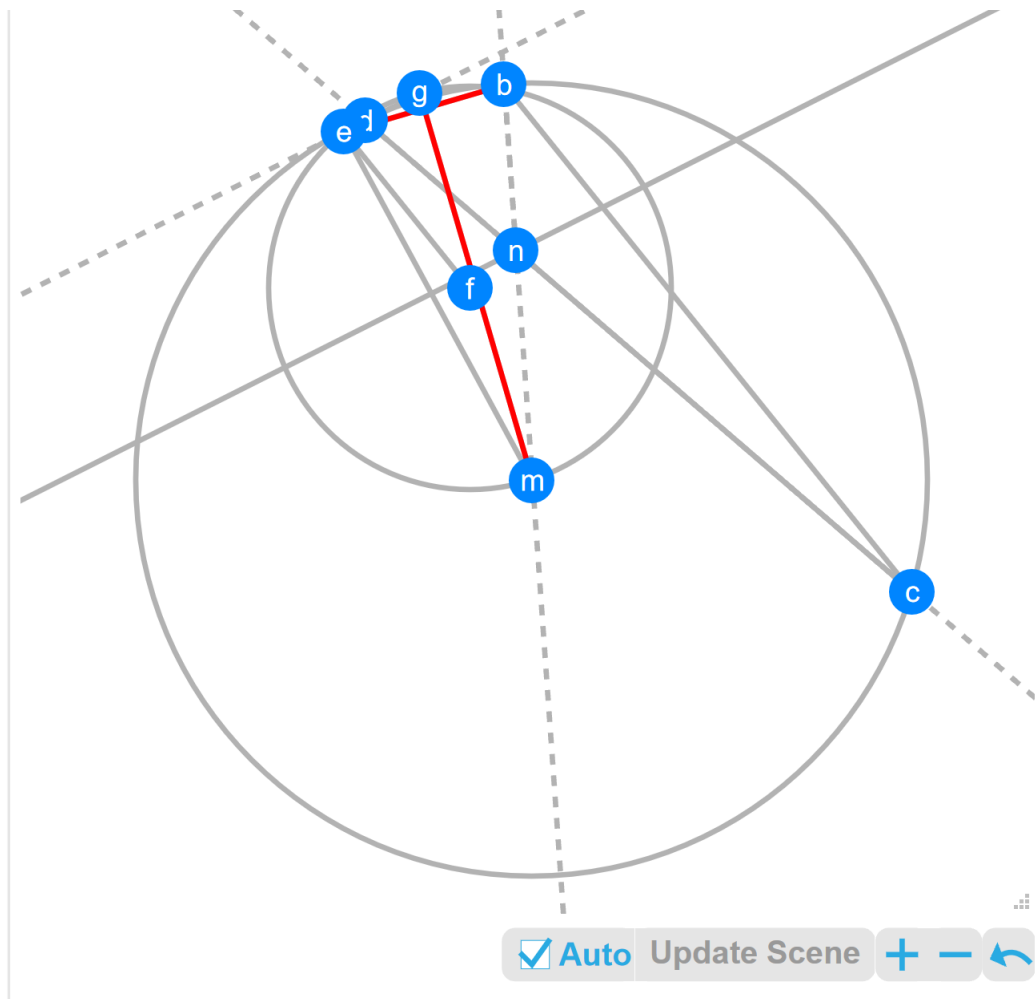
Let $bcdefghmn$ be a cyclic nonagon with centre a . Let bn be parallel to ed . Let an be parallel to ef . Let ad be parallel to gf . Let ac be parallel to mh . Let bc be parallel to mn . Prove gh is perpendicular to cd .



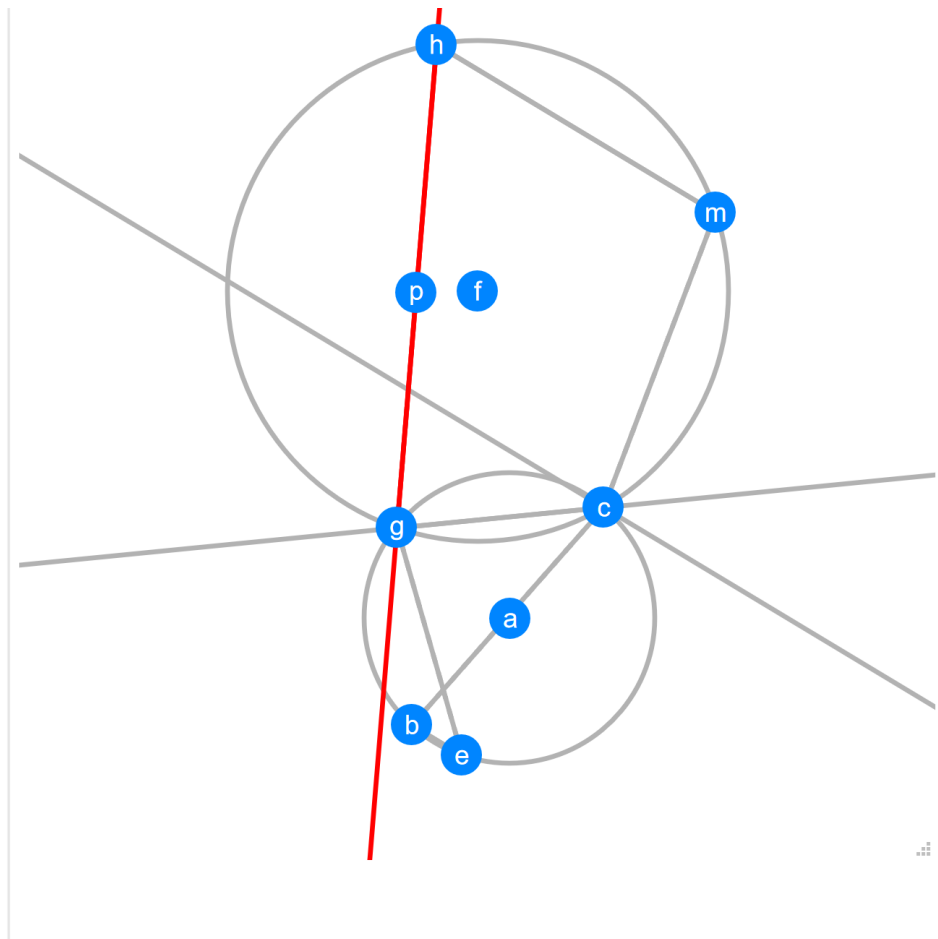
Let $bcdefghmn$ be a cyclic nonagon with centre a . Let dc be parallel to fe . Let am be parallel to gf . Let ae be parallel to hg . Let bn be parallel to mh . Let ac be parallel to nm . Prove cb is perpendicular to ed .



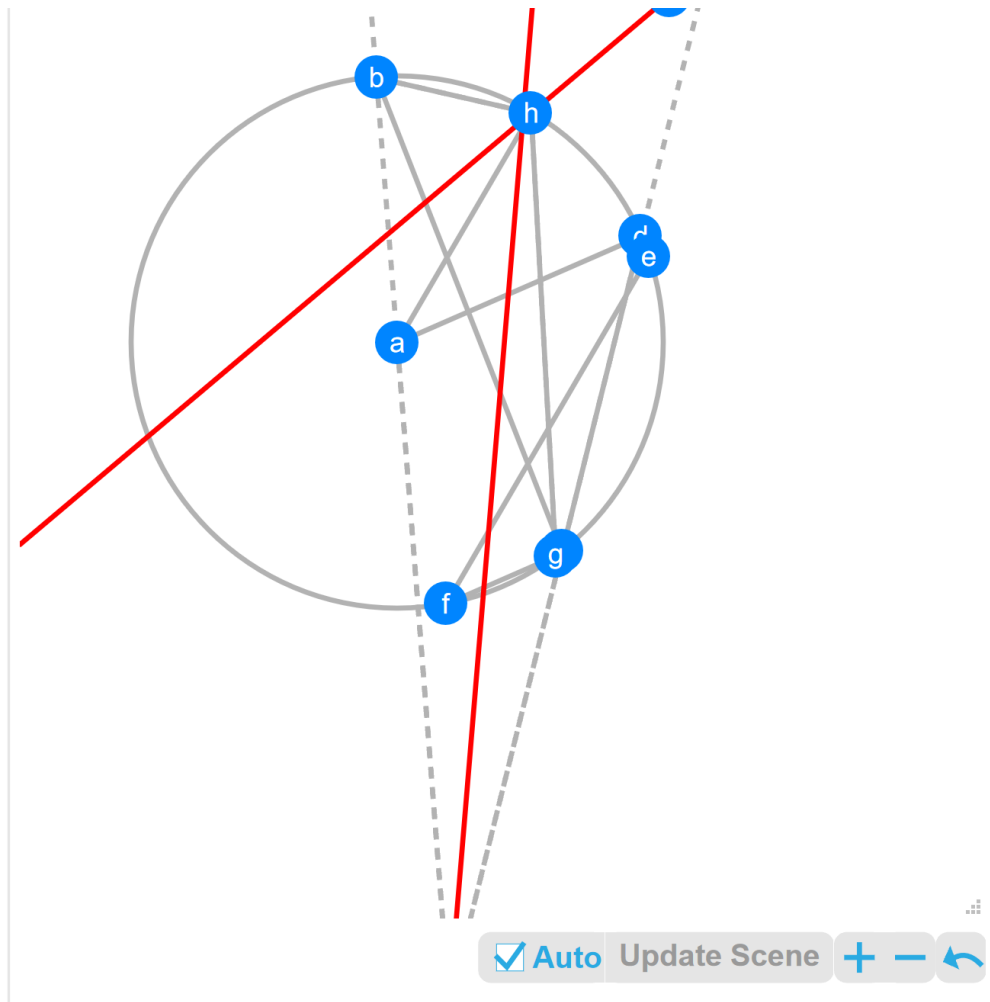
Let $bcdefgh$ be a cyclic heptagon with centre a . Let dc be parallel to gf . Let ae be parallel to hg . Let L_1 be the angle bisector of ef and bc . Let dc be parallel to L_1 . Prove bh is perpendicular to de .



