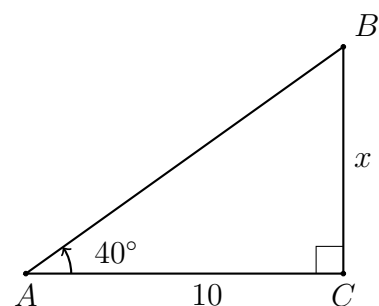Name:

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6.15 Exam: Tangent applications   **CCSS.HSG.SRT.C.8**

1. Given right $\triangle ABC$ with $AC = 10$, $m\angle A = 40°$. Find the value of $BC = x$.

2. Graph and label $\triangle ABC$ with $A(0,0)$, $B(5,3)$, and $C(5,0)$. Calculate the length of each side of the triangle.
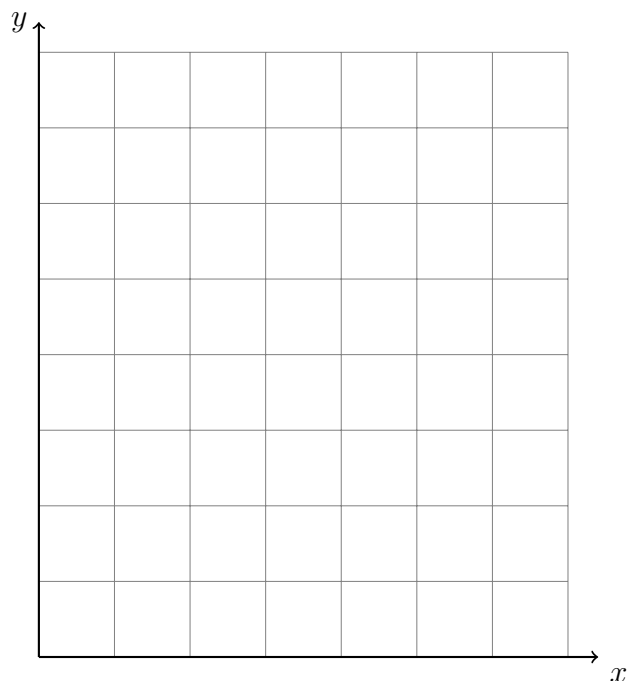
   (a) $AC =$

   (b) $BC =$

   (c) For the hypotenuse, express the length as a radical, then round to the nearest hundredth.

   (hint: use the Pythagorean theorem $a^2 + b^2 = c^2$)

   $AB =$

   (d) Find the slope of each line.

   $m_{AB} =$ $m_{AC} =$ $m_{BC} =$

3. Calculate each value. Round to the nearest thousandth.

    (a) $\tan 39°$ (b) $\tan 11°$

4. Find θ. Round to the nearest whole degree.

    (a) $\theta = \tan^{-1}\left(\dfrac{3}{10}\right)$ (b) $\tan \theta = \dfrac{2.6}{4.9}$

5. Convert radians and degrees. (nearest whole degree, nearest hundredth radian).

    (a) $85° =$ (b) $1.15 \, \text{radians} =$

6. Solve each equation for x, rounding to the nearest tenth.

    (a) $\tan 33° = \dfrac{x}{21}$ (b) $\tan 16° = \dfrac{3.7}{x}$

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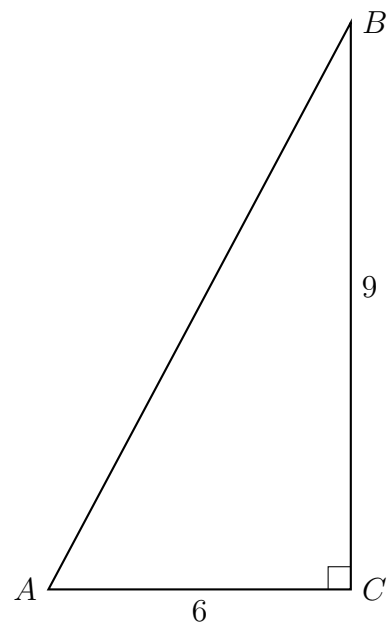
7. $\triangle ABC$ is shown with $m\angle C = 90°$ and the lengths of the triangle's sides are $AC = 6$, $BC = 9$.   (not drawn to scale)
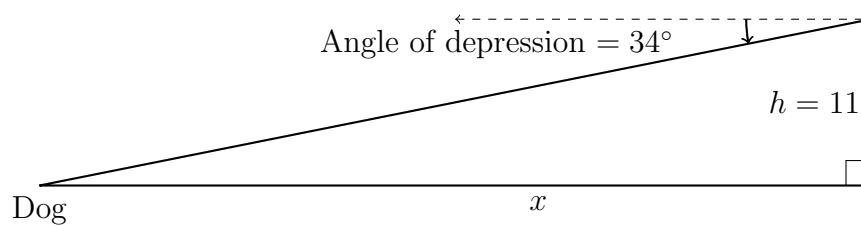
    (a) Write down the value of $\tan A$.

