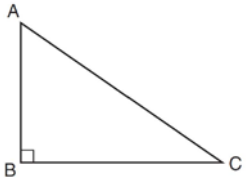
Name: _____

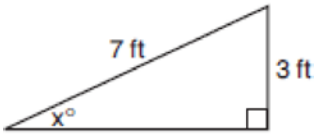
G.SRT.C.8: Using Trigonometry to Find an Angle 2

1 In right triangle ABC shown below, $AC = 29$ inches, $AB = 17$ inches, and $m\angle ABC = 90$. Find the number of degrees in the measure of angle BAC, to the *nearest degree*.

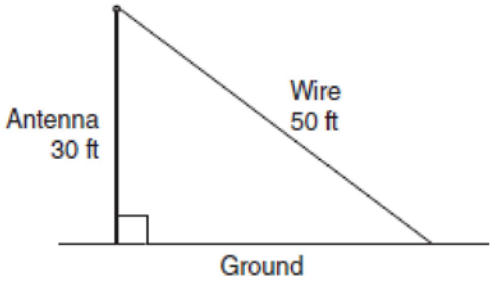


Find the length of $\overline{BC}$ to the *nearest inch*.

2 Ron and Francine are building a ramp for performing skateboard stunts, as shown in the accompanying diagram. The ramp is 7 feet long and 3 feet high. What is the measure of the angle, x, that the ramp makes with the ground, to the *nearest tenth of a degree?*

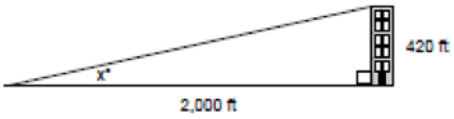


3 A communications company is building a 30-foot antenna to carry cell phone transmissions. As shown in the diagram below, a 50-foot wire from the top of the antenna to the ground is used to stabilize the antenna.



Find, to the *nearest degree,* the measure of the angle that the wire makes with the ground.

4 A person standing on level ground is 2,000 feet away from the foot of a 420-foot-tall building, as shown in the accompanying diagram. To the *nearest degree*, what is the value of x?



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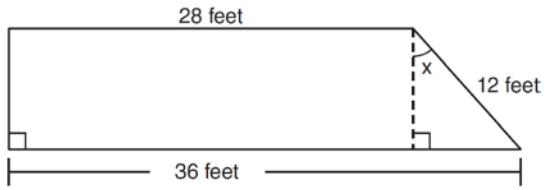
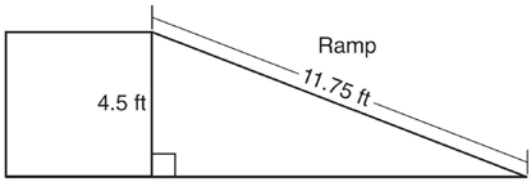
5 A trapezoid is shown below.



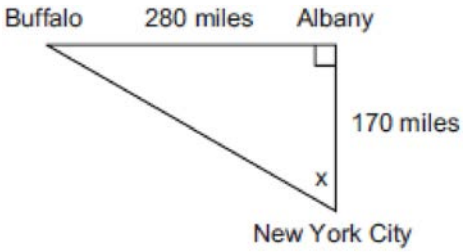
Calculate the measure of angle x, to the *nearest tenth of a degree*.

6 The diagram below shows a ramp connecting the ground to a loading platform 4.5 feet above the ground. The ramp measures 11.75 feet from the ground to the top of the loading platform.



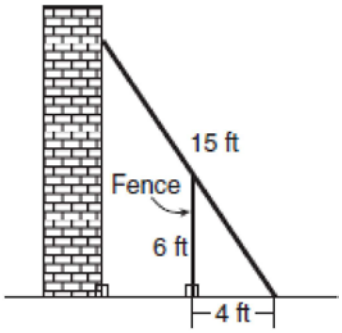
Determine and state, to the *nearest degree*, the angle of elevation formed by the ramp and the ground.

7 As seen in the accompanying diagram, a person can travel from New York City to Buffalo by going north 170 miles to Albany and then west 280 miles to Buffalo.



If an engineer wants to design a highway to connect New York City directly to Buffalo, at what angle, x, would she need to build the highway? Find the angle to the *nearest degree*. To the *nearest mile*, how many miles would be saved by traveling directly from New York City to Buffalo rather than by traveling first to Albany and then to Buffalo?

8 In the accompanying diagram, the base of a 15-foot ladder rests on the ground 4 feet from a 6-foot fence.



a If the ladder touches the top of the fence and the side of a building, what angle, to the *nearest degree*, does the ladder make with the ground?

b Using the angle found in part *a*, determine how far the top of the ladder reaches up the side of the building, to the *nearest foot*.

