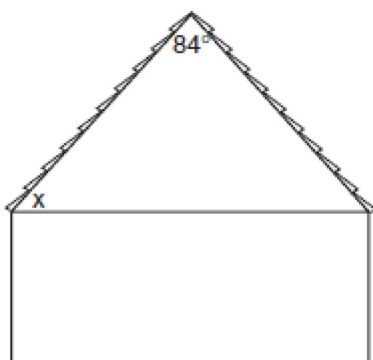


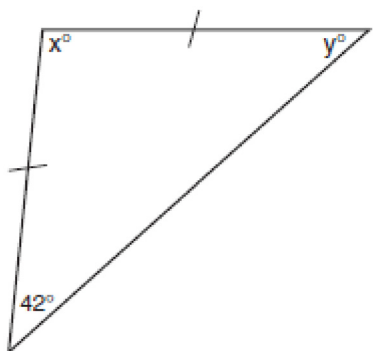
G.G.31: Isosceles Triangle Theorem 2: Investigate, justify, and apply the isosceles triangle theorem and its converse

- 1 The accompanying diagram shows the roof of a house that is in the shape of an isosceles triangle. The vertex angle formed at the peak of the roof is 84° .



What is the measure of x ?

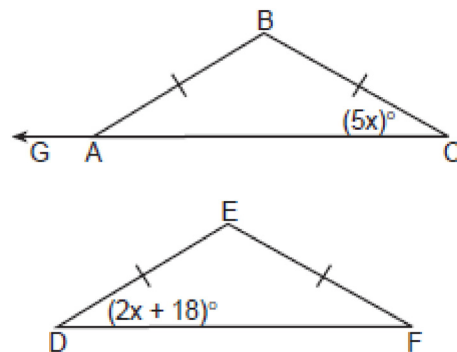
- 1) 138° 2) 96° 3) 84° 4) 48°
- 2 Tina wants to sew a piece of fabric into a scarf in the shape of an isosceles triangle, as shown in the accompanying diagram.



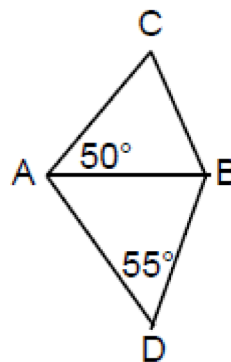
What are the values of x and y ?

- 1) $x = 42$ and $y = 96$ 2) $x = 69$ and $y = 69$
3) $x = 90$ and $y = 48$ 4) $x = 96$ and $y = 42$
- 3 In isosceles triangle DOG , the measure of the vertex angle is three times the measure of one of the base angles. Which statement about $\triangle DOG$ is true?
- 1) $\triangle DOG$ is a scalene triangle. 2) $\triangle DOG$ is an acute triangle. 3) $\triangle DOG$ is a right triangle. 4) $\triangle DOG$ is an obtuse triangle.

- 4 In the accompanying diagram, isosceles $\triangle ABC \cong$ isosceles $\triangle DEF$, $m\angle C = 5x$, and $m\angle D = 2x + 18$. Find $m\angle B$ and $m\angle BAG$.



- 5 In the accompanying diagram, $\triangle ABC$ and $\triangle ABD$ are isosceles triangles with $m\angle CAB = 50$ and $m\angle BDA = 55$. If $AB = AC$ and $AB = BD$, what is $m\angle CBD$?

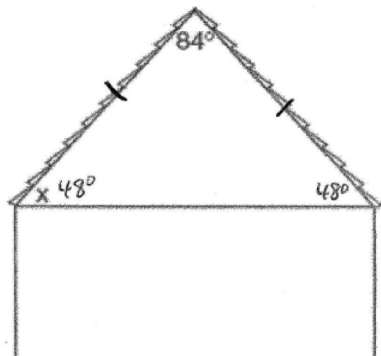


- 6 Vertex angle A of isosceles triangle ABC measures 20° more than three times $m\angle B$. Find $m\angle C$.
- 7 Hersch says if a triangle is an obtuse triangle, then it cannot also be an isosceles triangle. Using a diagram, show that Hersch is incorrect, and indicate the measures of all the angles and sides to justify your answer.

G.G.31: Isosceles Triangle Theorem 2: Investigate, justify, and apply the isosceles triangle theorem and its converse

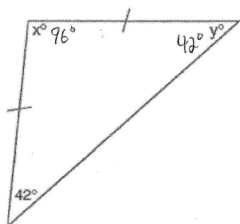
Answer Section

1 ANS: 4



REF: 060615a

2 ANS: 4



REF: 060510a

3 ANS: 4

$$A = 3x \quad 3x + x + x = 180$$

$$B = x \quad 5x = 180 \quad \text{The vertex angle is } 3(36) = 108^\circ.$$

$$C = x \quad x = 36$$

REF: 060107a

4 ANS:

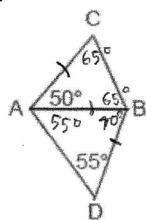
$$5x = 2x + 18$$

$$m\angle B = 120 \text{ and } m\angle BAG = 150. \quad 3x = 18 \quad \text{Therefore the triangles' congruent angles are } 30^\circ.$$

$$x = 6$$

REF: 060838a

5 ANS:

135. $m\angle CBD = 65^\circ + 70^\circ = 135^\circ$

REF: 069930a

6 ANS:

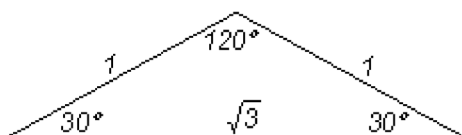
$$A = 3x + 20 \quad 3x + 20 + x + x = 180$$

$$32. \quad B = x \quad 5x + 20 = 180$$

$$C = x \quad x = 32$$

REF: 010223a

7 ANS:



REF: 060027a