Geometry 21:   Review sheet   for   TEST chapter 8

In $\triangle ABC$, $AC \perp BC$, CD is the altitude to AB. Using the given information, determine the following measures:
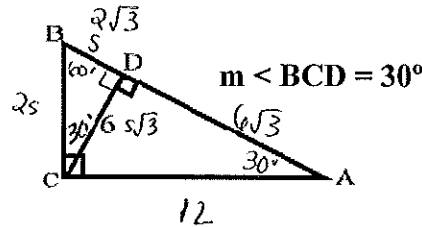
1.   AB ___$8\sqrt{3}$___

$\dfrac{S\sqrt{3}}{\sqrt{3}} = \dfrac{6}{\sqrt{3}}$

$S = \dfrac{6\sqrt{3}}{3} = 2\sqrt{3}$

m < BCD = 30°

2.   BC ___$4\sqrt{3}$___

12

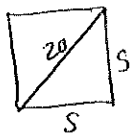3.   AD ___$6\sqrt{3}$___   4.   DB ___$2\sqrt{3}$___   5. AC ___12___

Sketch the figure that is described. Find the requested length then find the area and perimeter of the figure.
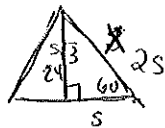
10. The diagonal of a square is 20 centimeters. Find the length of a side.

$S\sqrt{2} = 20$

$S = \dfrac{20}{\sqrt{2}}$

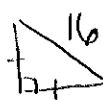$\dfrac{20\sqrt{2}}{2} = \boxed{10\sqrt{2}}$

11. The altitude of an equilateral triangle is 24 inches. Find the length of a side.

$S\sqrt{3} = 24$

$\dfrac{24\sqrt{3}}{3} = \boxed{8\sqrt{3}}$

12. The hypotenuse of an isosceles right triangle is 16 centimeters. Find the length of a side.

$16 = S\sqrt{2}$

$\dfrac{16\sqrt{2}}{2} = \boxed{8\sqrt{2}}$

~Determine whether the triangle is right, acute or obtuse. (Show your work!) *(2 pts each)*

15.   14, 27, 30 ___acute___

$30^2 \bigcirc 14^2 + 27^2$

$900 \boxed{<} 925$

16. 30, 50, 40 ___Right___

$50^2 \boxed{=} 30^2 + 40^2$

17.   14, 48, 52 ___obtuse___

$52^2 \boxed{>} 14^2 + 48^2$

$2704 \qquad 2500$

18. $\sqrt{22}$, $2\sqrt{3}$, $3\sqrt{7}$ ___obtuse___

$4.7 \quad 3.46 \quad 7.9$

$(3\sqrt{7})^2 \boxed{>} (\sqrt{22})^2 + (2\sqrt{3})^2$

$9.7 \qquad 22 + (4.3)$
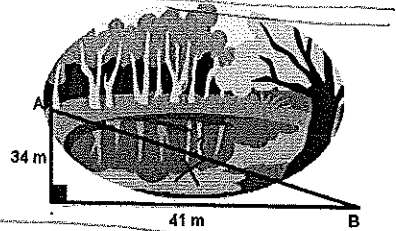
$\boxed{63} \qquad 12 \qquad = \boxed{34}$

21) To get from point A to point B you must avoid walking through a pond. To avoid the pond, you must walk 34 meters south and 41 meters east. To the *nearest meter*, how many meters would be saved if it were possible to walk through the pond?

$$34^2 + 41^2 = x^2$$
$$2837 = x^2$$
$$x = 53.26$$

$$\begin{array}{r} 34 \\ +41 \\ \hline 75 \end{array}$$
$$-53.26$$

21.74 m would be saved

22) A baseball diamond is a square with sides of 90 feet. What is the shortest distance, to the *nearest tenth* of a foot, between first base and third base?
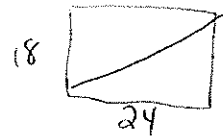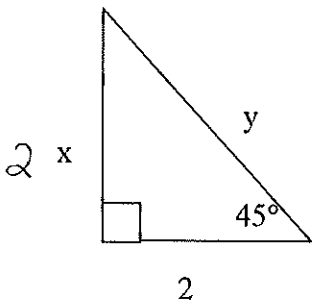
90

$$90^2 + 90^2 = x^2$$
$$16200 = x^2$$

127.28 ft

23) A suitcase measures 24 inches long and 18 inches high. What is the diagonal length of the suitcase to the *nearest tenth* of a foot?

