Discoverer 0.37

disable tests   show all relationships

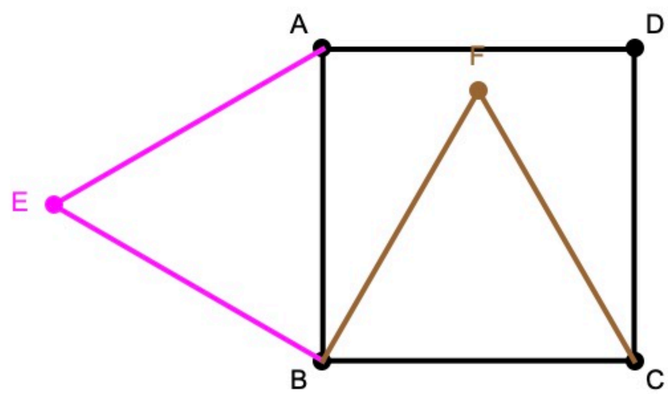
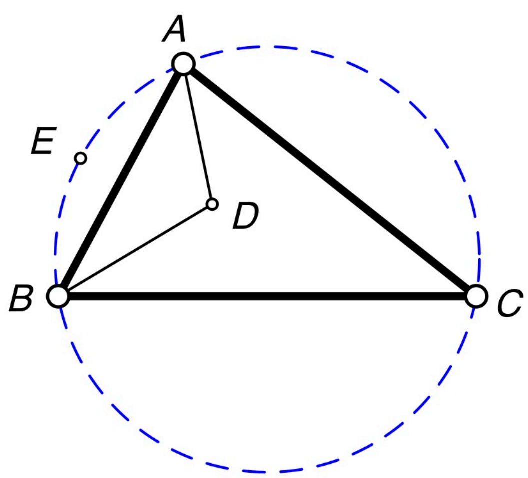


figure number 184 of 665

F=equilateralTriangleCCW[BC]
level 2.2
-----
points: {A, B, C, D, E, F}
lines: {AB, BC, CD, AD, AE, BE, BF, CF}
triangles: {ABE, BCF}

{ABCD=square[A,B,C,D], E=equilateralTriangleCW[AB], F=equilateralTriangleCCW[BC]}

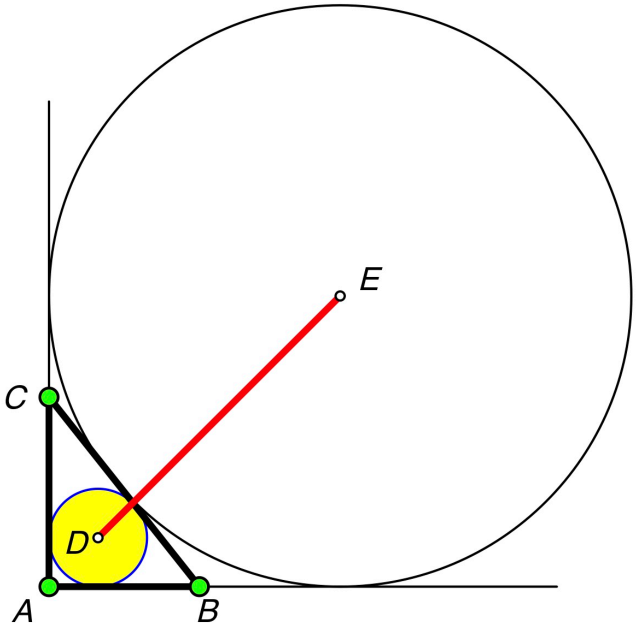
Relationships:
{AF||CE}



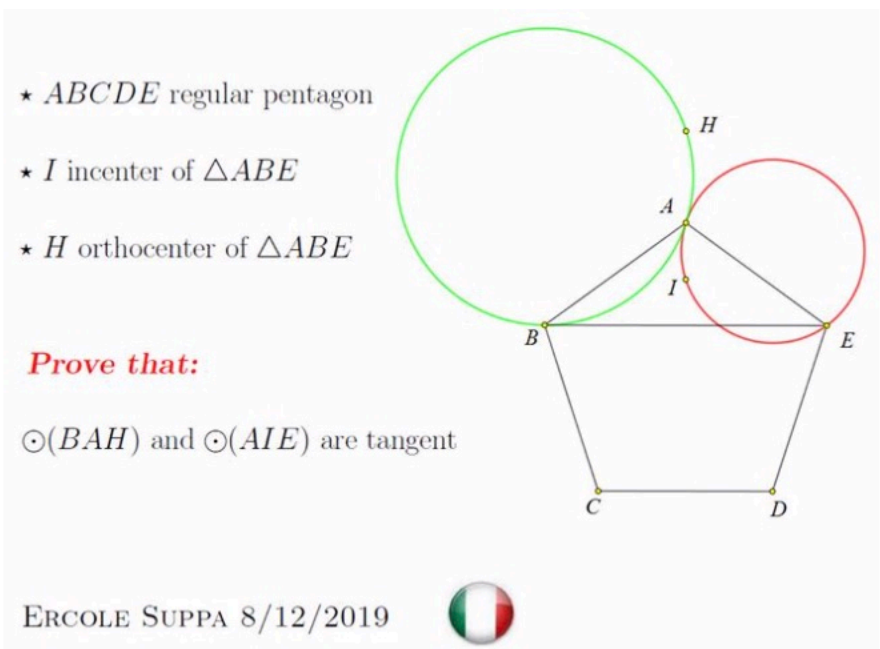
D is incenter of $\triangle ABC$
E is circumcenter of $\triangle ABD$

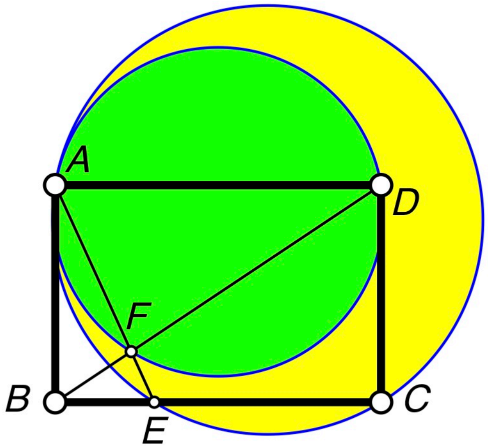
Prove: AEBC cyclic

Stanley Rabinowitz, Nov. 2019



Start with right triangle ABC
1. D=incenter[ABC]
2. E=excenter[ABC,A]
Conclusion: DE/BC=$\sqrt{2}$





ABCD is a rectangle.
E is any point on BC.
F=BD∩AE.

Prove:

⊙ACE is tangent to ⊙ADF.

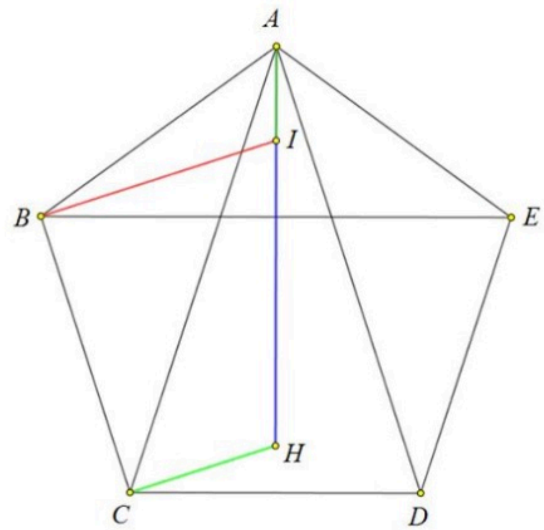
Stanley Rabinowitz, December 2019

4076

- ⋆ $ABCDE$ regular pentagon
- ⋆ I incenter of $\triangle ABE$
- ⋆ H orthocenter of $\triangle ACD$

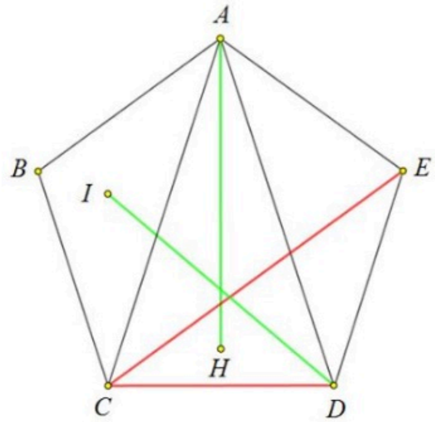
Prove that:

- $BI \parallel CH$
- $CH + BI = AH$
- $CH + AI = BI$
- $\dfrac{1}{CH} + \dfrac{1}{BI} = \dfrac{1}{AI}$