    (b) Find the measure of $\angle A$.

    (c) Write down the value of $\tan A$.

    (d) Find the measure of $\angle B$.

8. From the top of a hill a dog is visible at an angle of depression of $34°$. If the hill is 11 meters tall, determine the distance from the dog to the base of the hill, x, to the *nearest foot*.

Angle of depression $= 34°$
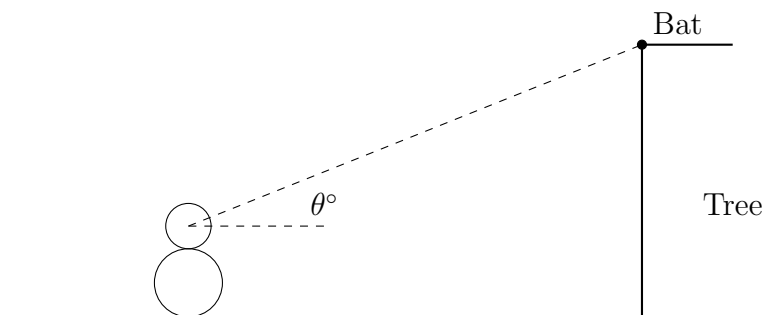
$h = 11$

Dog

x

9. A bear is standing 22 feet away from the base of a tree, looking up at a bat 16 feet off the ground. The bear is 5 feet tall.
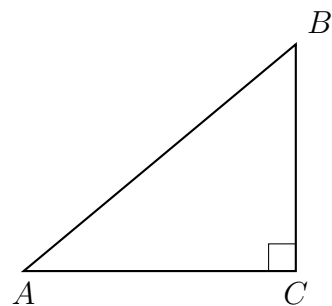
(a) Mark the scenario.

(b) Find the angle of elevation the bear views the bat, θ, to the nearest tenth degree.

(not drawn to scale)

Bat

$\theta°$

Tree

10. The right $\triangle ABC$ has a base of $AC = 6$ units. The area of the triangle is 15 square units. Find the lengths of all three sides and measures of all angles of the triangle. ("solve the triangle")
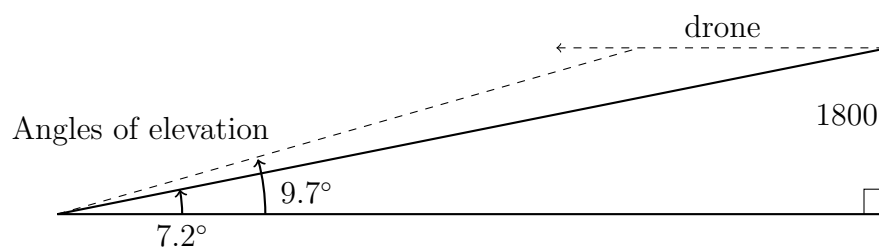
B

A   C

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11. A drone flying at an altitude of 1,800 meters is observed twice. The first time the angle of elevation is 7.2° and exactly one minute later the angle of elevation is 9.7°.

Find the distance the drone flies over the minute and its speed in kilometers per hour.

(not drawn to scale)

drone

Angles of elevation

1800

9.7°

7.2°

12. A square is partitioned into two rectangles. The sum of the perimeters of the two rectangles is 36. Find the area of the square.