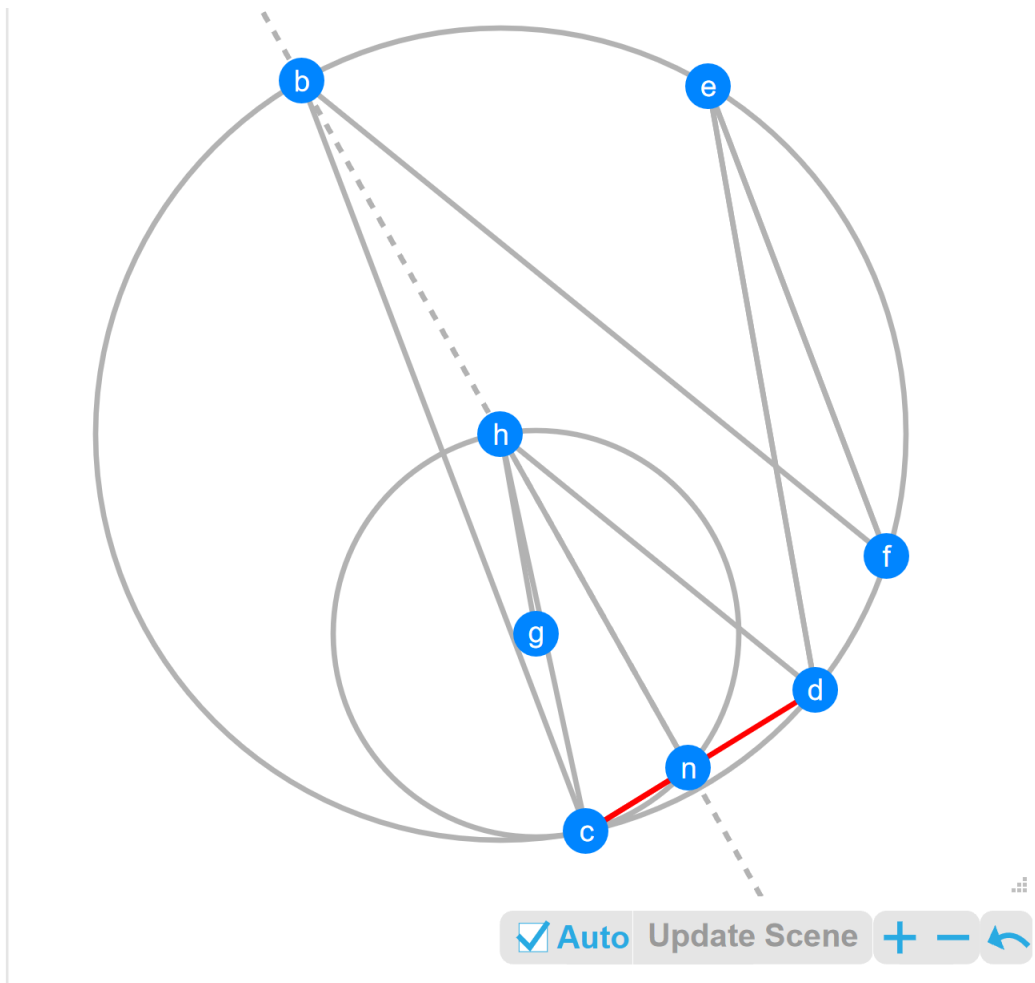
Let $bcde$ be a cyclic quadrilateral with centre m . Let gem be a triangle with circumcentre f . Let edg be collinear. Let bc be parallel to fe . Let L_1 be the angle bisector of dc and mb . Let ed be parallel to L_1 . Prove gm is perpendicular to be .



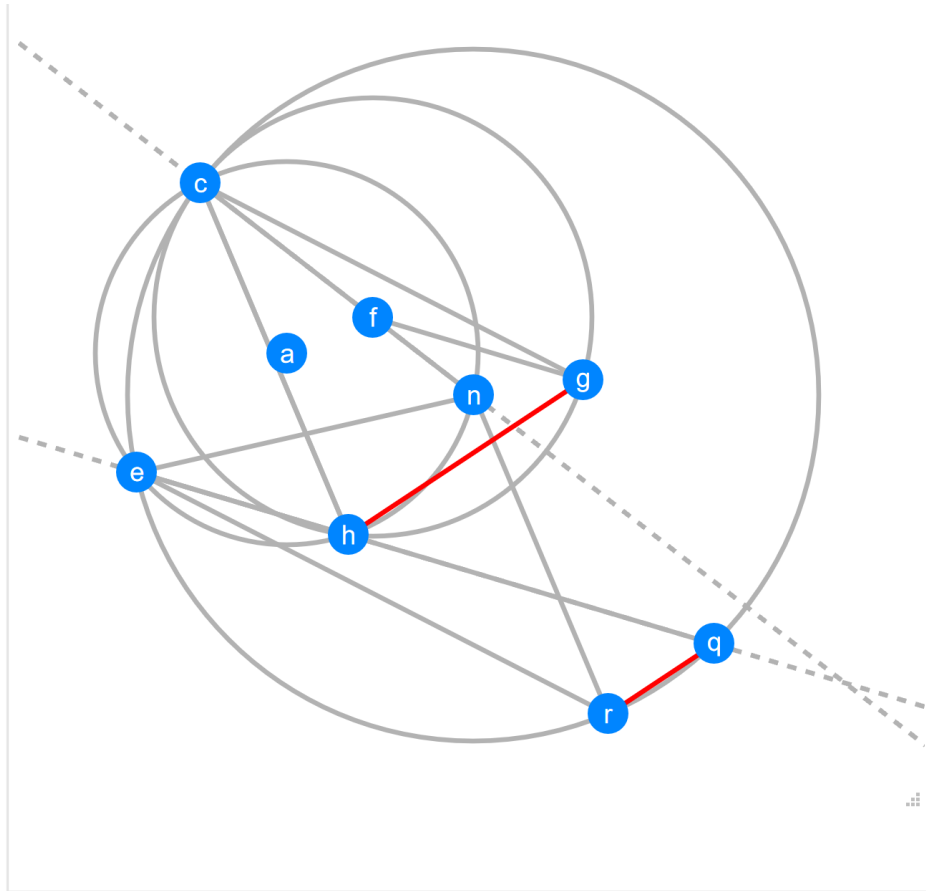
Let $bcge$ be a cyclic quadrilateral with centre a . Let $ghmc$ be a cyclic quadrilateral with centre f . Let be be parallel to mh . Let L_1 be the reflection of eg in gc . Let L_2 be the angle bisector of bcm . Let be be parallel to L_2 . Prove L_1 is parallel to gh .



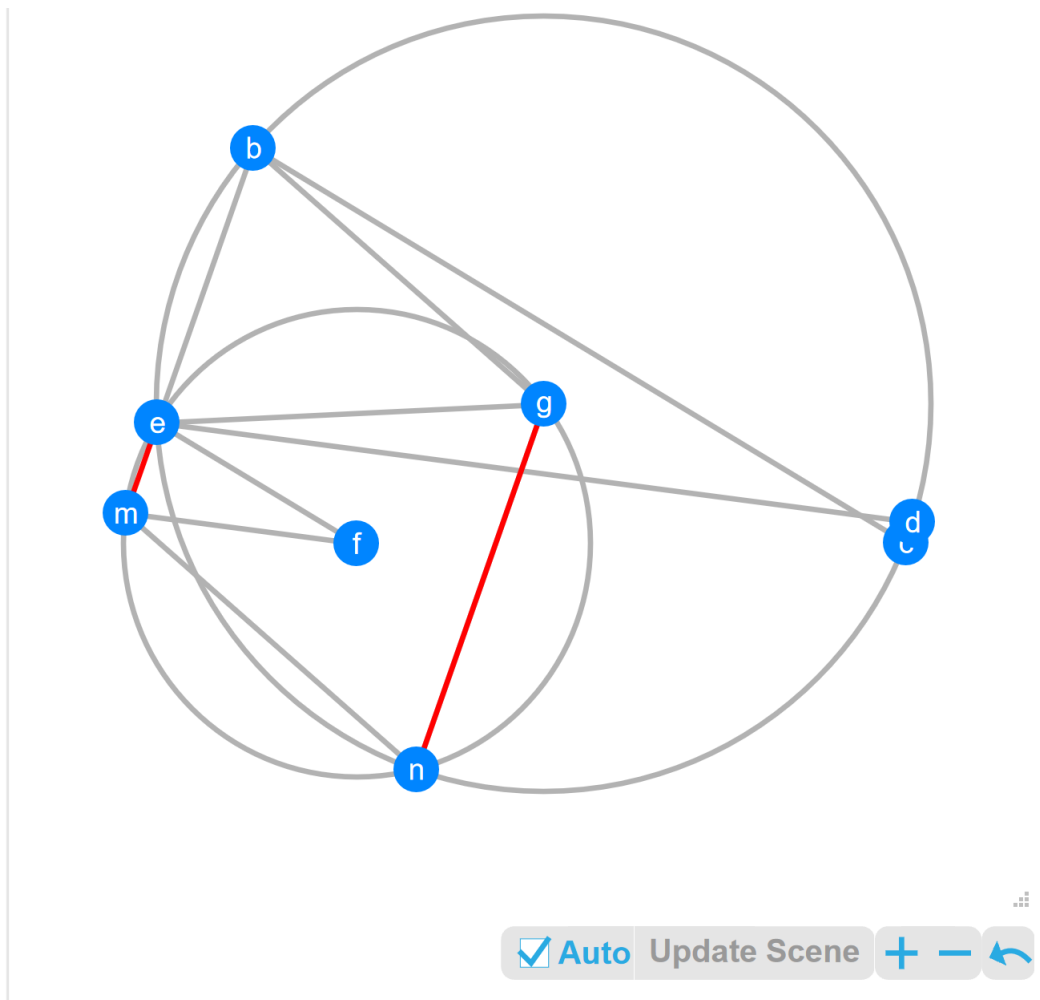
Let $bcdefgh$ be a cyclic heptagon with centre a . Let bc be parallel to de . Let ah be parallel to ef . Let ad be parallel to fg . Let $L1$ be the angle bisector of ab and cd . Let $L2$ be the angle bisector of bhg . Determine the angle between $L2$ and $L1$.