Ercole Suppa 10/12/2019

4084

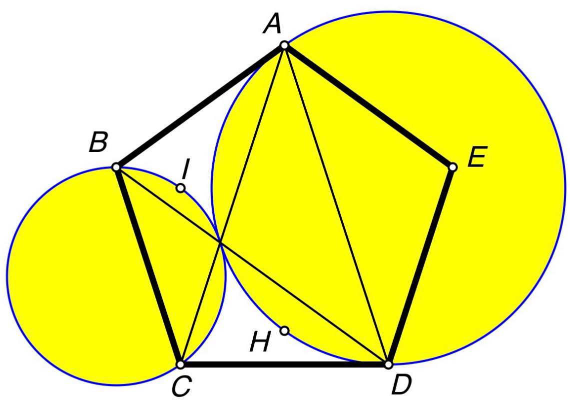


- ⋆ $ABCDE$ regular pentagon
- ⋆ I incenter of $\triangle ABC$
- ⋆ H orthocenter of $\triangle ACD$

Prove that:

- $CD^2 + CE^2 = AH^2 + DI^2$
- $\dfrac{1}{CH} + \dfrac{1}{CI} = \dfrac{1}{BI}$

Ercole Suppa 10/12/2019

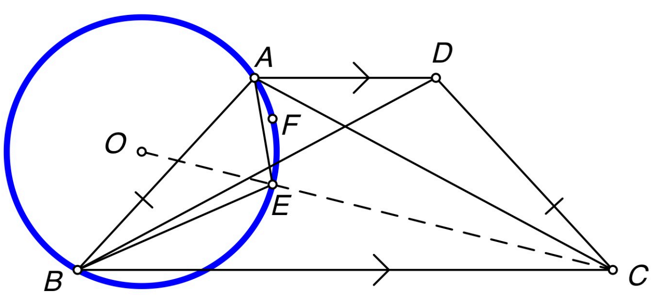


ABCDE is a regular pentagon.
I is the incenter of △ABC.
H is the orthocenter of △ACD.

Prove:

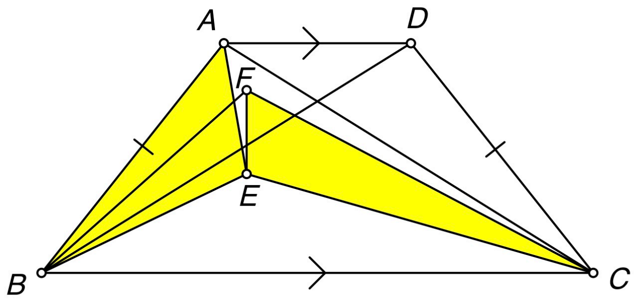
(i) ⊙BCI is tangent to ⊙ADH.
(ii) AC meets BD at the touch point.

Stanley Rabinowitz, December 2019



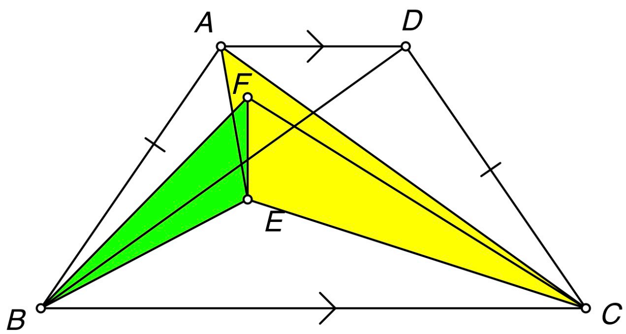
ABCD is an isosceles trapezoid.
1. E is the incenter of △ABC.
2. F is the incenter of △ABD.
Prove:
(i) ABEF is cyclic.
(ii) CEO is a straight line.

Stanley Rabinowitz, December 2019



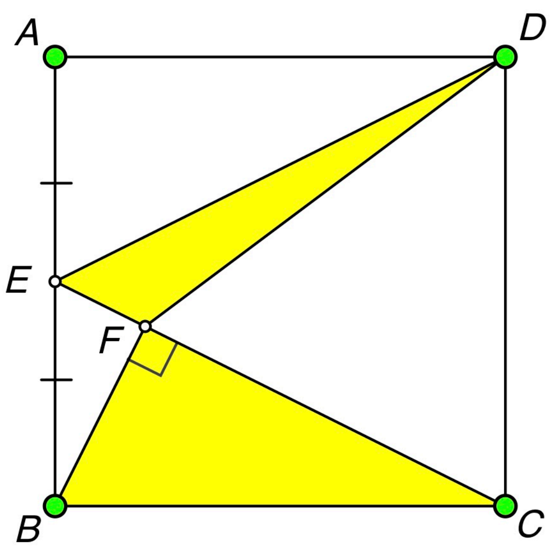
ABCD is an isosceles trapezoid.
1. E is the incenter of △ABC.
2. F is the incenter of △ABD.
Prove: Triangles ABE and CEF have the same area.

Stanley Rabinowitz, December 2019



ABCD is an isosceles trapezoid.
1. E is the incenter of △ABC.
2. F is the incenter of △ABD.
Prove: △ACE~△FBE.

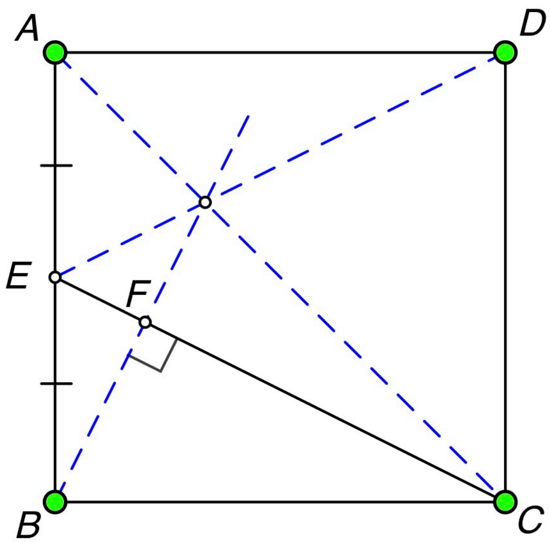
Stanley Rabinowitz, December 2019



ABCD is a square.
AE=BE.
BF⊥CE.

Prove: △BCF and △DEF have the same perimeter.

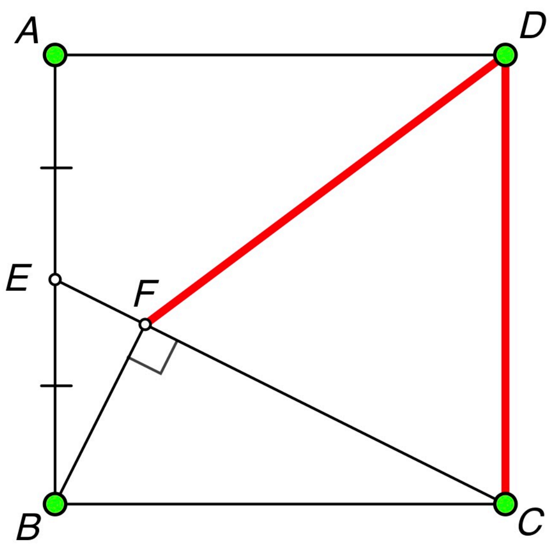
Stanley Rabinowitz, December 2019



ABCD is a square.
AE=BE.
BF⊥CE.

Prove: AC, BF, DE concur.

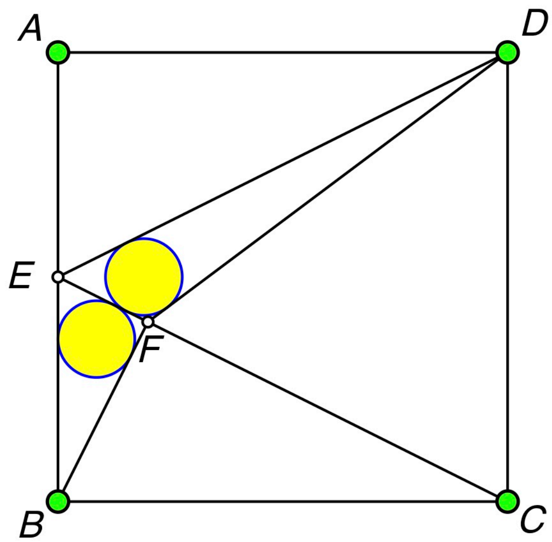
Stanley Rabinowitz, December 2019



ABCD is a square.
AE=BE.
BF⊥CE.

Prove: DF=DC.

Stanley Rabinowitz, December 2019



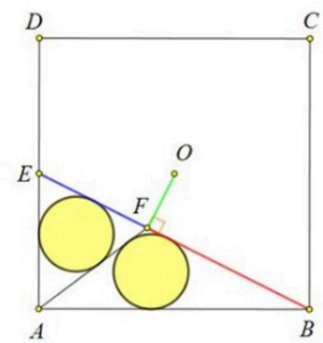
ABCD is a square.
AE=BE.
BF⊥CE.

