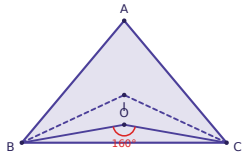
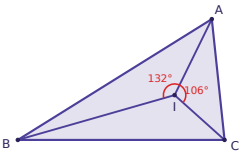
Acute triangle ABC has circumcenter O and incenter I. If ∠BOC = 160°, find ∠BIC.



Acute triangle ABC has incenter I and orthocenter H. If ∠AIB = 132° and ∠AIC = 106°, find ∠BHC.

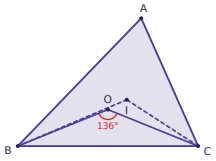


The interior angles of a convex polygon form an arithmetic sequence. The smallest angle is 135° and the angles increase by 3° each time. How many sides does the polygon have?

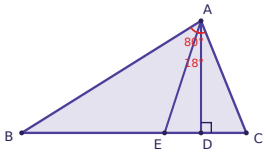
A regular star is drawn by joining every 4th vertex of a regular polygon. Each point of the star measures 20°. How many points does the star have?

The interior angles of a convex polygon form an arithmetic sequence. The smallest angle is 105° and the angles increase by 6° each time. Find the largest angle.

Acute triangle ABC has circumcenter O and incenter I. If ∠BOC = 136°, find ∠BIC.



In triangle ABC, AD is the altitude to BC and AE bisects ∠BAC (D and E lie on BC). If ∠DAE = 18°, ∠BAC = 80° and ∠ACB > ∠ABC, find ∠ACB.



Inside acute angle XOY, points P_1, P_3, P_5, … lie on ray OX and points P_2, P_4, … lie on ray OY, each point farther from O than the one before it on the same ray, so that $OP_1 = P_1P_2 = \ldots = P_9P_{10}$. The last segment P_9P_{10} is perpendicular to OX (the ray through P_9). Find $\angle OP_6P_7$.

Expert Angle Problems: Triangle Centers, Circles & Polygons · 2

ANSWER

116°

Expert Angle Problems: Triangle Centers, Circles & Polygons · 1

ANSWER

130°

Expert Angle Problems: Triangle Centers, Circles & Polygons · 4

ANSWER

9

Expert Angle Problems: Triangle Centers, Circles & Polygons · 3

ANSWER

15

Expert Angle Problems: Triangle Centers, Circles & Polygons · 6

ANSWER

124°

Expert Angle Problems: Triangle Centers, Circles & Polygons · 5

ANSWER

135°

Expert Angle Problems: Triangle Centers, Circles & Polygons · 8

ANSWER

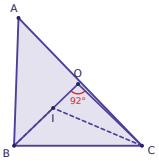
117°

Expert Angle Problems: Triangle Centers, Circles & Polygons · 7

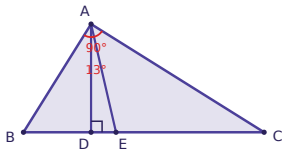
ANSWER

68°

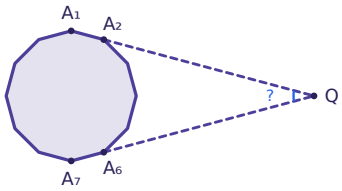
Acute triangle ABC has circumcenter O and incenter I. If ∠BOC = 92°, find ∠BIC.



In triangle ABC, AD is the altitude to BC and AE bisects ∠BAC (D and E lie on BC). If ∠DAE = 13°, ∠BAC = 90° and ∠ABC > ∠ACB, find ∠ABC.

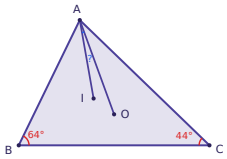


The sides A_1A_2 and A_6A_7 of a regular 12-sided polygon $A_1A_2\ldots A_{12}$ are extended beyond A_2 and A_6 until they meet at Q. Find $\angle A_2QA_6$.

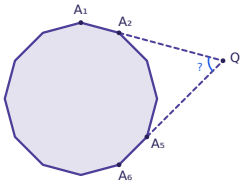


Inside acute angle XOY, points P_1, P_3, P_5, … lie on ray OX and points P_2, P_4, … lie on ray OY, each point farther from O than the one before it on the same ray, so that $OP_1 = P_1P_2 = \ldots = P_9P_{10}$. The last segment P_9P_{10} is perpendicular to OX (the ray through P_9). Find $\angle OP_3P_4$.

Acute triangle ABC has circumcenter O and incenter I. If ∠ABC = 64° and ∠ACB = 44°, find ∠OAI.