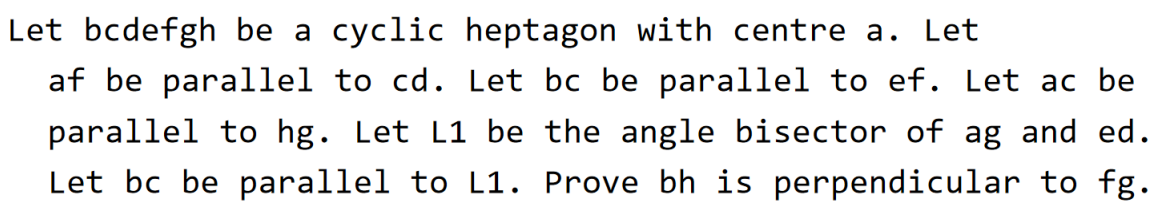
Let $bcdef$ be a cyclic pentagon with centre h . Let hd be parallel to fb . Let bc be parallel to fe . Let hcn be a triangle with circumcentre g . Let hbn be collinear. Let ed be parallel to gh . Prove cn is parallel to cd .

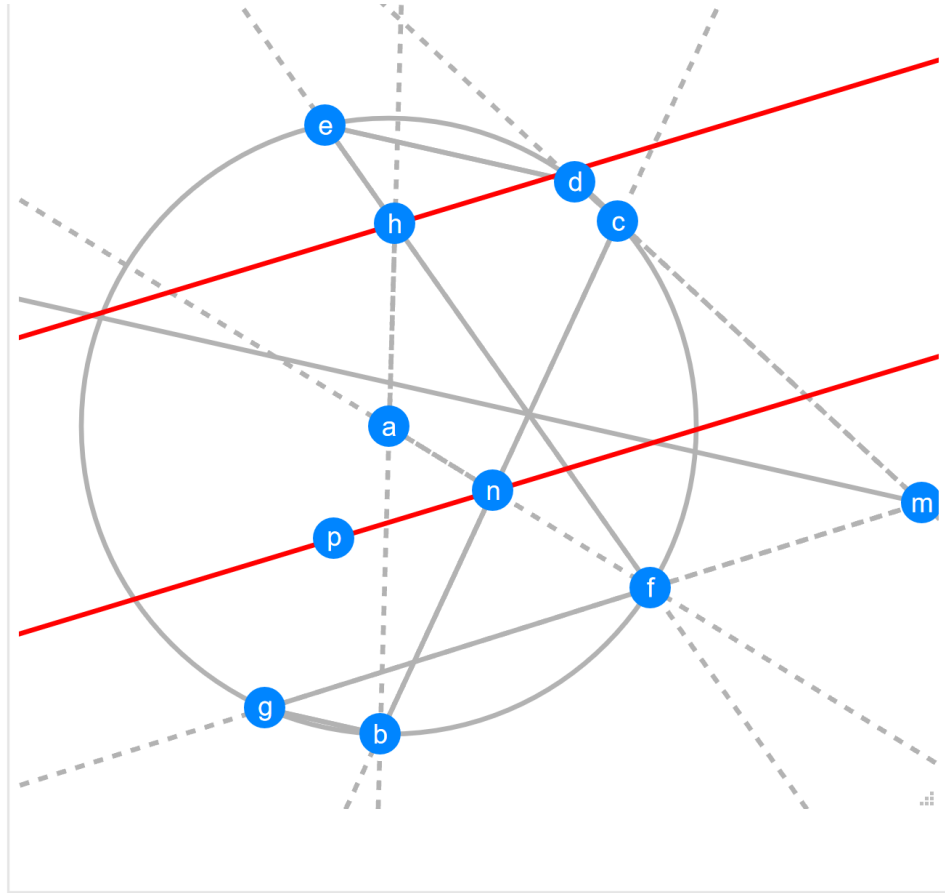


Let $nche$ be a cyclic quadrilateral with centre a . Let ghc be a triangle with circumcentre f . Let he be parallel to fg . Let cnf be collinear. Let eqr be a triangle with circumcentre n . Let ehq be collinear. Let hc be parallel to nr . Prove qr is parallel to gh .

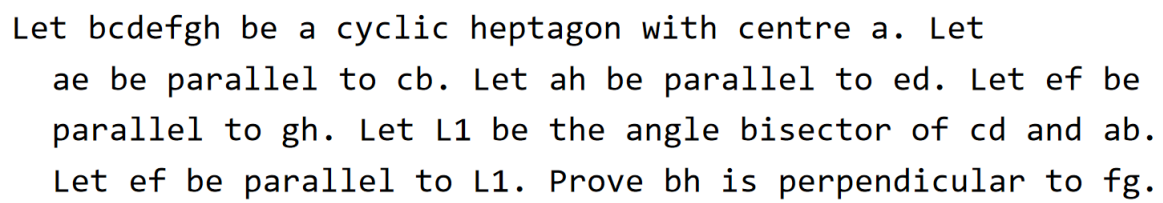


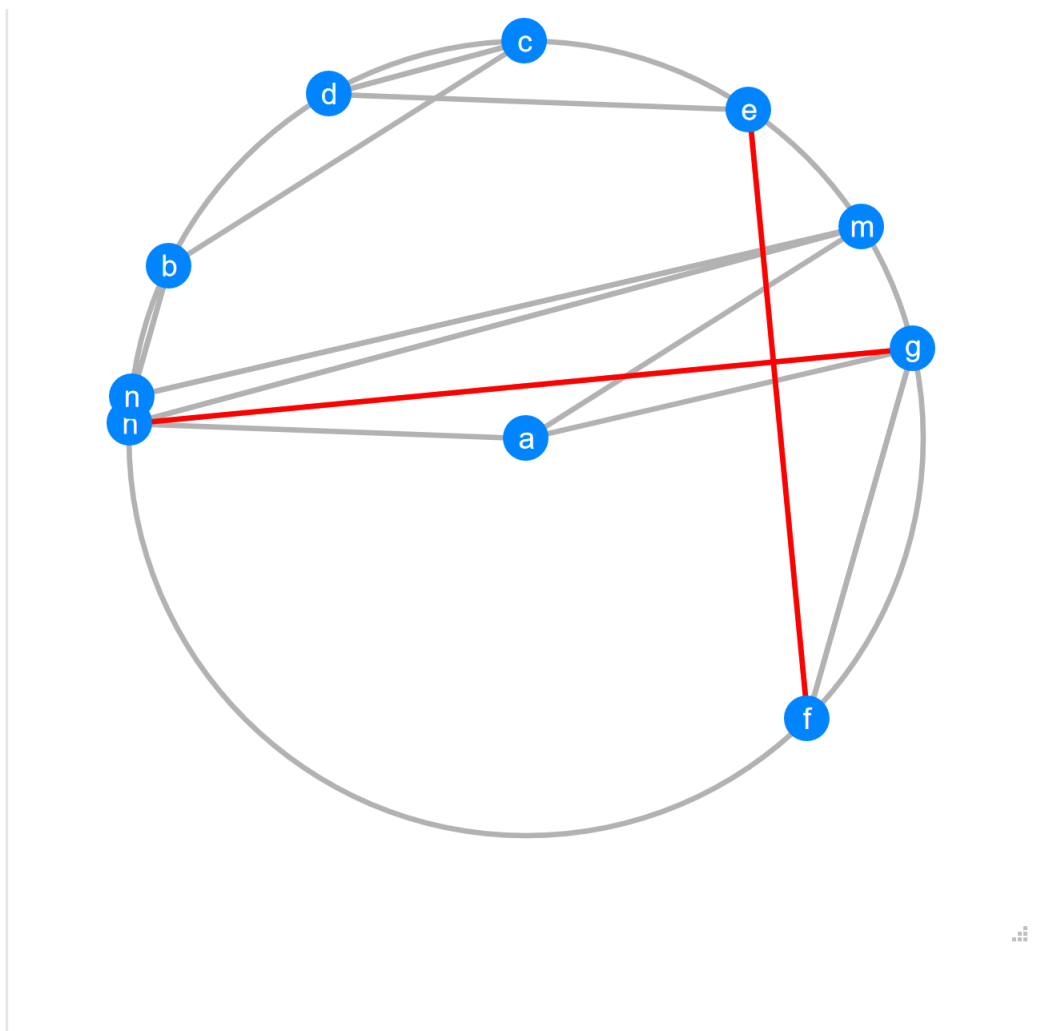
Let $bcde$ be a cyclic quadrilateral with centre g . Let eb be parallel to dc . Let $gemn$ be a cyclic quadrilateral with centre f . Let gb be parallel to mn . Let bc be parallel to fe . Let de be parallel to fm . Prove gn is parallel to em .