Prove: incircles of △BEF and △DEF are congruent.

Stanley Rabinowitz, December 2019

4094

- ⋆ $ABCD$ square with center O
- ⋆ $AE = ED$
- ⋆ $OF \perp EB$



Prove that:

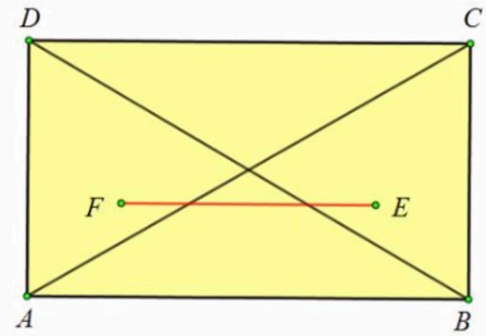
- ◆ $EF + FO = FB$
- ◆ the incircles of $\triangle AFE$ and $\triangle ABF$ are congruent

Ercole Suppa 11/12/2019

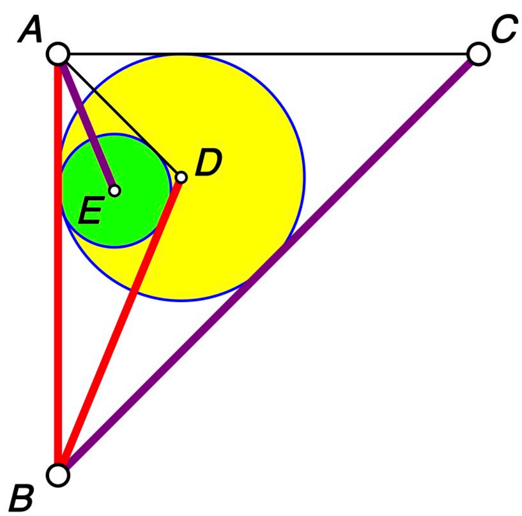
4100 - An easy problem 🙂

- $ABCD$ rectangle
- E incenter of $\triangle ABC$
- F incenter of $\triangle ABD$

Prove that: $AD + EF = AC$



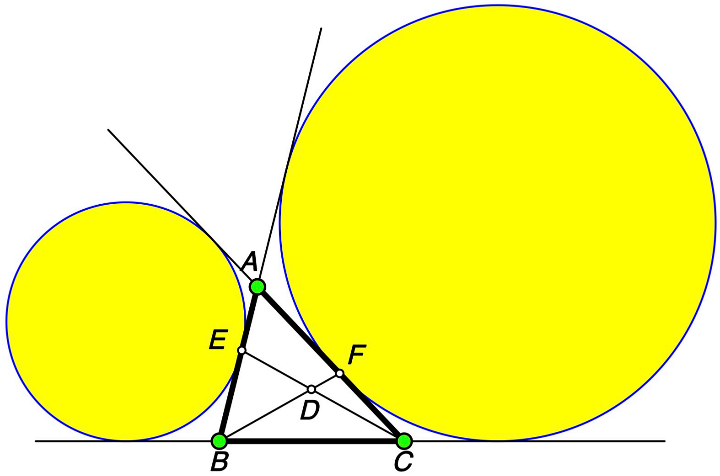
ERCOLE SUPPA 13/12/2019



BA=AC, BA⊥AC
D is the incenter of △BAC.
E is the incenter of △BAD.

Prove: AB+BD=AE+BC

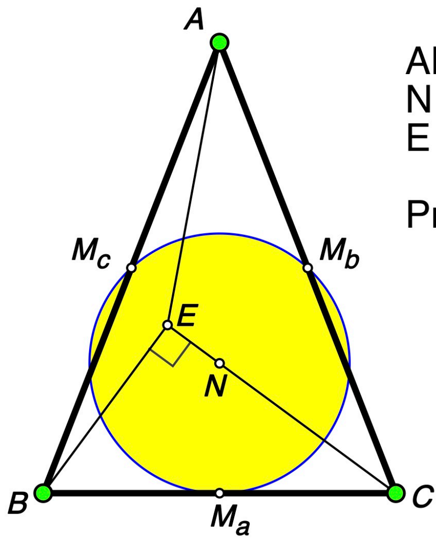
Stanley Rabinowitz, December 2019



ABC is an arbitrary triangle.
E and F are touch points.

Prove: $AC \cdot DF = AE \cdot BD$

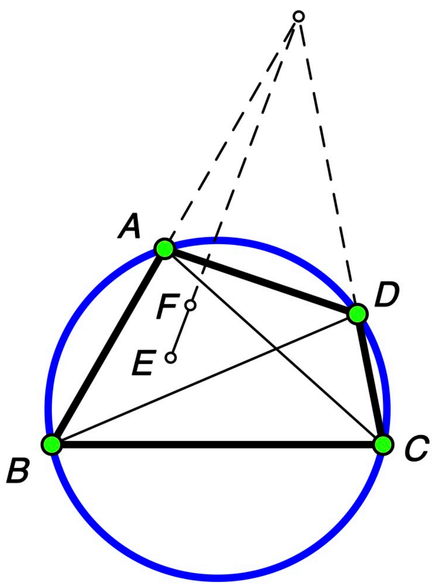
Stanley Rabinowitz, December 2019



AB=AC
N is the center of the 9-point circle of △ABC.
E is the foot of the perpendicular from B to CN.

Prove: AB · BE = AE · BC

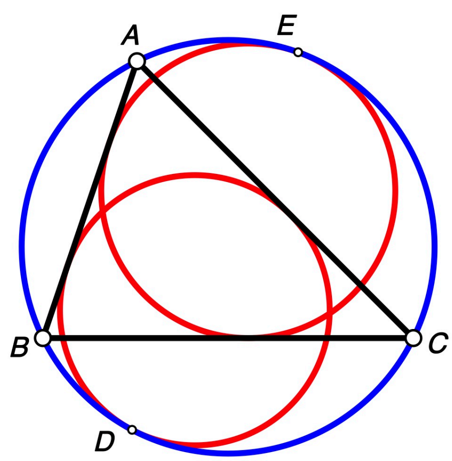
Stanley Rabinowitz, December 2019



ABCD is a cyclic quadrilateral.
E is the symmedian point of △ABC.
F is the symmedian point of △ABD.

Prove: BA, CD, EF concur

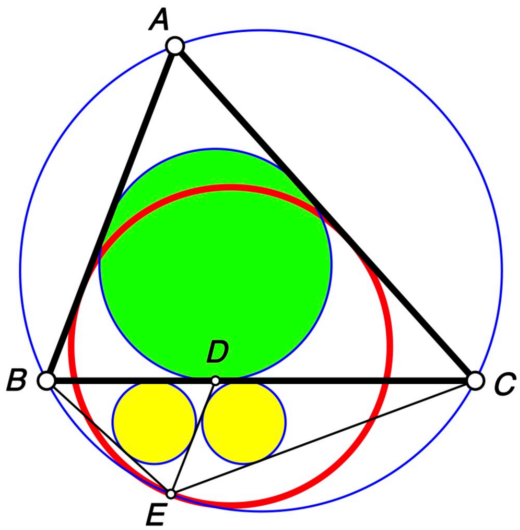
Stanley Rabinowitz, December 2019



The blue circle is the circumcircle of △ABC.
Points D and E are touch points.

Prove: AD · CE = BE · CD

Stanley Rabinowitz, January 1, 2020



D is the point where the incircle of △ABC touches BC.
E is the point where the red circle touches the circumcircle of △ABC.

Prove: The incircles of △BDE and △CDE are congruent.

