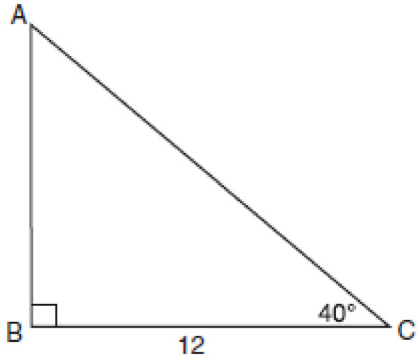
Name: _____

A.A.44: Using Trigonometry to Find a Side 2: Find the measure of a side of a right triangle, given an acute angle and the length of another side

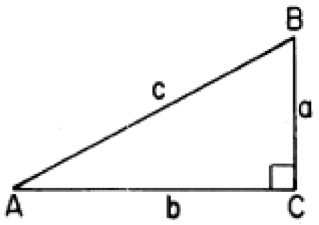
1 In the accompanying diagram of right triangle ABC, $BC = 12$ and $m\angle C = 40$.



Which single function could be used to find AB?

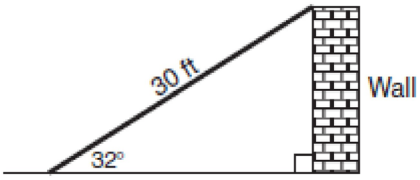
1) $\tan 50$
2) $\sin 50$
3) $\cos 40$
4) $\sin 40$

2 In right triangle ABC, $m\angle C = 90$. Which equation is true for this triangle?



1) $a = b\sin A$
2) $a = c\tan A$
3) $a = c\cos A$
4) $a = c\sin A$

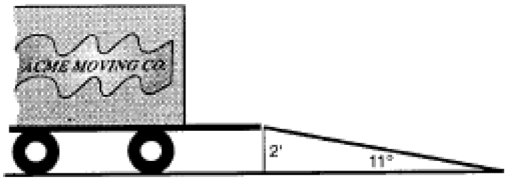
3 The accompanying diagram shows a ramp 30 feet long leaning against a wall at a construction site.



If the ramp forms an angle of 32° with the ground, how high above the ground, to the *nearest tenth*, is the top of the ramp?

1) 15.9 ft
2) 18.7 ft
3) 25.4 ft
4) 56.6 ft

4 The tailgate of a truck is 2 feet above the ground. The incline of a ramp used for loading the truck is 11°, as shown below.



Find, to the *nearest tenth of a foot*, the length of the ramp.

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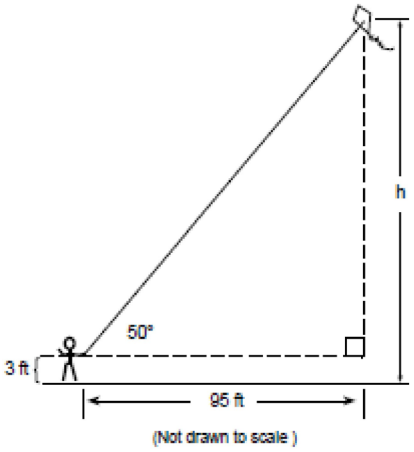
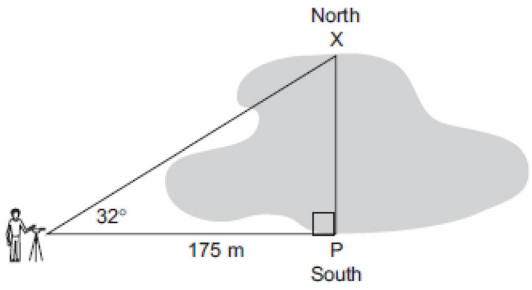
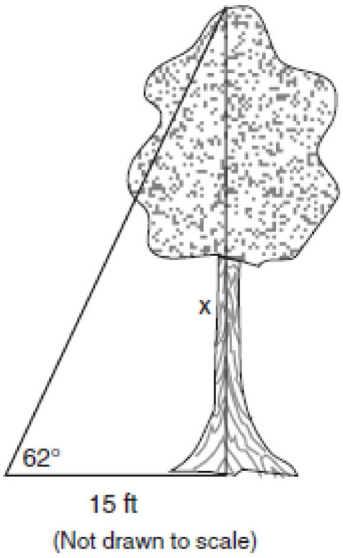
5 Joe is holding his kite string 3 feet above the ground, as shown in the accompanying diagram. The distance between his hand and a point directly under the kite is 95 feet. If the angle of elevation to the kite is 50°, find the height, *h*, of his kite, to the *nearest foot.*



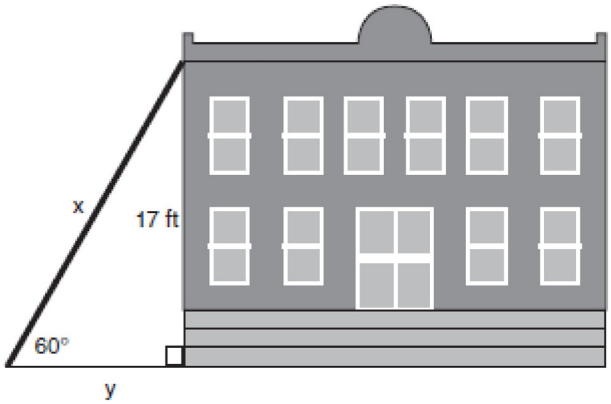
6 A surveyor needs to determine the distance across the pond shown in the accompanying diagram. She determines that the distance from her position to point *P* on the south shore of the pond is 175 meters and the angle from her position to point *X* on the north shore is 32°. Determine the distance, *PX,* across the pond, rounded to the *nearest meter*.