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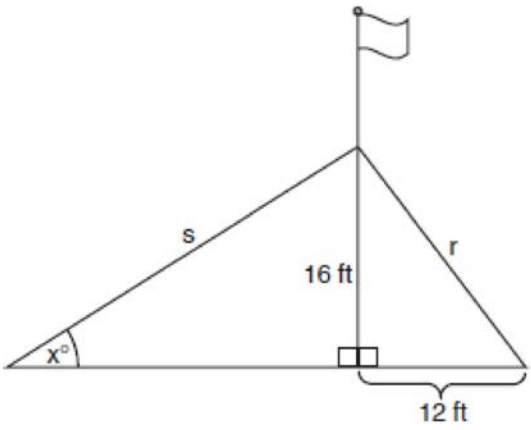
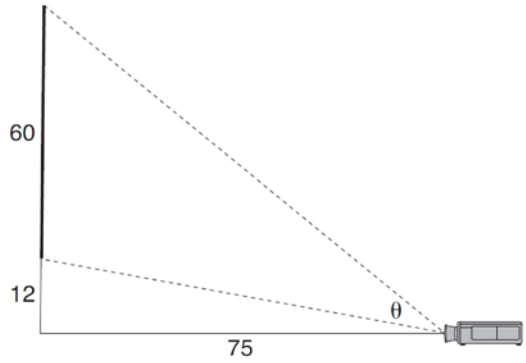
9 The accompanying diagram shows a flagpole that stands on level ground. Two cables, *r* and *s*, are attached to the pole at a point 16 feet above the ground. The combined length of the two cables is 50 feet. If cable *r* is attached to the ground 12 feet from the base of the pole, what is the measure of the angle, *x*, to the *nearest degree*, that cable *s* makes with the ground?



10 As modeled below, a movie is projected onto a large outdoor screen. The bottom of the 60-foot-tall screen is 12 feet off the ground. The projector sits on the ground at a horizontal distance of 75 feet from the screen.



Determine and state, to the *nearest tenth of a degree*, the measure of θ, the projection angle.

11 In right triangle ABC, $AB = 20$, $AC = 12$, $BC = 16$, and $m\angle C = 90$. Find, to the *nearest degree*, the measure of $\angle A$.

12 A ladder leans against a building. The top of the ladder touches the building 10 feet above the ground. The foot of the ladder is 4 feet from the building. Find, to the *nearest degree*, the angle that the ladder makes with the level ground.

13 A 28-foot ladder is leaning against a house. The bottom of the ladder is 6 feet from the base of the house. Find the measure of the angle formed by the ladder and the ground, to the *nearest degree*.

14 A man standing on level ground is 1000 feet away from the base of a 350-foot-tall building. Find, to the *nearest degree*, the measure of the angle of elevation to the top of the building from the point on the ground where the man is standing.

G.SRT.C.8: Using Trigonometry to Find an Angle 2
Answer Section

1 ANS:

54, 23. $\cos A = \frac{17}{29}$. $\sqrt{29^2 - 17^2} \approx 23$

$x \approx 54$

REF: 081238ia

2 ANS:

25.4. $\sin x = \frac{3}{7}$

$x \approx 25.4$

REF: 060735a

3 ANS:

$\sin x = \frac{30}{50}$

$x = \sin^{-1} \frac{3}{5}$

$x \approx 37$

REF: 061033ia

4 ANS:

12. $\tan x = \frac{420}{2000}$

$x \approx 12$

REF: 089927a

5 ANS:

41.8. $\sin x = \frac{8}{12}$

$A \approx 41.8$

REF: 081135ia

6 ANS:

$\sin x = \frac{4.5}{11.75}$

$x \approx 23$

REF: 061528geo

7 ANS:

59, 122. $\tan x = \frac{280}{170}$. $x \approx 59$ $a^2 + b^2 = c^2$ $170^2 + 280^2 = c^2$ $c \approx 328$. The trip from New York City to Buffalo via Albany is 450 (280 + 170) miles. Therefore traveling directly to Buffalo would save (450 – 328) 122 miles.

REF: 060231a

8 ANS:

56, 12. $\tan x = \frac{6}{4}$. $x \approx 56$ $\sin 56 = \frac{\text{opposite}}{15}$ $\text{opposite} \approx 12$

REF: 010438a

9 ANS:

32. $a^2 + b^2 = c^2$ $12^2 + 16^2 = c^2$ $c = 20$. If the combined length of the two cables is 50 feet, then *s* is 30 (50 – 20) feet. $\sin x = \frac{16}{30}$ $x \approx 32$

REF: 060539a

10 ANS:

$\tan x = \frac{12}{75}$ $\tan y = \frac{72}{75}$ $43.83 - 9.09 \approx 34.7$

$x \approx 9.09$ $y \approx 43.83$

REF: 081634geo

11 ANS:

53. $\sin A = \frac{16}{20}$

$A \approx 53$

REF: 011032ia

12 ANS:

$\tan x = \frac{10}{4}$

$x \approx 68$

REF: 061630geo

13 ANS:

78. $\cos x = \frac{6}{28}$

$x \approx 78$

REF: 061235ia

14 ANS:

$\tan x = \dfrac{350}{1000}$

$x \approx 19$

REF: 061335ia