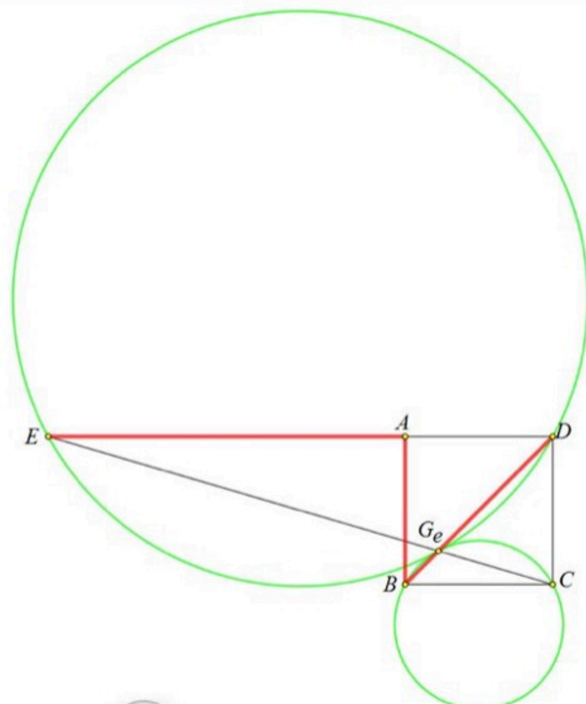
Stanley Rabinowitz, January 2020

4271

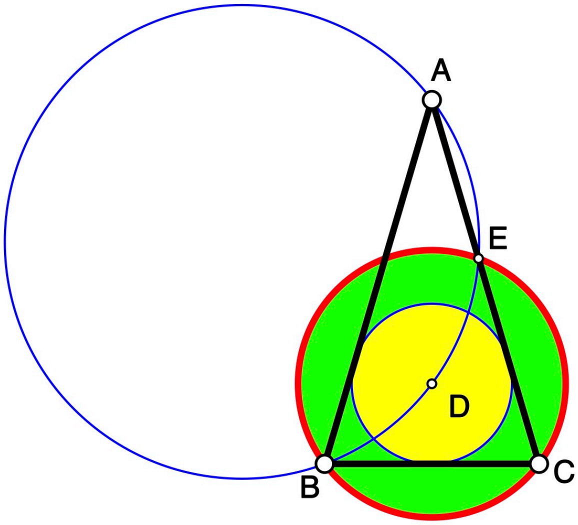
- ⋆ $ABCD$ square
- ⋆ G_e Gergonne point of $\triangle ABC$
- ⋆ $E = AD \cap CG_e$

Prove that:

- $AB + BD = EA$
- $\odot(DAG_e)$ and $\odot(BCG_e)$ are tangent



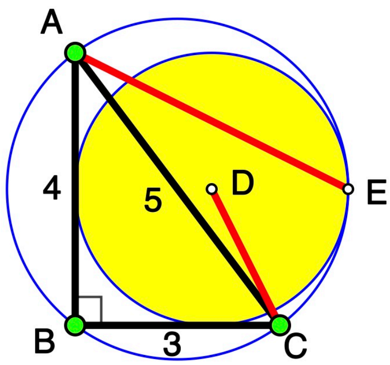
Ercole Suppa 3/1/2020



AB=AC
D is incenter of △ABC.
⊙ABD meets AC at E.

Prove: ⊙BCE and the incircle are concentric.

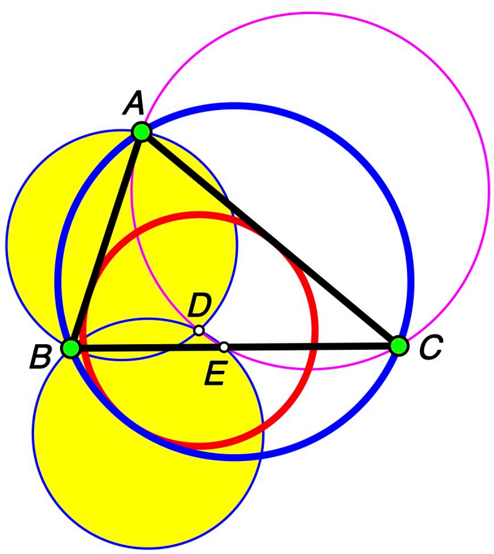
Stanley Rabinowitz, January 2020



ABC is a 3-4-5 right triangle.
D is the center of the circle that touches AB, BC, and the circumcircle of △ABC.
E is the touch point of the two circles.

Prove: AE=2 · CD

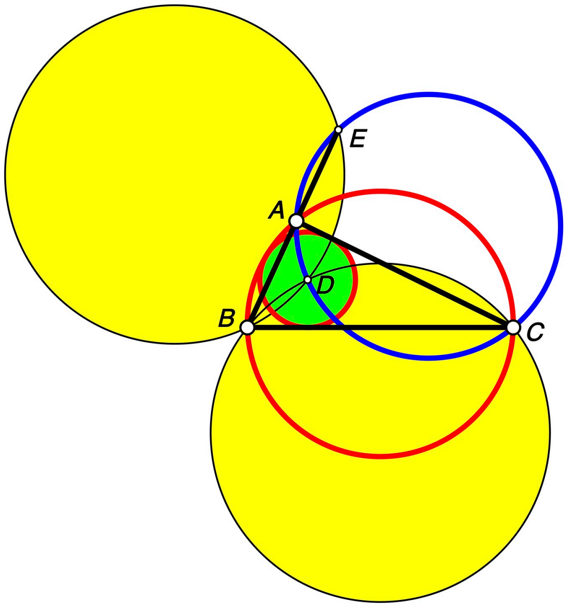
Stanley Rabinowitz, January 2020



D is the center of the red circle tangent to AB, AC and the blue circumcircle of △ABC.
⊙ADC meets BC at E.

Prove: ⊙ABD ≅ ⊙BDE
(i.e. yellow circles are congruent)

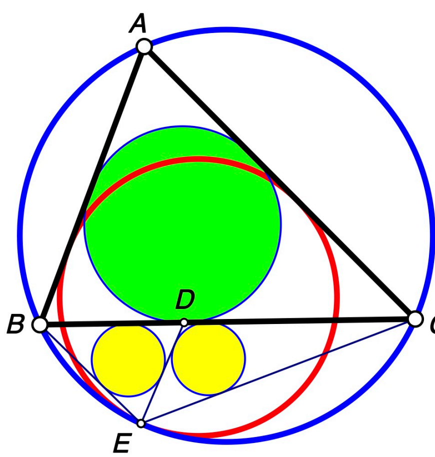
Stanley Rabinowitz, January 2020



D is the center of the green circle that touches BC, AC, and ⊙ABC.
BA meets ⊙ADC at E.

Prove that ⊙BCD and ⊙BDE are congruent.

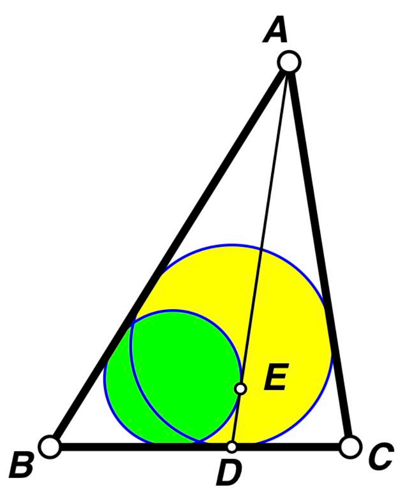
Stanley Rabinowitz, January 2020



The green incircle of △ABC touches BC at D.
The red circle touches the blue circle at E.

Prove that the yellow incircles are congruent.

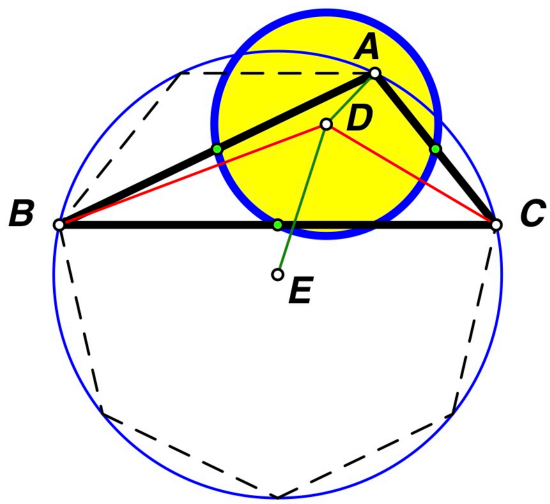
Stanley Rabinowitz, January 2020



D and E are touch points.