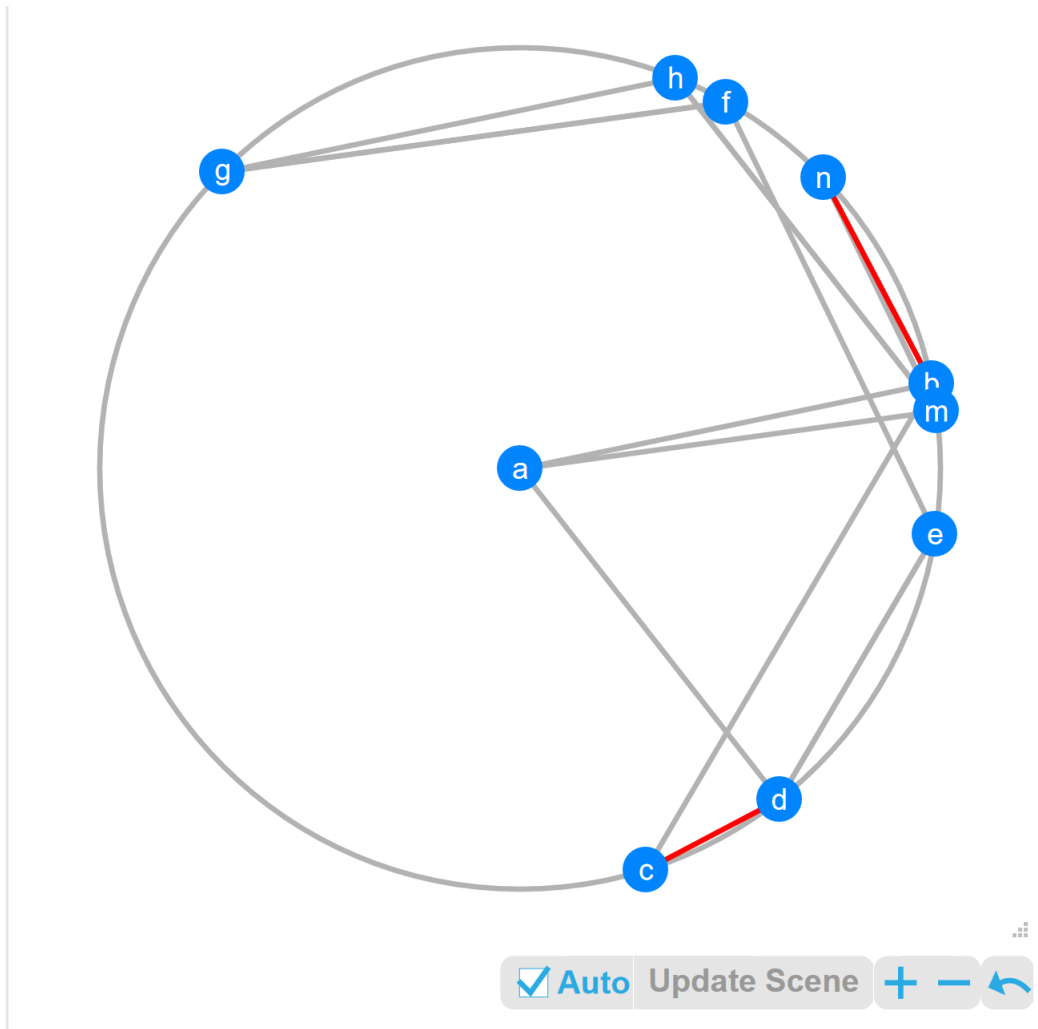


Let $bcdefg$ be a cyclic hexagon with centre a . Let bg be parallel to ed .
 Let $L1$ be the angle bisector of ef and ab . Let $L2$ be the angle bisector of fg and dc . Let bg be parallel to $L2$. Let $L3$ be the angle bisector of af and cb . Determine the angle between $L3$ and $L1$.

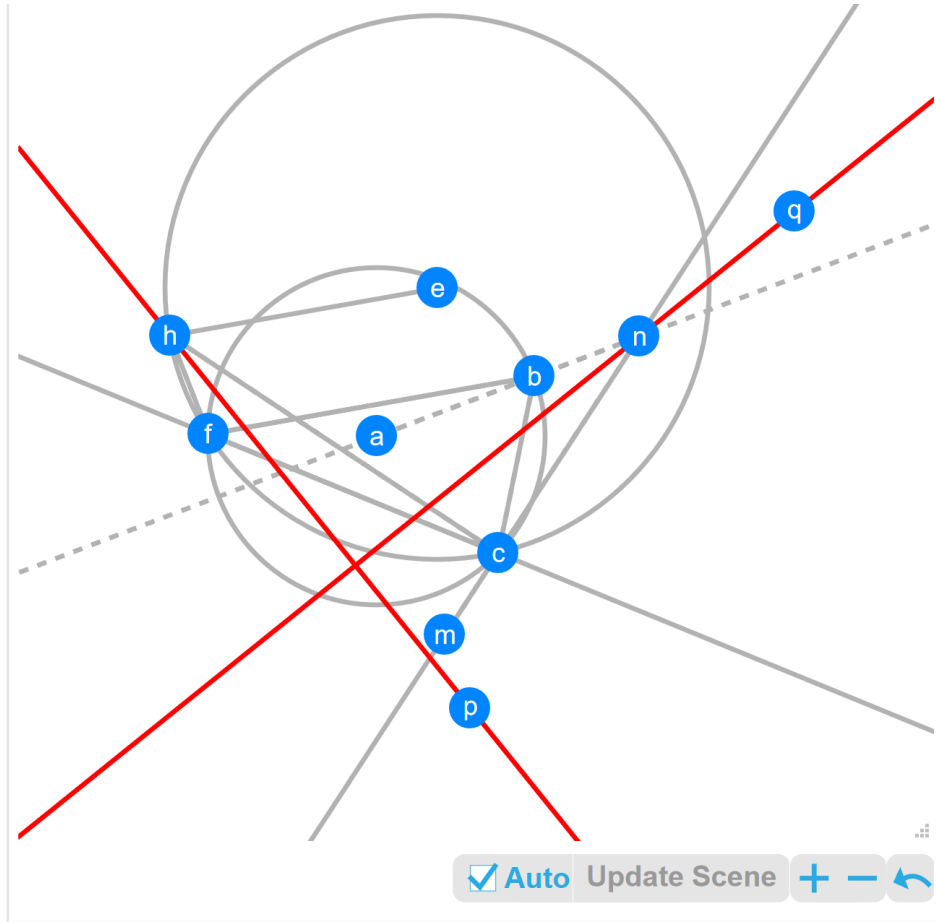




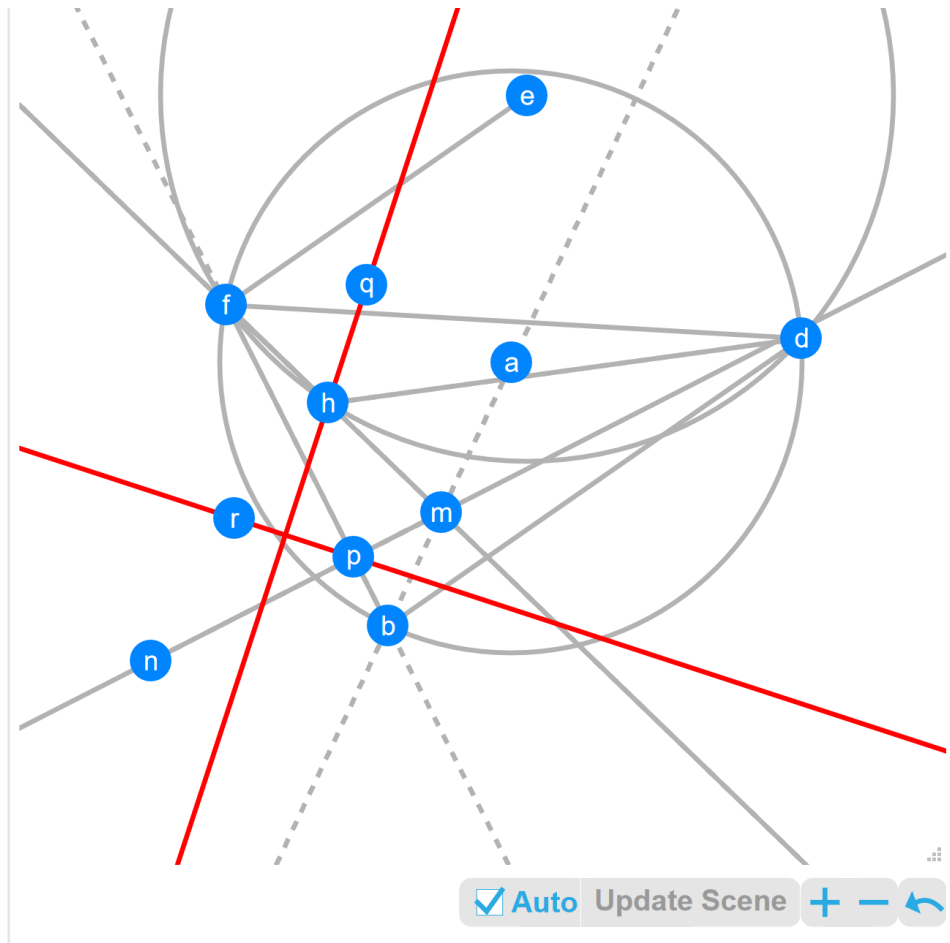
Let $bcdefghmn$ be a cyclic nonagon with centre a . Let am be parallel to bc . Let ah be parallel to de . Let bn be parallel to gf . Let dc be parallel to mh . Let ag be parallel to nm . Prove fe is perpendicular to hg .



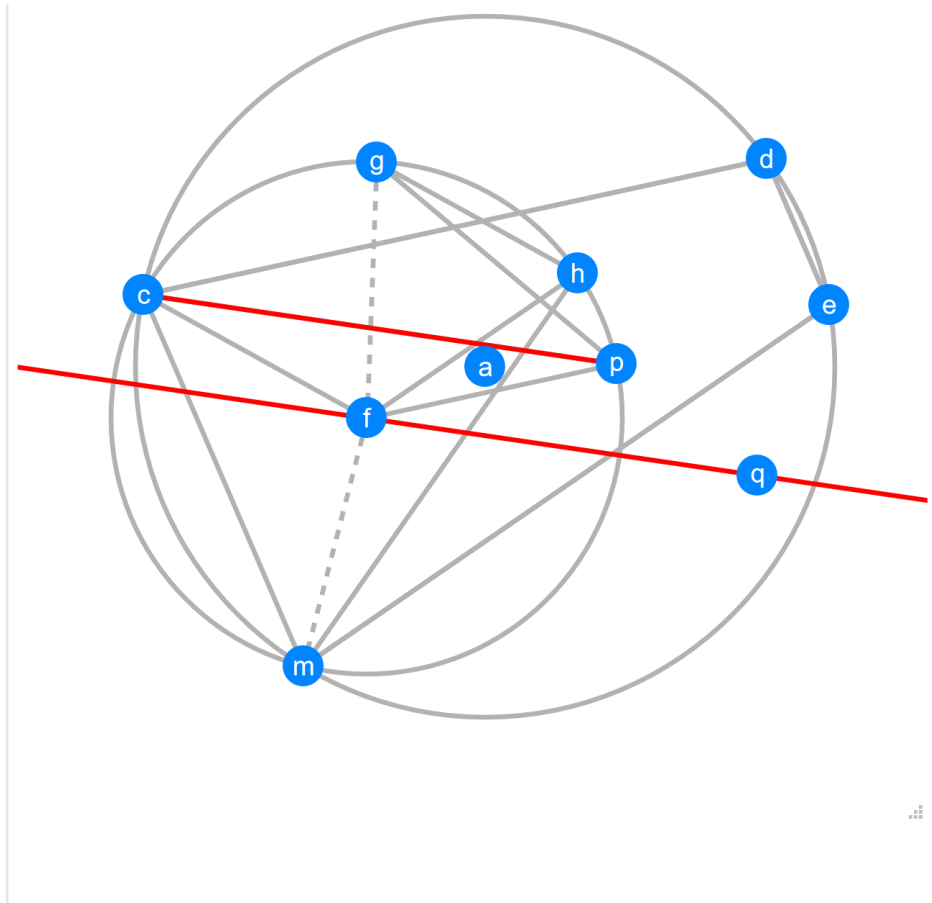
Let $bcdefghmn$ be a cyclic nonagon with centre a . Let bc be parallel to ed . Let am be parallel to gf . Let ab be parallel to gh . Let ad be parallel to mh . Let ef be parallel to nm . Prove cd is perpendicular to nb .