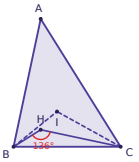


The sides A_1A_2 and A_5A_6 of a regular 12-sided polygon $A_1A_2\ldots A_{12}$ are extended beyond A_2 and A_5 until they meet at Q. Find $\angle A_2QA_5$.



Inside acute angle XOY, points P_1, P_3, P_5, … lie on ray OX and points P_2, P_4, … lie on ray OY, each point farther from O than the one before it on the same ray, so that $OP_1 = P_1P_2 = \ldots = P_4P_5$. The last segment P_4P_5 is perpendicular to OY (the ray through P_4). Find $\angle OP_3P_4$.

Acute triangle ABC has orthocenter H and incenter I. If ∠BHC = 136°, find ∠BIC.



Expert Angle Problems: Triangle Centers, Circles & Polygons · 10

ANSWER

58°

Expert Angle Problems: Triangle Centers, Circles & Polygons · 9

ANSWER

113°

Expert Angle Problems: Triangle Centers, Circles & Polygons · 12

ANSWER

144°

Expert Angle Problems: Triangle Centers, Circles & Polygons · 11

ANSWER

30°

Expert Angle Problems: Triangle Centers, Circles & Polygons · 14

ANSWER

60°

Expert Angle Problems: Triangle Centers, Circles & Polygons · 13

ANSWER

10°

Expert Angle Problems: Triangle Centers, Circles & Polygons · 16

ANSWER

112°

Expert Angle Problems: Triangle Centers, Circles & Polygons · 15

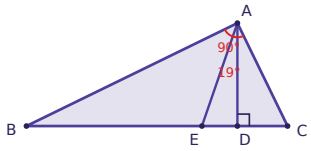
ANSWER

108°

A regular star is drawn by joining every 3rd vertex of a regular polygon. Each point of the star measures 45°. How many points does the star have?

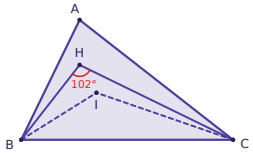
Inside acute angle XOY, points P_1, P_3, P_5, … lie on ray OX and points P_2, P_4, … lie on ray OY, each point farther from O than the one before it on the same ray, so that $OP_1 = P_1P_2 = \ldots = P_4P_5$. The last segment P_4P_5 is perpendicular to OY (the ray through P_4). Find $\angle OP_1P_2$.

In triangle ABC, AD is the altitude to BC and AE bisects ∠BAC (D and E lie on BC). If ∠DAE = 19°, ∠BAC = 90° and ∠ACB > ∠ABC, find ∠ACB.



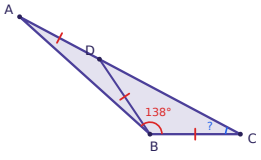
Inside acute angle XOY, points P_1, P_3, P_5, … lie on ray OX and points P_2, P_4, … lie on ray OY, each point farther from O than the one before it on the same ray, so that $OP_1 = P_1P_2 = \ldots = P_5P_6$. The last segment P_5P_6 is perpendicular to OX (the ray through P_5). Find $\angle OP_1P_2$.

Acute triangle ABC has orthocenter H and incenter I. If ∠BHC = 102°, find ∠BIC.



A regular star is drawn by joining every 3rd vertex of a regular polygon. Each point of the star measures 72°. How many points does the star have?

In triangle ABC, point D lies on side AC so that AD = DB = BC. If ∠ABC = 138°, find ∠ACB.



Inside acute angle XOY, points P_1, P_3, P_5, … lie on ray OX and points P_2, P_4, … lie on ray OY, each point farther from O than the one before it on the same ray, so that $OP_1 = P_1P_2 = \ldots = P_8P_9$. The last segment P_8P_9 is perpendicular to OY (the ray through P_8). Find $\angle OP_2P_3$.

Expert Angle Problems: Triangle Centers, Circles & Polygons · 18

ANSWER

144°

Expert Angle Problems: Triangle Centers, Circles & Polygons · 17

ANSWER

8

Expert Angle Problems: Triangle Centers, Circles & Polygons · 20

ANSWER

150°

Expert Angle Problems: Triangle Centers, Circles & Polygons · 19

ANSWER

64°

Expert Angle Problems: Triangle Centers, Circles & Polygons · 22

ANSWER

10

Expert Angle Problems: Triangle Centers, Circles & Polygons · 21

ANSWER

129°

Expert Angle Problems: Triangle Centers, Circles & Polygons · 24

ANSWER

150°

Expert Angle Problems: Triangle Centers, Circles & Polygons · 23

ANSWER

28°