Prove: AC+DE=AE+CD

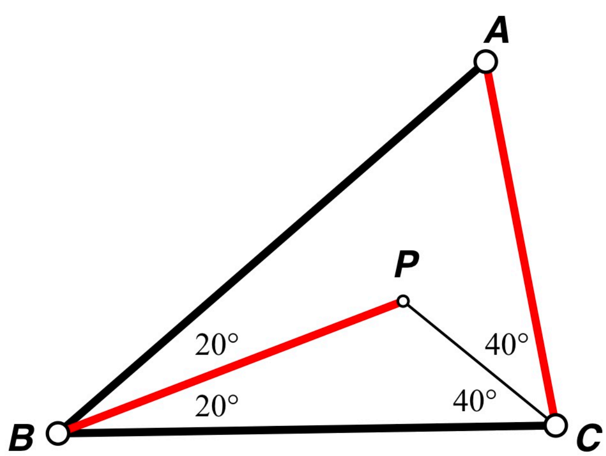
Stanley Rabinowitz, January 2020



ABC: heptagonal triangle
D: center of 9-point circle
E: circumcenter

Prove: AD+BD=CD+DE

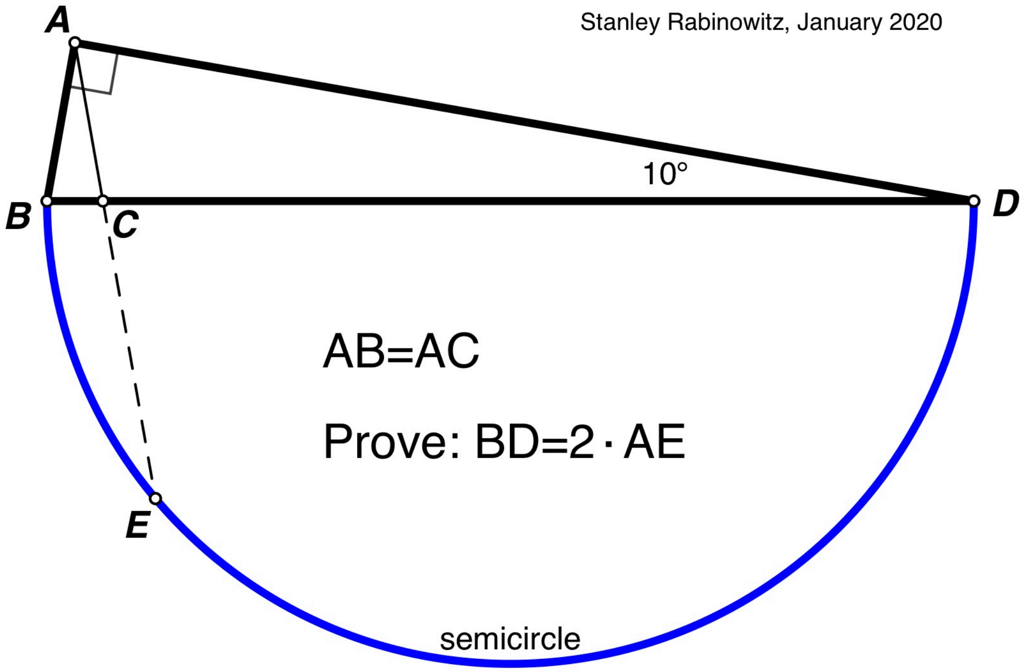
Stanley Rabinowitz, January 2020



Prove: AC=BP

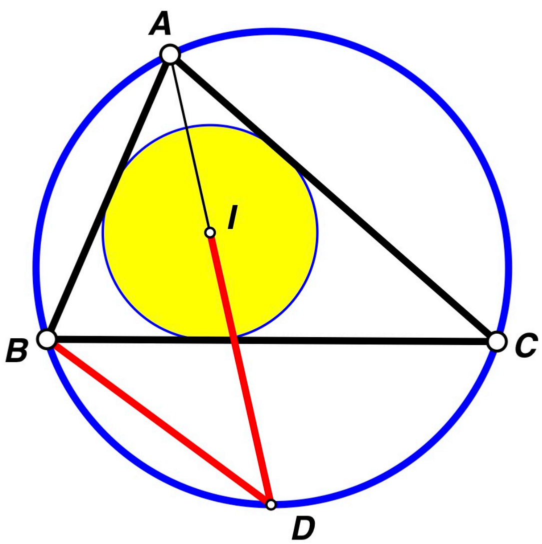
Stanley Rabinowitz, January 2020

Stanley Rabinowitz, January 2020



AB=AC

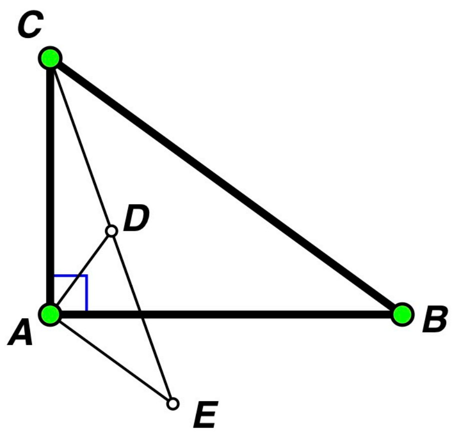
Prove: BD=2·AE



Let I be the incenter of △ABC.
AI meets ⊙ABC at D.

Prove: DB=DI.

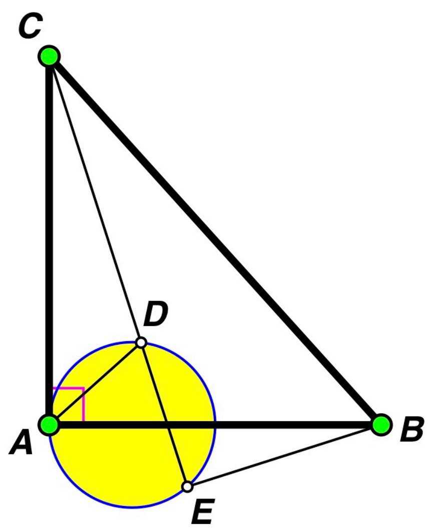
Stanley Rabinowitz, January 2020



Let D be the symmedian point of right triangle CAB. CD=DE.

Prove: DA⊥AE

Stanley Rabinowitz, January 2020

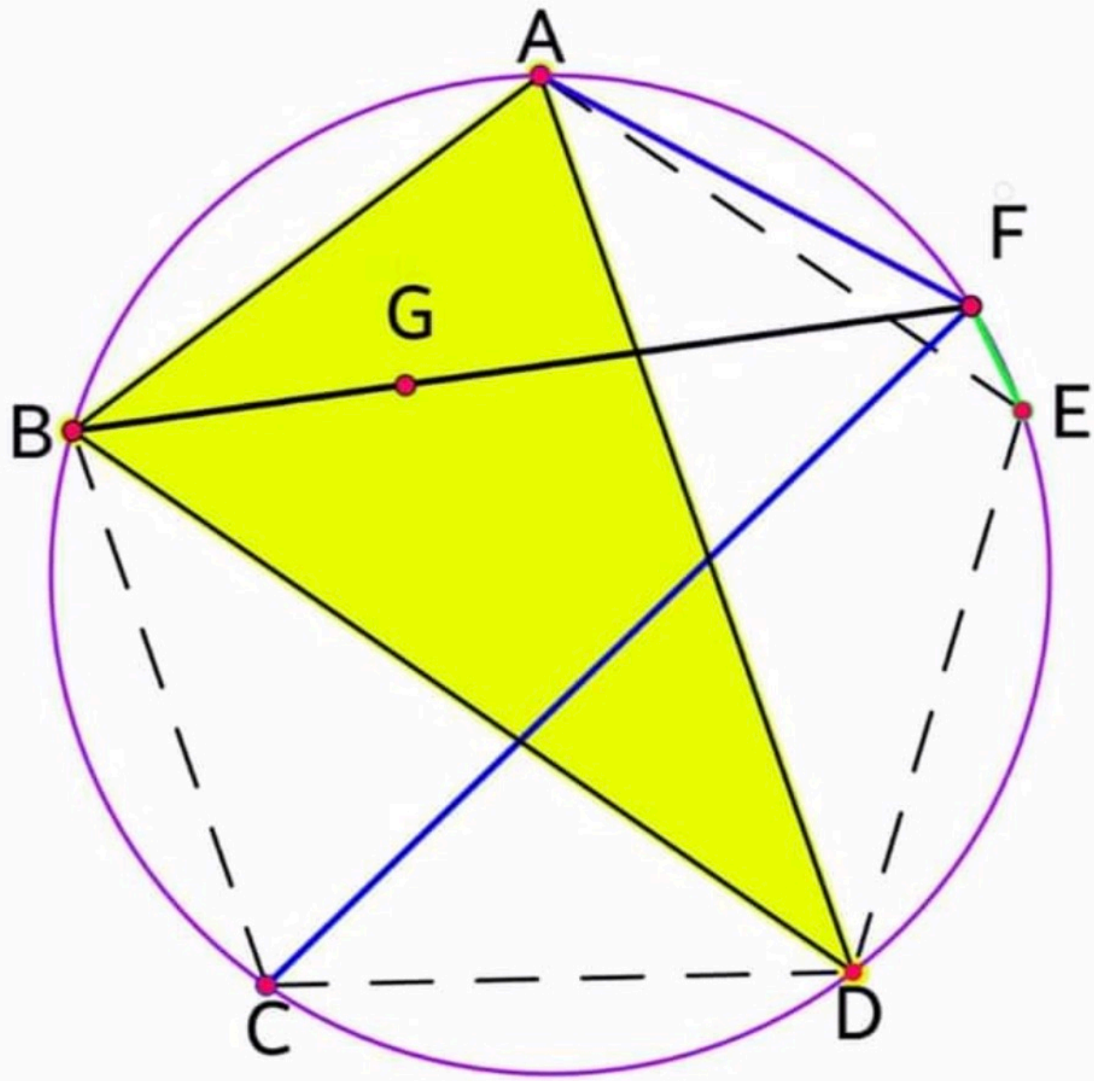


Let D be the symmedian point of right triangle CAB.
The circle tangent to CA at A passing through D meets CD at E.