7 Find, to the *nearest tenth of a foot*, the height of the tree represented in the accompanying diagram.



8 In the accompanying diagram, *x* represents the length of a ladder that is leaning against a wall of a building, and *y* represents the distance from the foot of the ladder to the base of the wall. The ladder makes a 60° angle with the ground and reaches a point on the wall 17 feet above the ground. Find the number of feet in *x* and *y*.



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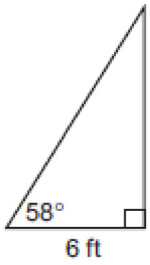
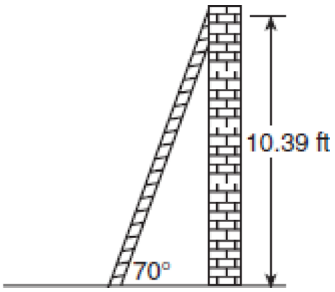
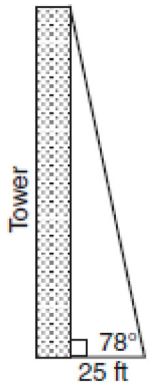
9 In the accompanying diagram, a ladder leaning against a building makes an angle of 58º with level ground. If the distance from the foot of the ladder to the building is 6 feet, find, to the *nearest foot*, how far up the building the ladder will reach.



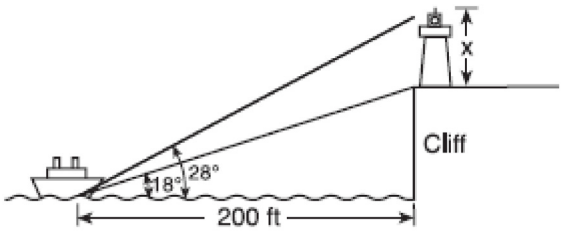
10 As shown in the accompanying diagram, a ladder is leaning against a vertical wall, making an angle of 70° with the ground and reaching a height of 10.39 feet on the wall. Find, to the nearest foot, the length of the ladder. Find, to the nearest foot, the distance from the base of the ladder to the wall.



11 From a point on level ground 25 feet from the base of a tower, the angle of elevation to the top of the tower is 78°, as shown in the accompanying diagram. Find the height of the tower, to the *nearest tenth of a foot*.



12 A lighthouse is built on the edge of a cliff near the ocean, as shown in the accompanying diagram. From a boat located 200 feet from the base of the cliff, the angle of elevation to the top of the cliff is 18° and the angle of elevation to the top of the lighthouse is 28°. What is the height of the lighthouse, *x*, to the nearest tenth of a foot?



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Answer Section

1 ANS: 1 PTS: 2 REF: 010926a
2 ANS: 4 PTS: 2 REF: 018933siii
3 ANS: 1

$$\sin 32 = \frac{x}{30}$$
$$x \approx 15.9$$

PTS: 2 REF: 080724a
4 ANS:

10.5. $\sin 11 = \frac{2}{x}$
$x \approx 10.5$

PTS: 2 REF: spring9825a
5 ANS:

116. $\tan 50 = \frac{\text{opposite}}{95}$ $h \approx 113 + 3 \approx 116$
$\text{opposite} \approx 113$

PTS: 4 REF: 069934a
6 ANS:

109. $\tan 32 = \frac{\text{opposite}}{175}$
$\text{opposite} \approx 109$

PTS: 3 REF: 060030a
7 ANS:

28.2. $\tan 62 = \frac{x}{15}$
$x \approx 28.2$

PTS: 4 REF: 010135a
8 ANS:

$x = 19.6$ and $y = 9.8$. $\sin 60 = \frac{17}{x}$ $\tan 60 = \frac{17}{y}$
$x \approx 19.6$ $y \approx 9.8$

PTS: 4 REF: 080231a

9 ANS:

10. $\tan 58 = \dfrac{\text{opposite}}{6}$

$\text{opposite} \approx 10$

PTS: 2 REF: 010531a

10 ANS:

Length of ladder = 11 and distance from the base of the ladder to the wall = 4. $\sin 70 = \dfrac{10.39}{\text{hypotenuse}}$.

$\text{hypotenuse} \approx 11$

$\tan 70 = \dfrac{10.39}{\text{adjacent}}$

$\text{adjacent} \approx 4$

PTS: 4 REF: 010638a

11 ANS:

117.6. $\tan 78 = \dfrac{\text{opposite}}{25}$

$\text{opposite} \approx 117.6$

PTS: 2 REF: 010735a

12 ANS:

41.4. $\tan 18 = \dfrac{x}{200}$ $\tan 28 = \dfrac{x}{200}$ $106.34 - 64.98 \approx 41.4$

$x \approx 64.98$ $x \approx 106.34$

PTS: 4 REF: 010837a