

Geometry · Triangle Theorems and Points of Concurrency · Quiz

Common Core G-CO.C.10, G-C.A.3 · mathovore.fr

Name: _____ Date: ____/____/____ Score: _____

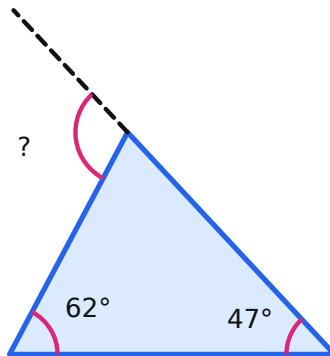
Ten multiple-choice questions check angle sums, exterior angles, midsegments, and the four centers of a triangle. Choose the best answer for each. The explanation after each question names the common mistake.

Geometry Common Core: G-CO.C.10 · G-C.A.3

Questions

Question 1

The figure shows a triangle with side BC extended. What is the measure of the exterior angle at C?



Exterior angle at C.

- A. 71°
- B. 15°
- C. 218°
- D. 109°

Question 2

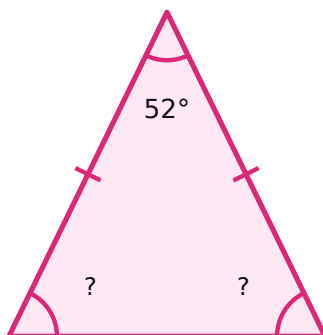
Two angles of a triangle measure 74° and 38° . What is the third angle?

- A. 112°

- B. 68°
- C. 106°
- D. 142°

Question 3

What is the measure of each base angle of this isosceles triangle?

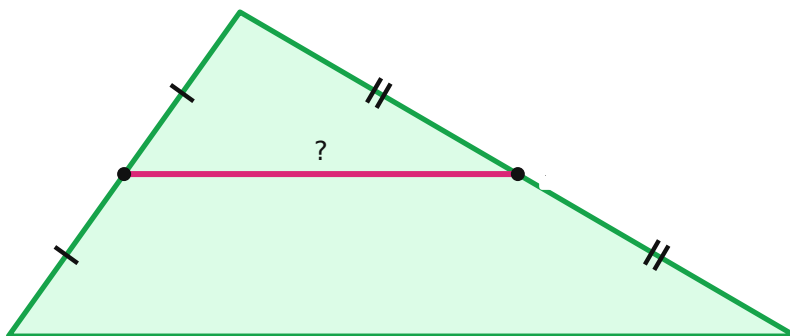


Isosceles triangle.

- A. 52°
- B. 76°
- C. 64°
- D. 128°

Question 4

D and E are midpoints of $\overline{AB}$ and $\overline{AC}$, and $BC = 34$. What is DE ?



Midsegment DE.

- A. 68
- B. 34
- C. 51

D. 17

Question 5

G is the centroid of a triangle and the median from vertex A has length 24. How far is G from A?

- A. 12
- B. 8
- C. 16
- D. 18

Question 6

Which point of concurrency is the same distance from all three vertices of a triangle?

- A. circumcenter
- B. incenter
- C. centroid
- D. orthocenter

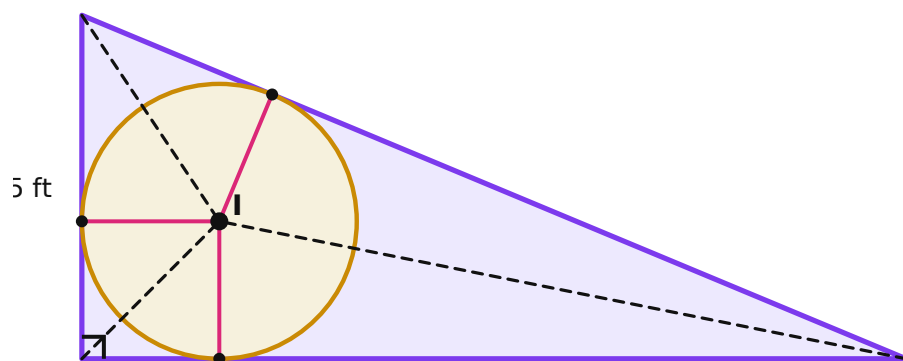
Question 7

Which point of concurrency is found where the three altitudes of a triangle meet?

- A. circumcenter
- B. orthocenter
- C. incenter
- D. centroid

Question 8

A circle touches all three sides of a triangle from the inside. Its center is where which lines meet?



Inscribed circle.

- A. the perpendicular bisectors

- B. the medians
- C. the angle bisectors
- D. the altitudes

Question 9

A triangle has vertices $(0,0)$, $(6,0)$, and $(3,9)$. What are the coordinates of its centroid?

- A. $(3,4.5)$
- B. $(3,6)$
- C. $(4.5,3)$
- D. $(3,3)$

Question 10

A right triangle has legs of 6 and 8. What is the radius of its circumscribed circle?

- A. 5 units
- B. 10 units
- C. 4 units
- D. 7 units

Answer key

1. **D** – The exterior angle equals the sum of the remote angles: $62 + 47 = 109$. The interior angle at C is 71, which is a common wrong answer.
2. **B** – Subtract from 180: $180 - 74 - 38 = 68$. Adding 74 and 38 gives 112, which is the exterior angle.
3. **C** – The base angles share $180 - 52 = 128$ degrees, so each is 64. Forgetting to divide by 2 gives 128.
4. **D** – A midsegment is half the length of the parallel third side: $34 / 2 = 17$. Doubling instead of halving gives 68.
5. **C** – The centroid is two thirds of the way from the vertex: $(2/3)(24) = 16$. The distance 8 is from G to the midpoint.
6. **A** – The circumcenter lies on all three perpendicular bisectors, so it is equidistant from the vertices. The incenter is equidistant from the sides.
7. **B** – Altitudes are perpendicular segments from a vertex to the opposite side, and their lines meet at the orthocenter.
8. **C** – The center of the inscribed circle is the incenter, which lies on all three angle bisectors and is equidistant from the sides.
9. **D** – Average the coordinates: $x = (0 + 6 + 3) / 3 = 3$ and $y = (0 + 0 + 9) / 3 = 3$.
10. **A** – The hypotenuse is 10 and is a diameter of the circumscribed circle, so the radius is 5. Using the hypotenuse itself gives 10.

Remember:

- Interior angles sum to 180 degrees; an exterior angle equals the sum of the two remote interior angles.
- Base angles of an isosceles triangle are congruent, and the converse is true.
- A midsegment is parallel to the third side and half its length.
- Medians meet at the centroid, two thirds of the way from each vertex.
- The circumcenter is the center of the circumscribed circle; the incenter is the center of the inscribed circle.