Prove: BE⊥CE

Stanley Rabinowitz, January 2020

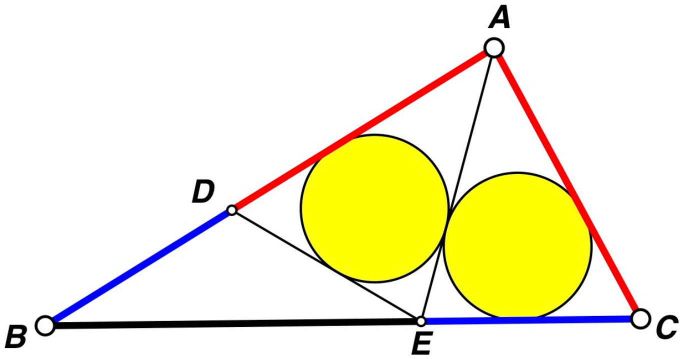
4443 by Er Jkh



- ○ ABCDE is a regular pentagon
- ○ G is Gergonne point of $\triangle ABD$
- ○ $F = \odot(ABCDE) \cap BG$

Prove :

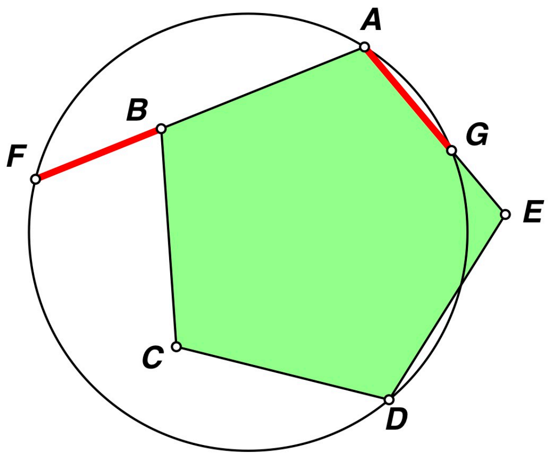
- $CF = 2AF$



∠ACB = 2∠ABC
AD=AC
CE=BD

Prove: Yellow circles are congruent.

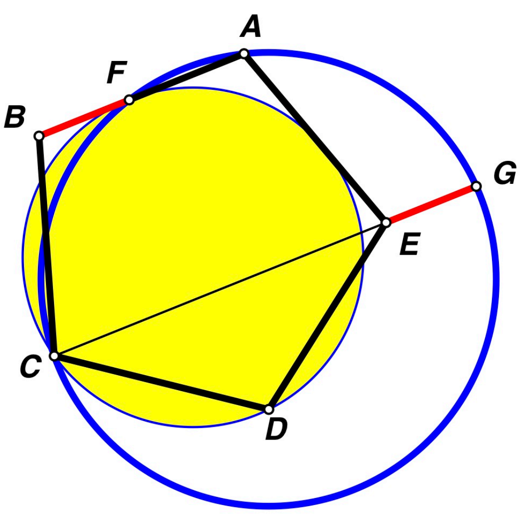
Stanley Rabinowitz, February 2020



ABCDE is a regular pentagon.
AF=AC
⊙AFD meets AE at G.

Prove: BF=AG.

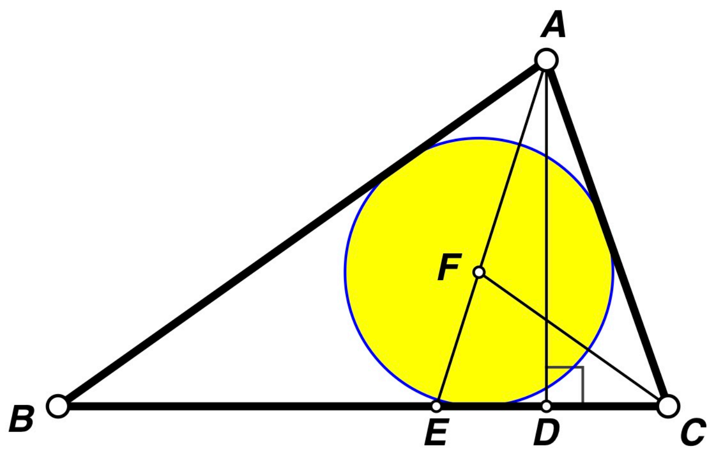
Stanley Rabinowitz, February 2020



ABCDE is a regular pentagon.
⊙CDF is tangent to AB at F.
CE meets ⊙ACF at G.

Prove: BF=EG.

Stanley Rabinowitz, February 2020

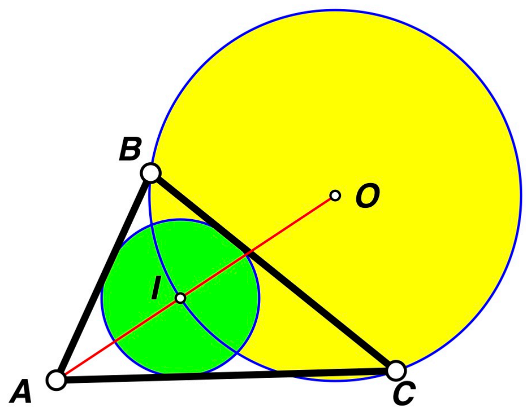


In △ABC, ∠C=2∠B.
F is the incenter.
AD⊥BC.

Prove:

(i) AC+CF=AB
(ii) AC+CD=BD
(iii) CE=CF

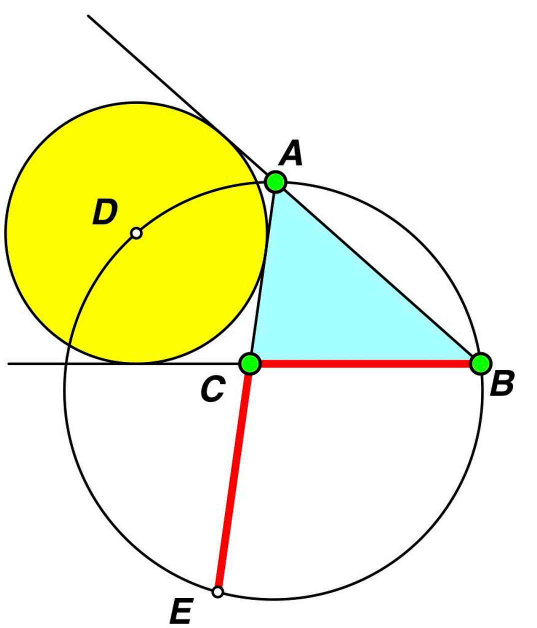
Stanley Rabinowitz, February 2020



I is the incenter of △ABC.
O is the circumcenter of △BIC.

Prove that A, I, O colline.

Stanley Rabinowitz, February 2020



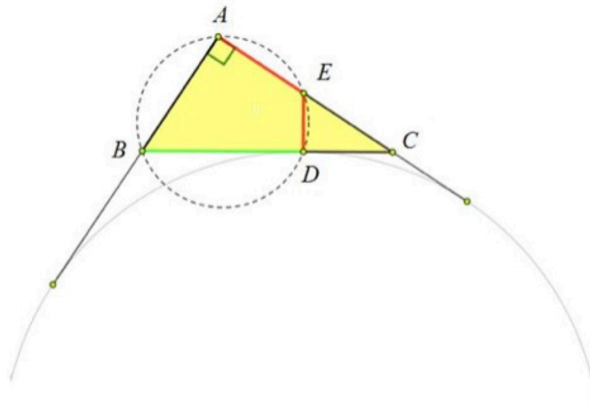
D is the B-excenter of △ABC.
AC meets ⊙DAB at E.

Prove BC=CE.