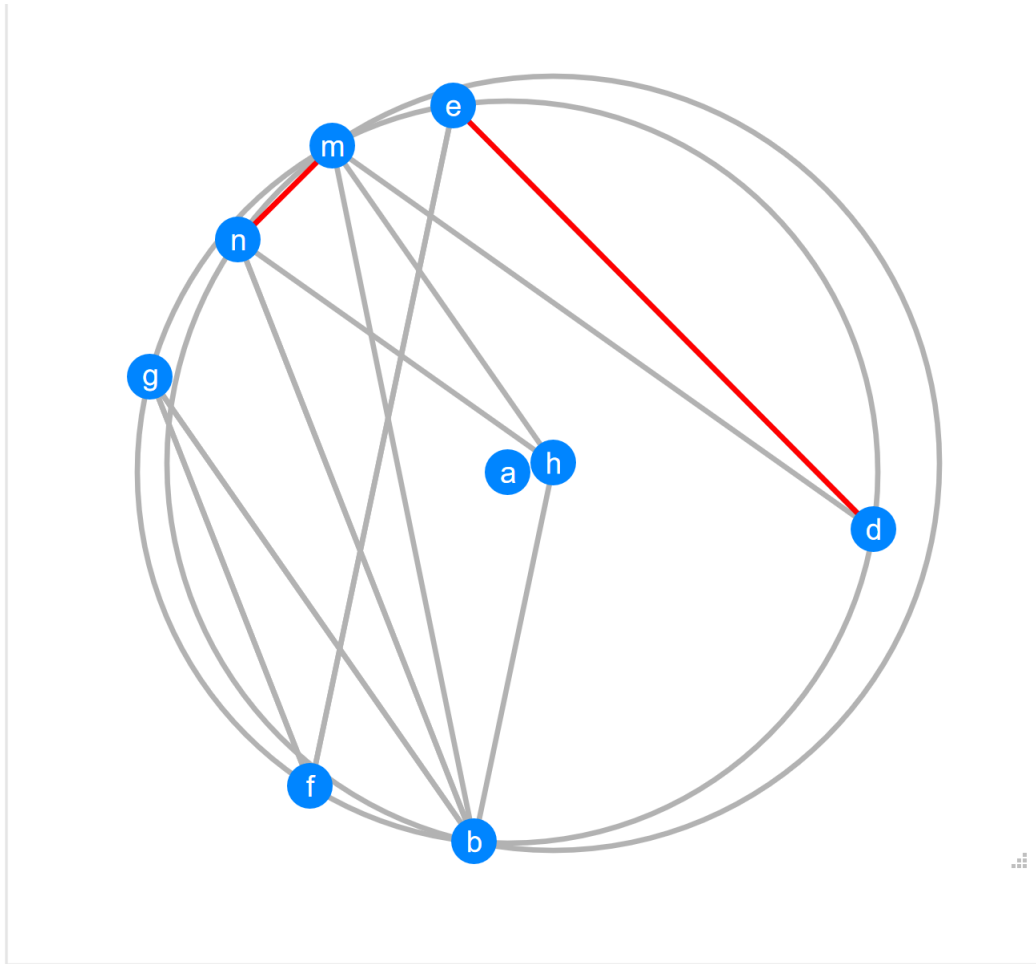
Let bcf be a triangle with circumcentre a . Let fch be a triangle with circumcentre e . Let bf be parallel to eh . Let $L1$ be the angle bisector of chf . Let $L2$ be the reflection of bc in fc . Let $L3$ be the angle bisector of $L2$ and ab . Determine the angle between $L1$ and $L3$.



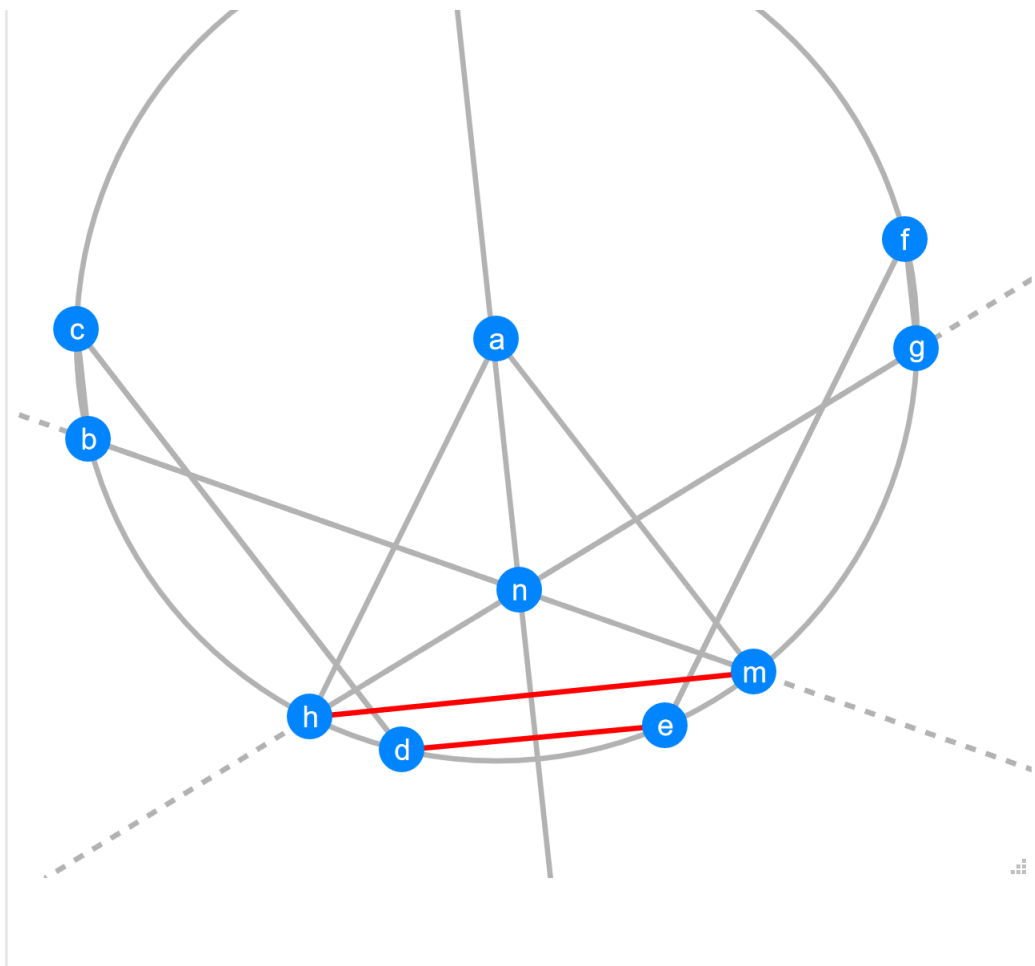
Let bfd be a triangle with circumcentre a . Let fdh be a triangle with circumcentre e . Let db be parallel to ef . Let $L1$ be the angle bisector of fhd . Let $L2$ be the reflection of ab in hf . Let $L3$ be the angle bisector of $L2$ and bf . Determine the angle between $L1$ and $L3$.



