Geometry Practice: G.G.31
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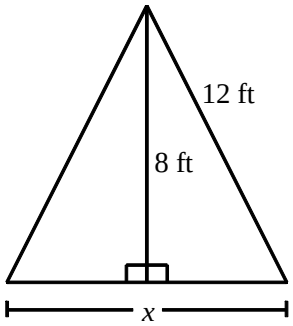
P.I. G.G.31: Investigate, justify, and apply the isosceles triangle theorem and its converse

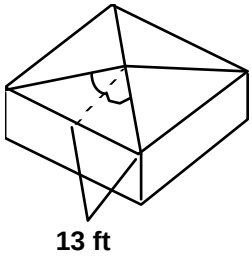
1. An isosceles triangle has two equal sides. Suppose the smallest side of such a triangle is 69 centimeters. Find all possible values for the length of the two other sides if the perimeter is at least 532 centimeters.

2. An isosceles triangle has a perimeter of 22 inches. The two equal sides are each 2 inches longer than the third side. How long is the third side?

3. Use any problem solving strategy to solve the following problem. The opening of a tent is shown below. How wide is the opening of the bottom? Write your answer in the simplest radical form and as a decimal rounded to the nearest tenth.

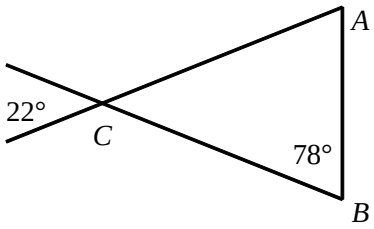


4. A roof consists of four congruent isosceles triangles. Find the number of feet of gutter that will be needed for the roof shown.

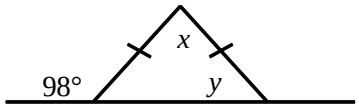


5. The two vertices of the base angles of an isosceles triangle are the points $A(x_1, y_1)$ and $B(x_2, y_2)$. Describe the possible coordinates of the third vertex, *C*.

6. True or False: ΔABC is isosceles.



7. Find the values of *x* and *y*.



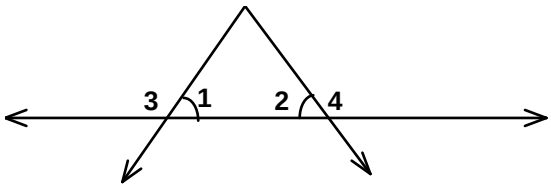
[A] $x = 16°;\ y = 82°$

[B] $x = 82°;\ y = 98°$

[C] $x = 16°;\ y = 98°$

[D] $x = 82°;\ y = 62°$

8. Suppose that $\angle 1 \cong \angle 2$, $m\angle 3 = 4x + 30$, and $m\angle 4 = 7x - 3$. Find the value of *x*.



[A] 103 [B] 11 [C] 74

[D] 45 [E] 15

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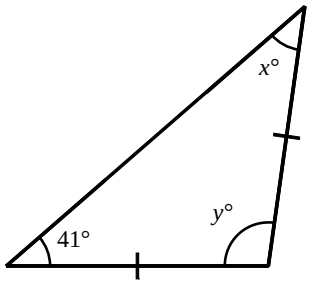
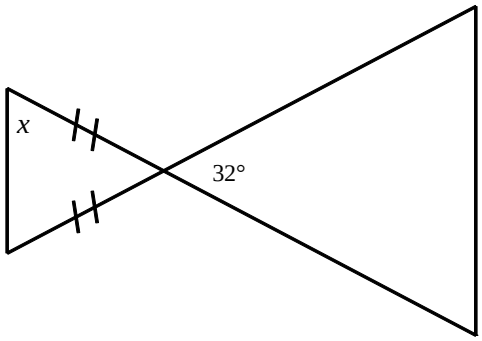
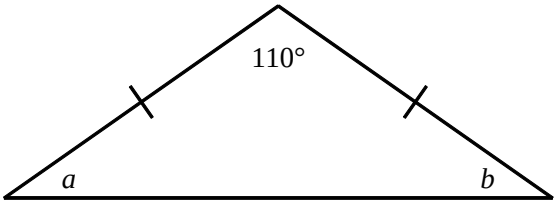
9. Find x and y.



10. Find the value of x. (The triangle is not drawn to scale.)



11. Find the measure of $\angle b$.



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[1] both ≥ 231.5 cm

[2] 6 in.

[3] $8\sqrt{5} \approx 17.9$ ft

[4] 104 ft

[5] a point on the line containing the midpoint of $\overline{AB}$, $\left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}\right)$ and perpendicular to $\overline{AB}$

[6] false

[7] A

[8] B

[9] $x = 41$
$y = 98$

[10] $74°$

[11] $35°$