Stanley Rabinowitz, February 2020

- ⋆ $\triangle ABC$ with $\angle BAC = 90°$
- ⋆ $D = (ABC, A)$ extouch
- ⋆ $\odot(ABD) \cap AC = \{A, E\}$

Prove that: $AE + ED = BD$

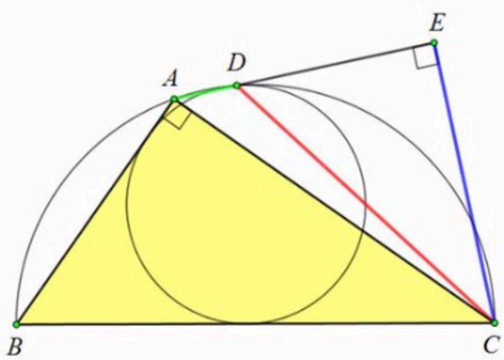


ERCOLE SUPPA 15/2/2020

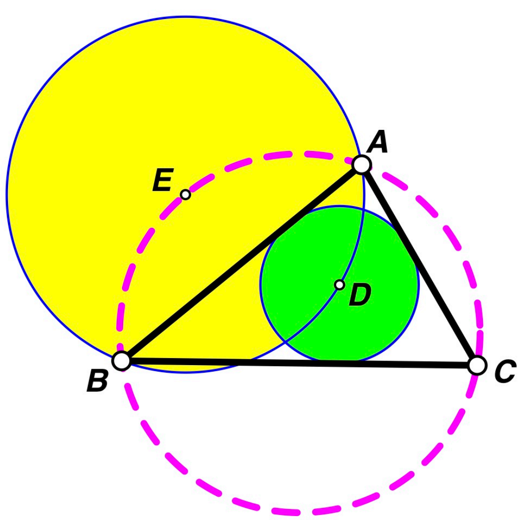
4577

- ⋆ $\triangle ABC$ with $\angle BAC = 90°$
- ⋆ $D = (ABC, B)$ mixtouch
- ⋆ E foot of C on AD

Prove that: $AD + CE = CD$



ERCOLE SUPPA 19/2/2020



D is the incenter of △ABC.
E is the circumcenter of △ABD.

Prove AEBC concyclic..

Stanley Rabinowitz, February 2020

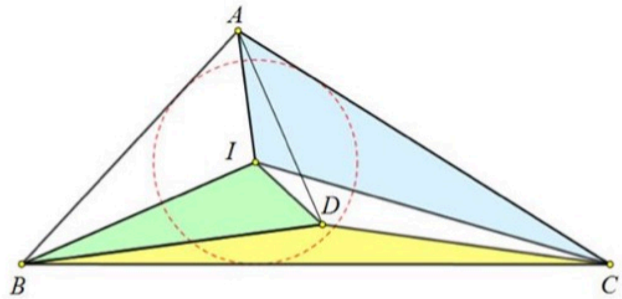
4589

⋆ I incenter of $\triangle ABC$

⋆ D orthocenter of $\triangle ABI$

Prove that:

$[BDI] + [BCD] = [AIC]$



Ercole Suppa 22/2/2020

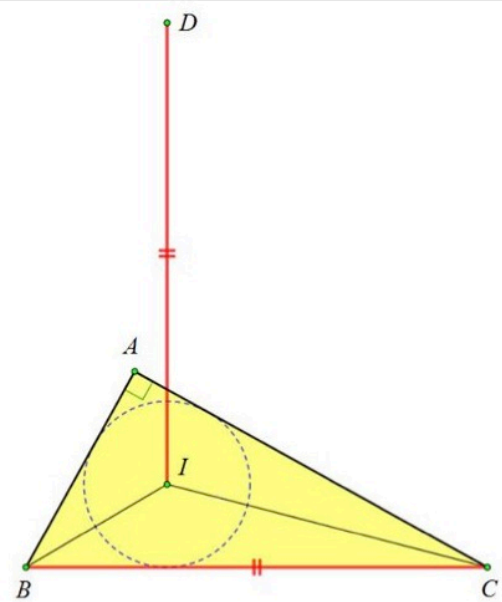
4590 - Inspired by Stanley Rabinowitz problem # 4578

⋆ $\triangle ABC$ right triangle with $\angle A = 90^\circ$

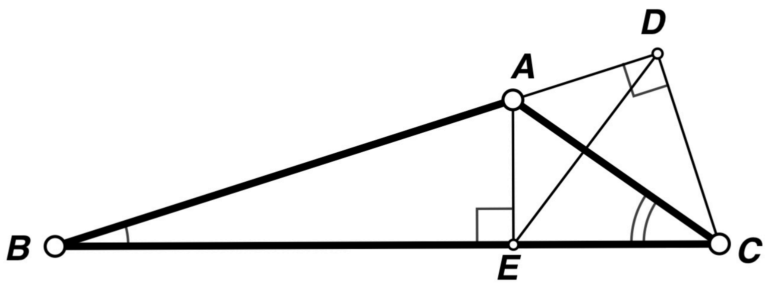
⋆ I incenter of $\triangle ABC$

⋆ D orthocenter of $\triangle BCI$

Prove that: $DI = BC$



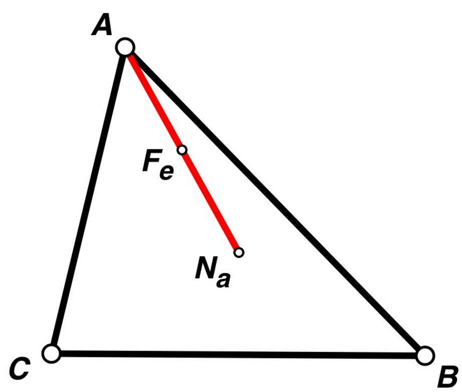
Ercole Suppa 22/2/2020



∠ACB = 2∠ABC
AE⊥BC, CD⊥BA

Prove: AB=2DE

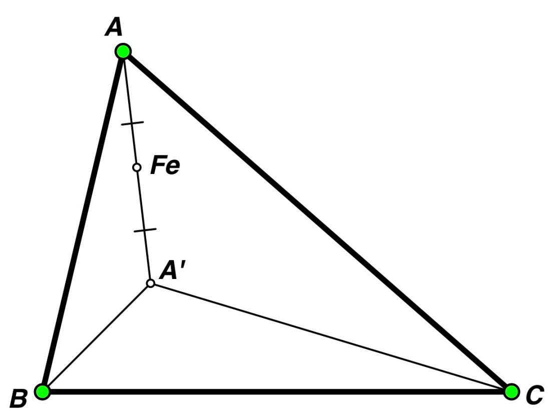
Stanley Rabinowitz, February 2020



AB+AC=2 · BC
N_a is the Nagel point of △ABC.
F_e is the Feuerbach point of △ABC.

Prove: F_e is the midpoint of AN_a

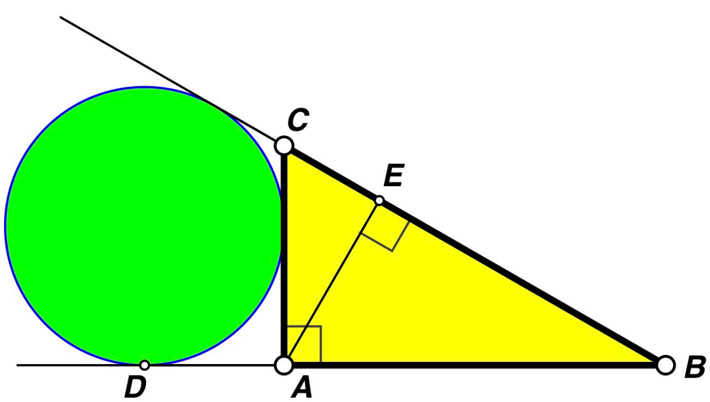
Stanley Rabinowitz, February 2020



Let Fe be the Feuerbach point of △ABC.
Reflect A about Fe to get A'.

Prove: ∠BAC + ∠BA'C = 180°

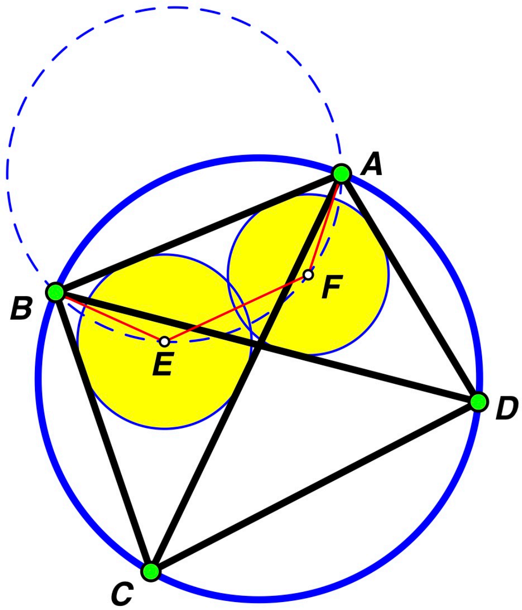
Stanley Rabinowitz, March 2020



Prove:

$$\frac{1}{AB} + \frac{1}{AD} = \frac{1}{AC} + \frac{1}{AE}$$

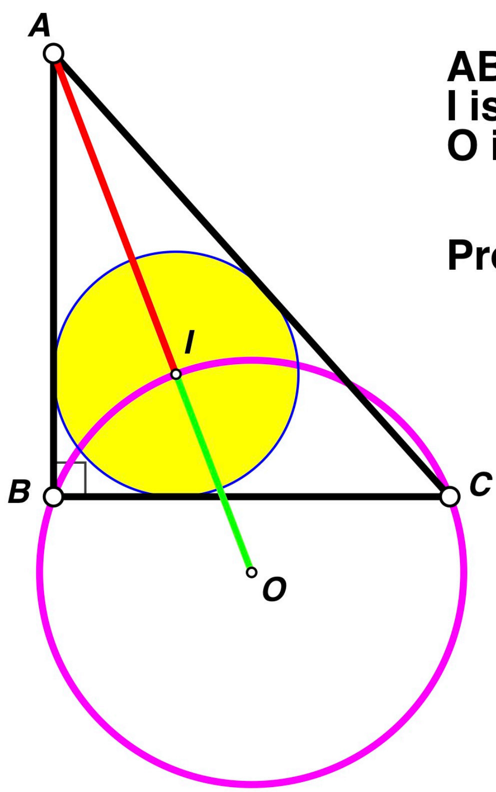
Stanley Rabinowitz, March 2020



ABCD is a cyclic quadrilateral.
E is the incenter of △ABC.
F is the incenter of △ABD.