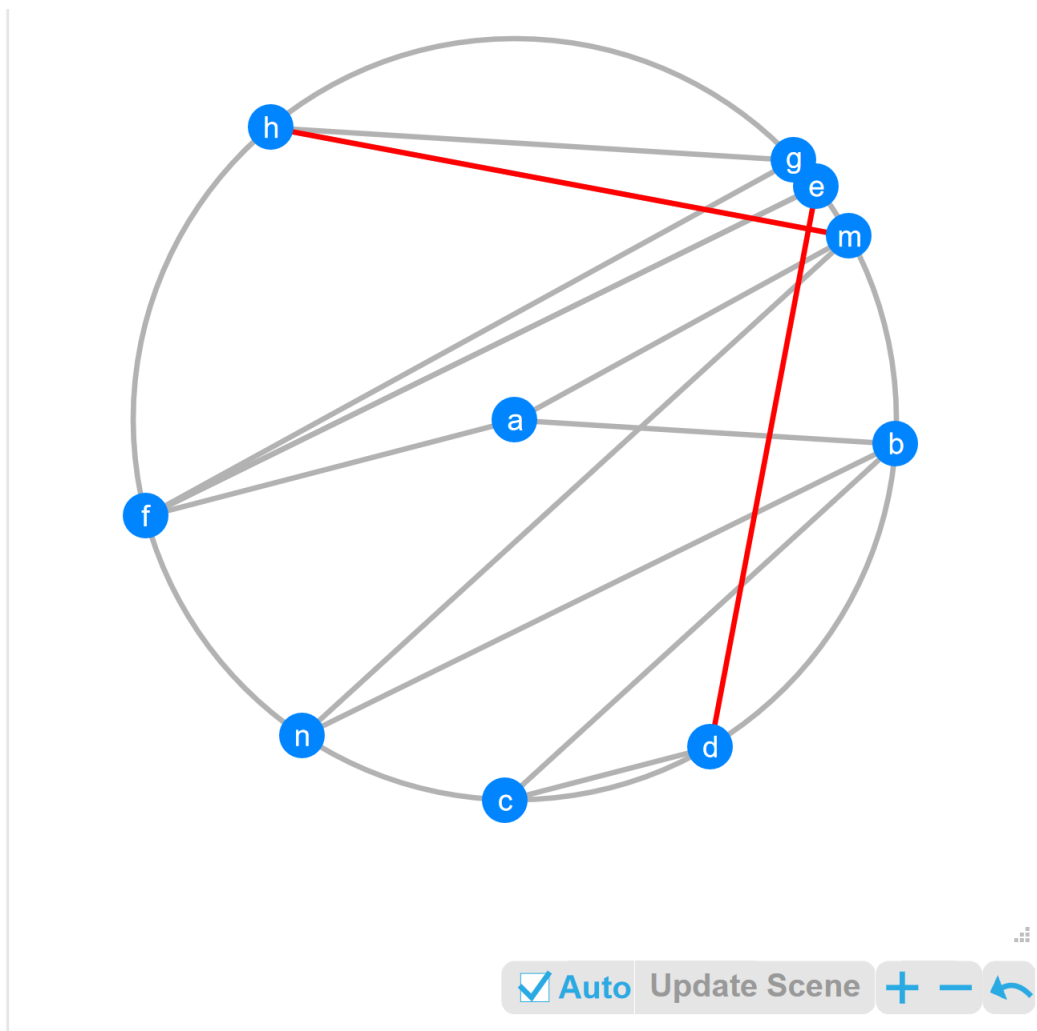
Let $mcde$ be a cyclic quadrilateral with centre a . Let mc be parallel to ed . Let $ghmcp$ be a cyclic pentagon with centre f . Let fc be parallel to gh . Let me be parallel to fh . Let dc be parallel to fp . Let $L1$ be the angle bisector of gfm . Determine the angle between $L1$ and pc .



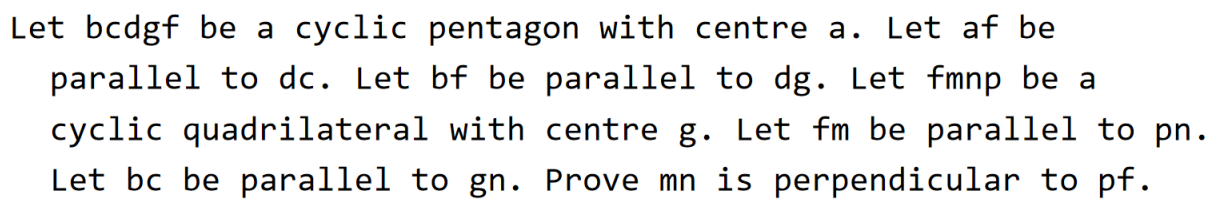
Let $bmdefg$ be a cyclic hexagon with centre a . Let mnb be a triangle with circumcentre h . Let gf be parallel to bn . Let bg be parallel to hm . Let md be parallel to hn . Let fe be parallel to hb . Prove ed is perpendicular to mn .

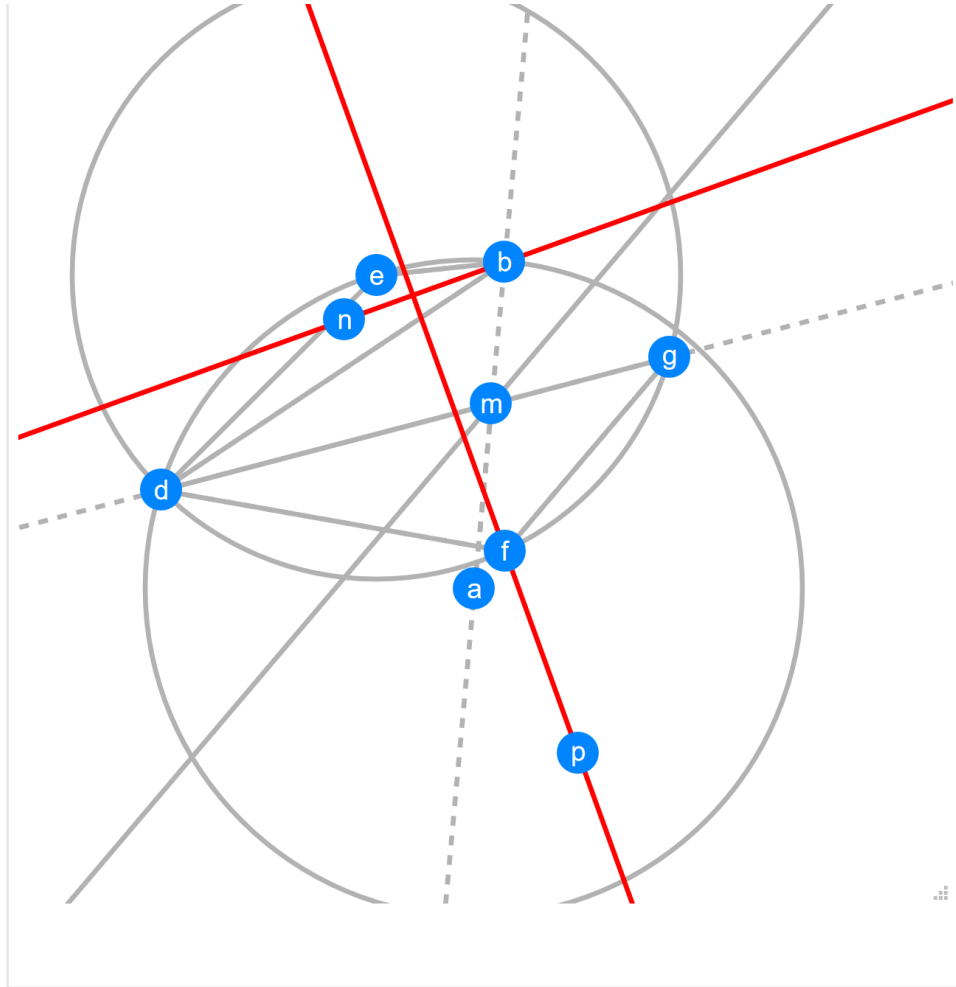


Let $bcdefghm$ be a cyclic octagon with centre a . Let am be parallel to dc . Let ah be parallel to fe . Let bc be parallel to fg . Let $L1$ be the angle bisector of gh and bm . Let bc be parallel to $L1$. Prove de is parallel to hm .

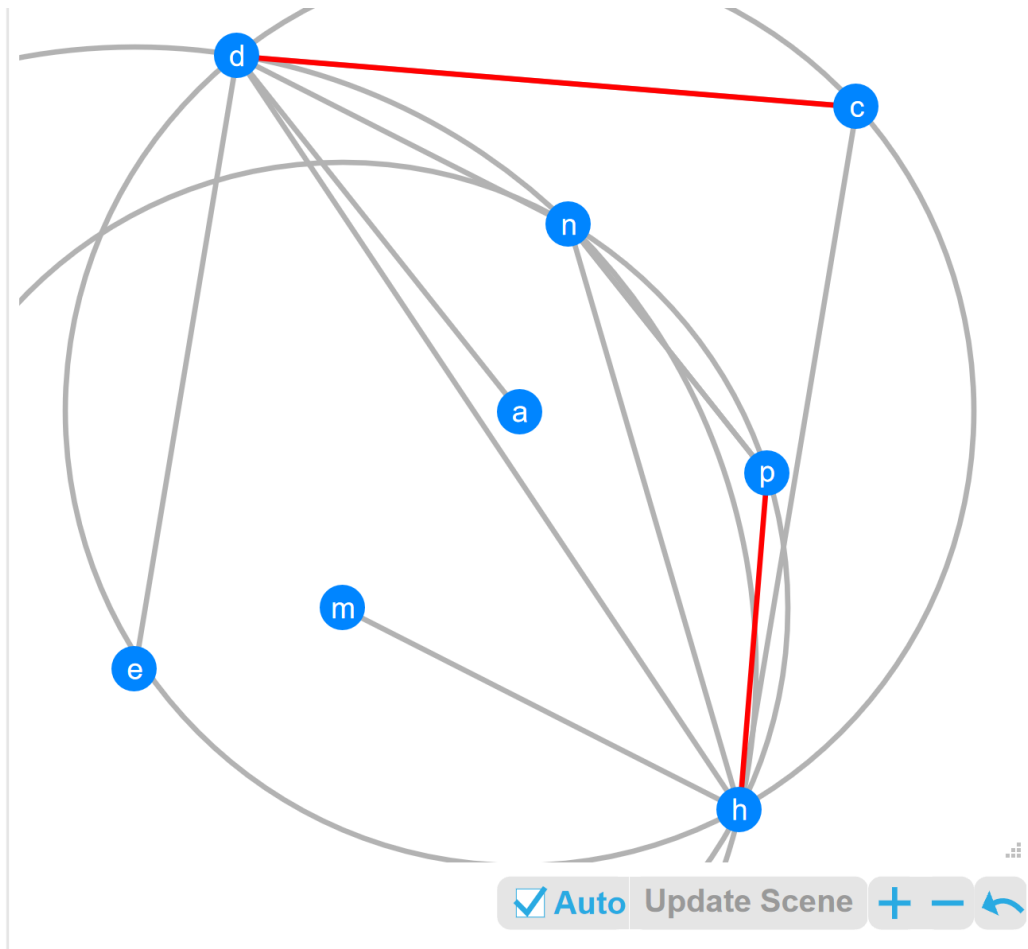


Let $bcdefghmn$ be a cyclic nonagon with centre a . Let af be parallel to cd . Let nb be parallel to fe . Let am be parallel to fg . Let ab be parallel to gh . Let bc be parallel to mn . Prove de is perpendicular to mh .

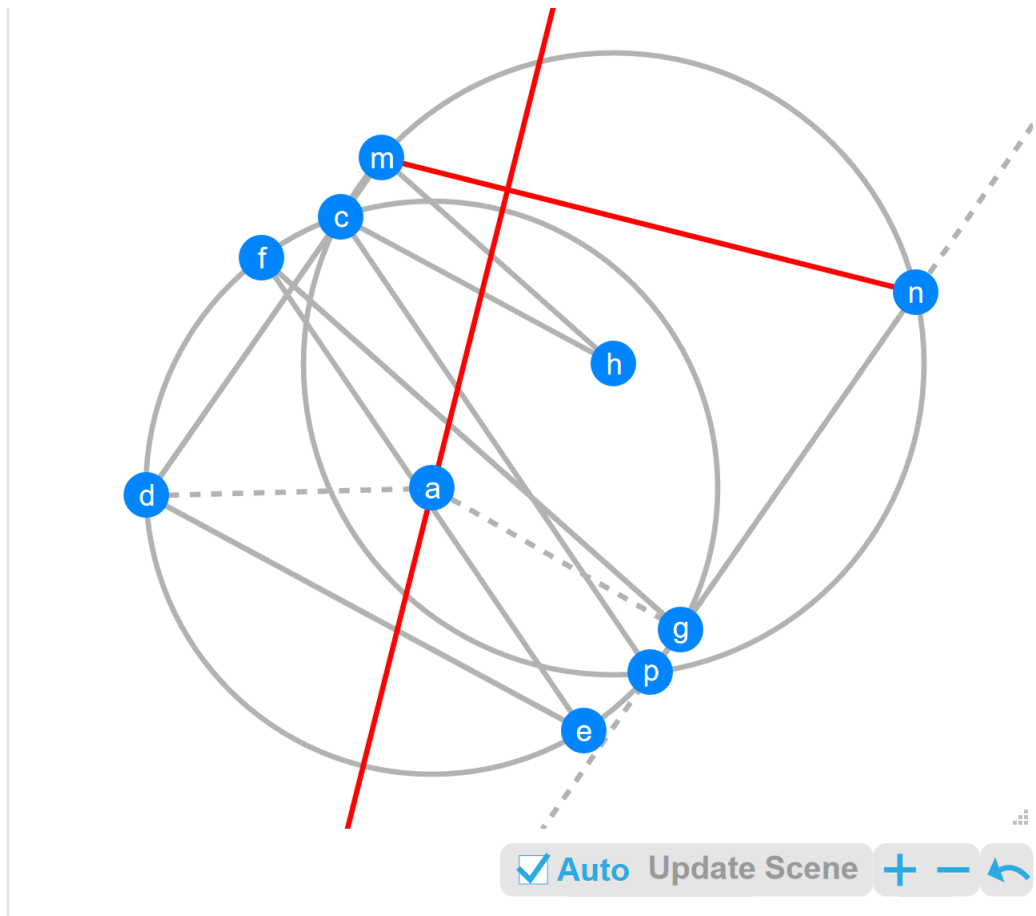




Let bed be a triangle with circumcentre a . Let fgd be a triangle with circumcentre e . Let $L1$ be the angle bisector of dg and ab . Let fg be parallel to $L1$. Let $L2$ be the angle bisector of dbe . Let $L3$ be the angle bisector of gfd . Determine the angle between $L2$ and $L3$.



Let hcd be a triangle with circumcentre a . Let ndh be a triangle with circumcentre e . Let hc be parallel to ed . Let nph be a triangle with circumcentre m . Let ad be parallel to pn . Let nd be parallel to mh . Prove dc is perpendicular to ph .

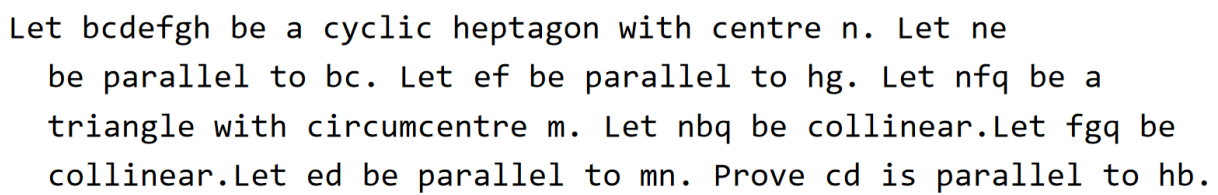


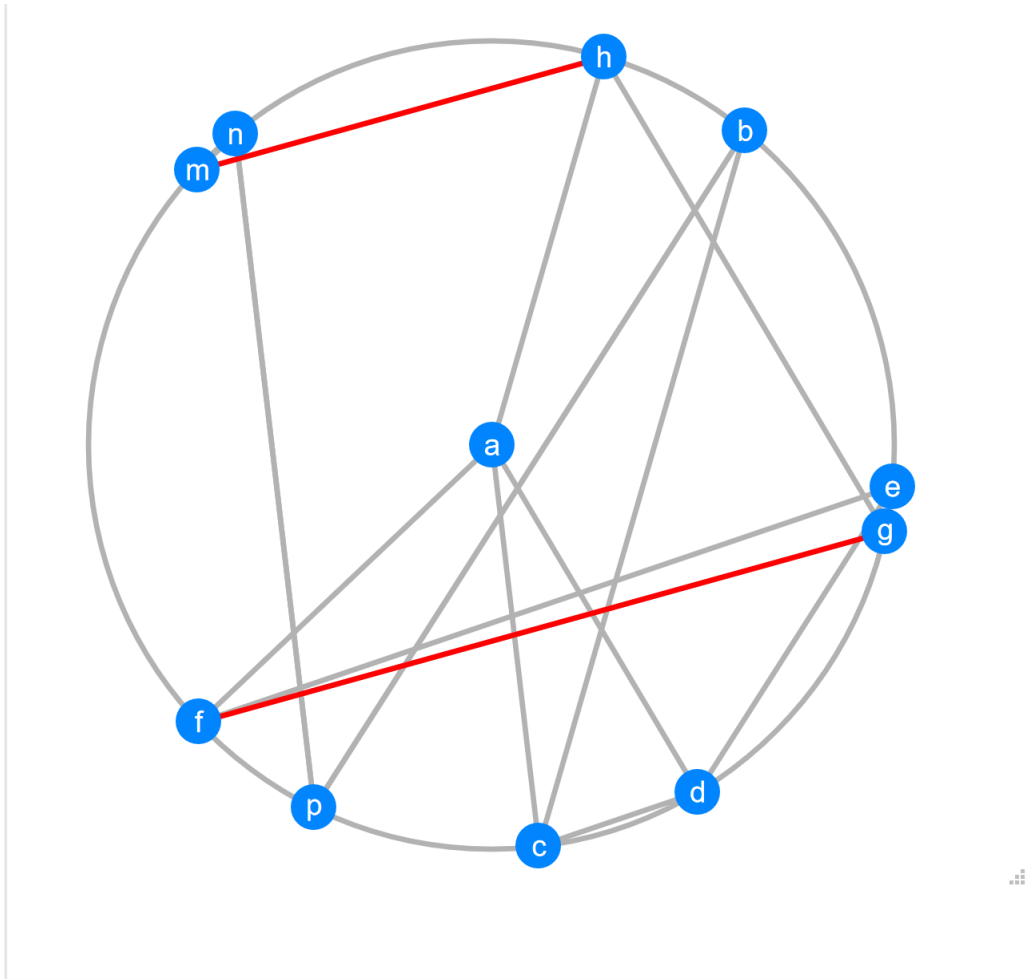
Let $pcdefg$ be a cyclic hexagon with centre a . Let pg be parallel to dc . Let pc be parallel to ef . Let mnp be a cyclic quadrilateral with centre h . Let pgn be collinear. Let gf be parallel to hm . Let ed be parallel to hc . Let $L1$ be the angle bisector of dag . Determine the angle between $L1$ and mn .



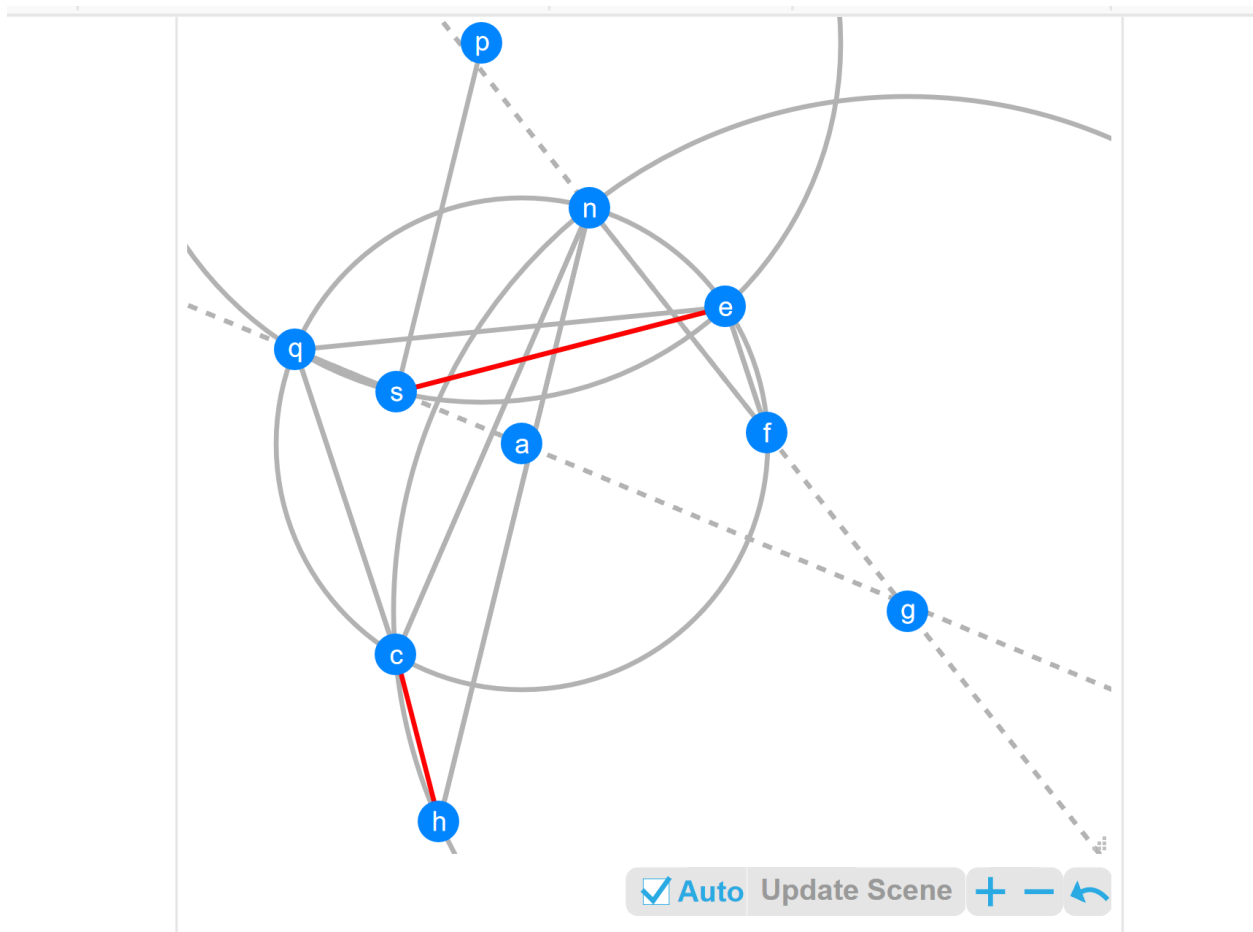
Let $bcdefg$ be a cyclic hexagon with centre p . Let pf be parallel to cd .