Prove: A, B, E, F concyclic.

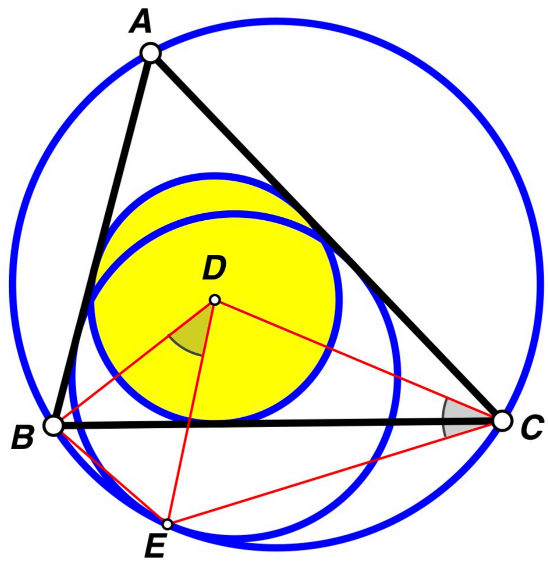
Stanley Rabinowitz, March 2020



ABC is a right triangle with 3BC=2AC.
I is the incenter of △ABC.
O is the circumcenter of △BIC.

Prove: $\dfrac{AI}{IO} = \phi$, **the golden ratio**

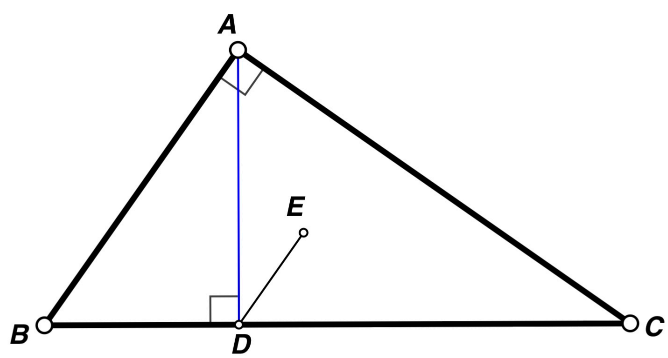
Stanley Rabinowitz, March 2020



D is the incenter of △ABC.
E is the A-mixtilinear touch point of △ABC.

Prove: ∠BDE = ∠DCE

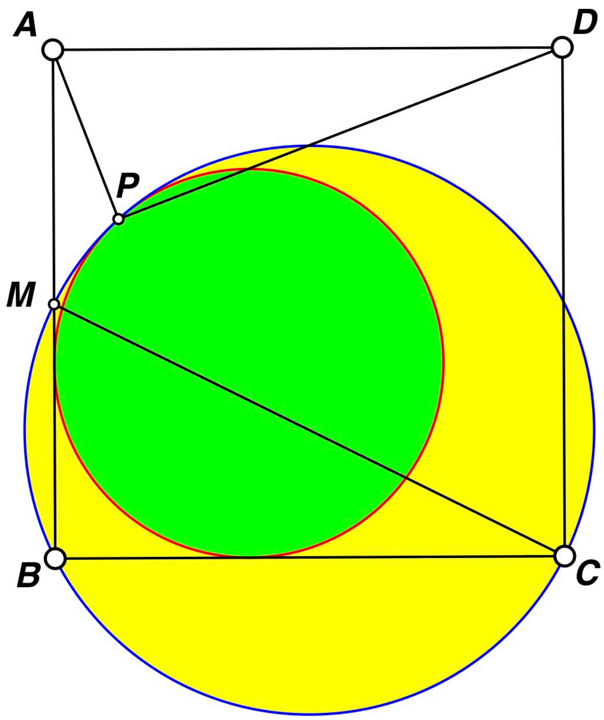
Stanley Rabinowitz, March 2020



AB⊥AC
AD⊥BC
E is symmedian point of △ADC.

Prove: ED||AB

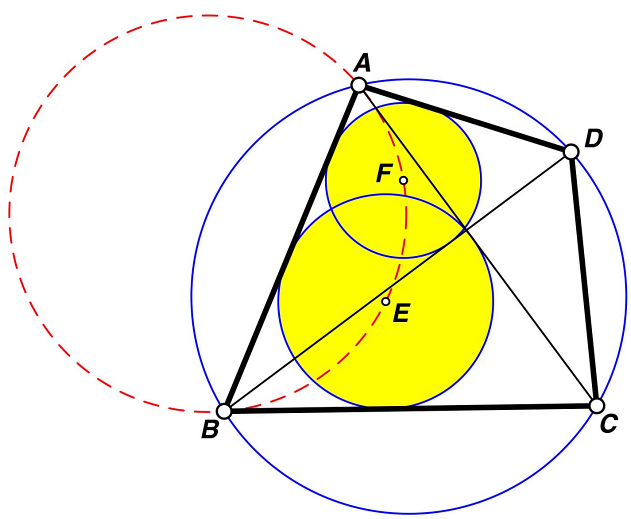
Stanley Rabinowitz, April 2020



ABCD is a square.
AM=MB.
P is the B-mixtilinear touch point of △MBC.

Prove: AP⊥DP

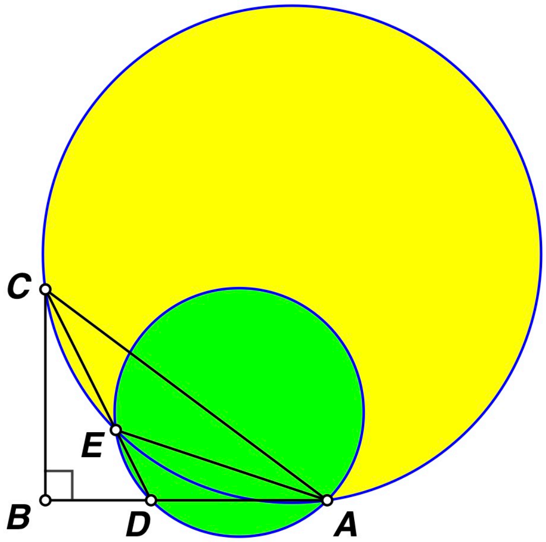
Stanley Rabinowitz, April 2020



ABCD is a cyclic quadrilateral.
E is the incenter of △ABC.
F is the incenter of △ABD.

Prove: ABEF is cyclic

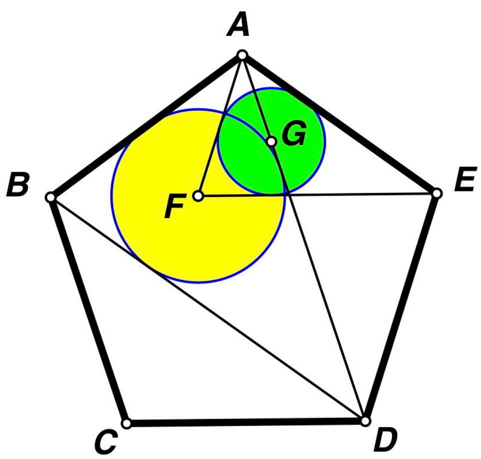
Stanley Rabinowitz, April 2020



BC=3, AB=4, AC=5
CD bisects ∠ACB
AE bisects ∠BAC

Prove: radius of ⊙ACE is twice the radius of ⊙ADE.

Stanley Rabinowitz, April 2020



ABCDE is a regular pentagon.
F is the incenter of △ABD.
G is the incenter of △AEF.

Prove:

$$\frac{\text{radius of } \odot F}{\text{radius of } \odot G} = \phi$$

Stanley Rabinowitz, April 2020