Let gb be parallel to ed . Let bc be parallel to fg . Let bnp be a triangle with circumcentre h . Let $L1$ be the angle bisector of hb and pn . Let gb be parallel to $L1$. Prove bn is perpendicular to ef .





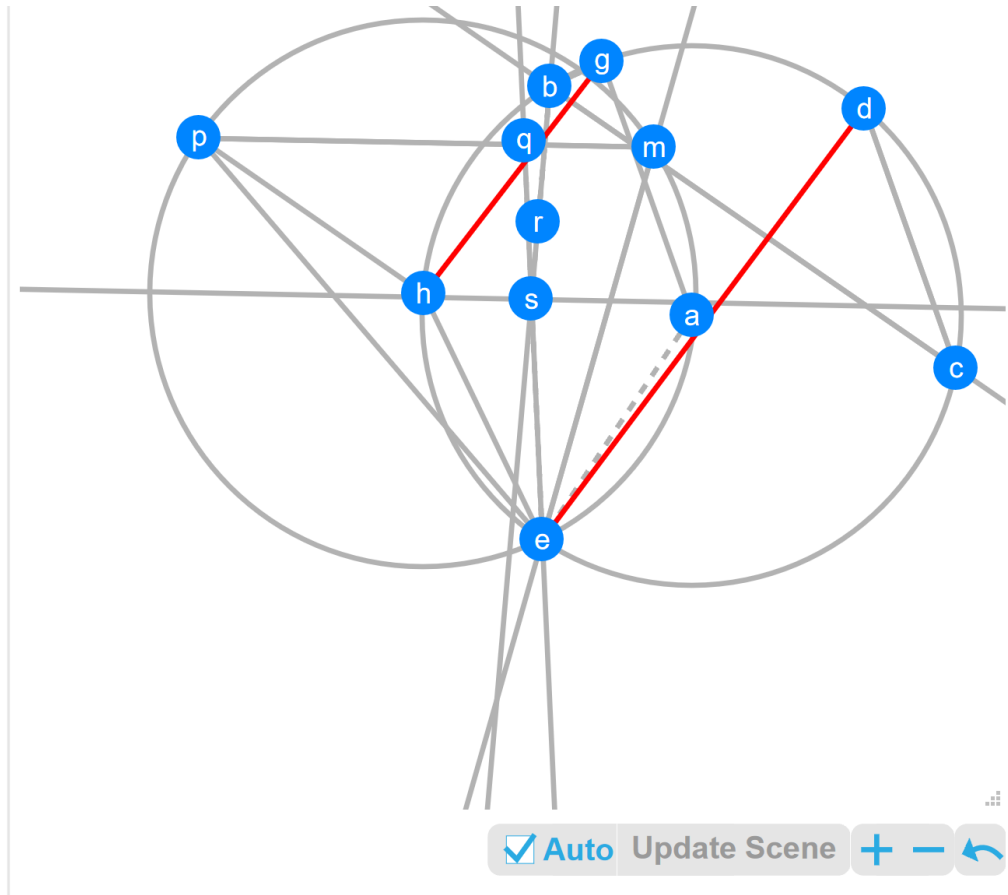
Let $bcdefghmnp$ be a cyclic decagon with centre a . Let ah be parallel to bc . Let bp be parallel to de . Let cd be parallel to ef . Let ad be parallel to gh . Let af be parallel to mn . Let ac be parallel to pn . Prove mh is parallel to gf .



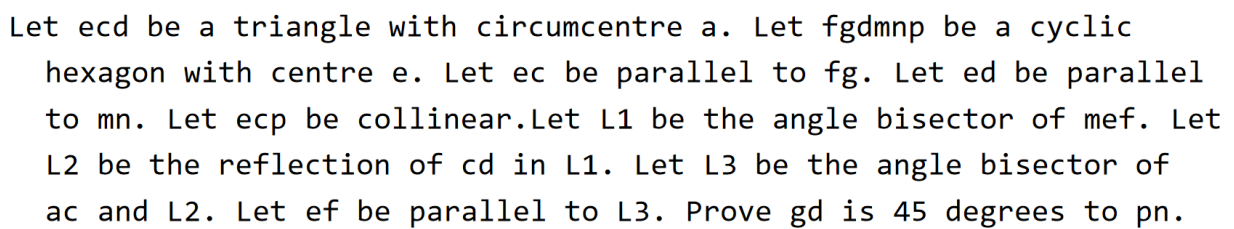
Let $ncqef$ be a cyclic pentagon with centre a . Let qc be parallel to fe . Let hcn be a triangle with circumcentre g . Let nfg be collinear. Let qes be a triangle with circumcentre p . Let qas be collinear. Let hn be parallel to ps . Prove se is perpendicular to hc .

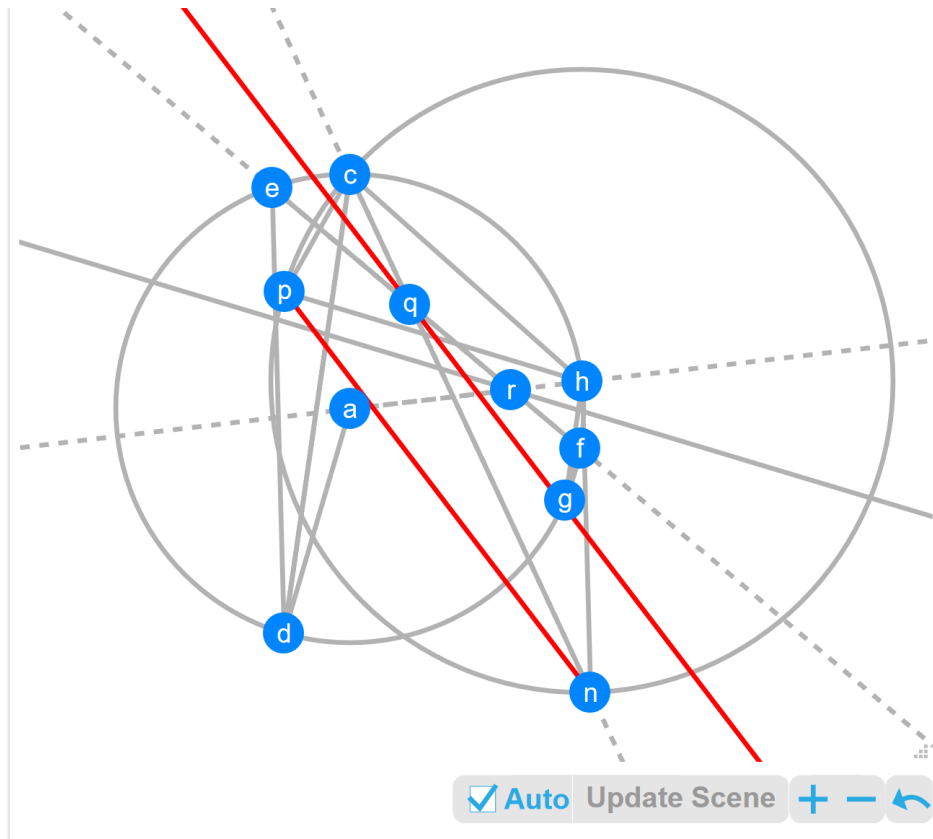


Let $bcdefghm$ be a cyclic octagon with centre a . Let ab be parallel to de . Let mb be parallel to gh . Let ae be parallel to mh . Let L_1 be the angle bisector of fam . Let L_2 be the angle bisector of bc and ef . Let L_1 be parallel to L_2 . Prove dc is parallel to gf .



Let $bcdehg$ be a cyclic hexagon with centre a . Let ag be parallel to dc . Let mep be a triangle with circumcentre h . Let bc be parallel to hp . Let $L1$ be the reflection of ae in me . Let $L2$ be the reflection of bg in bc . Let $L3$ be the angle bisector of $L2$ and $L1$. Let mp be parallel to $L3$. Prove de is parallel to hg .





Let $hcdefg$ be a cyclic hexagon with centre a . Let gh be parallel to dc . Let ad be parallel to fg . Let cnp be a triangle with circumcentre h . Let de be parallel to hn . Let $L1$ be the angle bisector of cn and fe . Let $L2$ be the angle bisector of ah and fe . Let hp be parallel to $L2$. Determine the angle between np and $L1$.