18
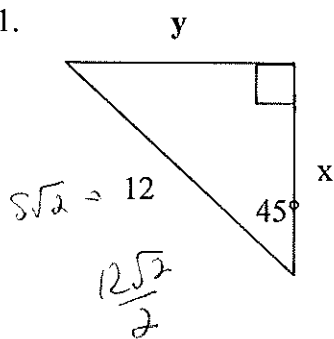24

30 in

Find the missing sides of the triangles. Leave answer in simplified radical form.
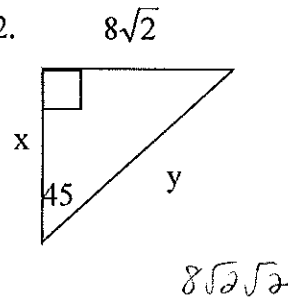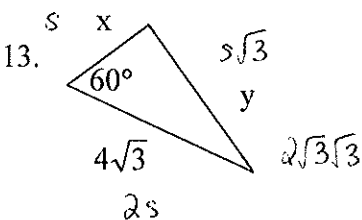
10.

2   x
45°
2

$$X = \underline{2} \quad Y = \underline{2\sqrt{2}}$$

11.

y
$5\sqrt{2} = 12$
45°
$\frac{12\sqrt{2}}{2}$
x

$$X = \underline{6\sqrt{2}} \quad Y = \underline{6\sqrt{2}}$$

12.

$8\sqrt{2}$
x
45
y
$8\sqrt{2}\sqrt{2}$

$$X = \underline{8\sqrt{2}} \quad Y = \underline{16}$$

13.

s   x
60°
$5\sqrt{3}$
y
$4\sqrt{3}$
$2\sqrt{3}\sqrt{3}$
2s

$$X = \underline{2\sqrt{3}} \quad Y = \underline{6}$$

14.

s
2
60°
x
y

$$X = \underline{2\sqrt{3}} \quad Y = \underline{4}$$

15.

2s
60°
$16\sqrt{3}$
s   y
x
$5\sqrt{3}$

$$X = \underline{24} \quad Y = \underline{8\sqrt{3}}$$

Name _____ Class _____ Date _____
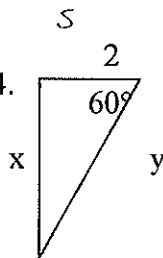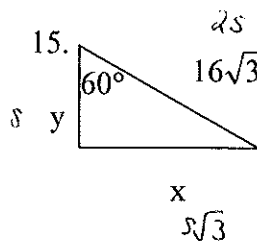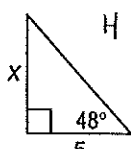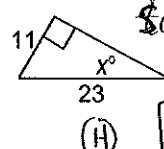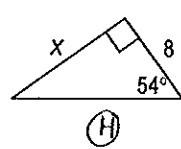
Extra Practice (continued)
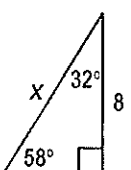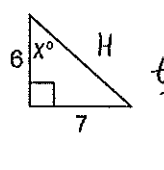
Chapter 8

Lessons 8-3

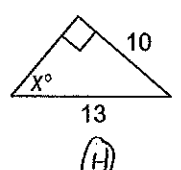Find the value of x. Round lengths of segments to the nearest tenth and angle measures to the nearest degree.

20.

$\tan 48 = \frac{x}{5}$
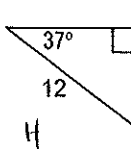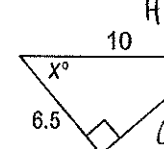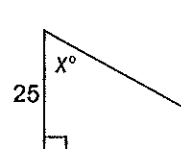
$\boxed{5.55}$

21.

$\sin x = \frac{11}{23}$

(H) $\boxed{28.57}$

22.

$\tan 54 = \frac{x}{8}$

(H) $\boxed{11.01}$

23.

(H)

$\sin 58 = \frac{8}{x}$ $\boxed{9.43}$

or $\cos 32 = \frac{8}{x}$

24.

$\tan x = \frac{7}{6}$

$\boxed{49.4}$

25.

$\sin x = \frac{10}{13}$

(H)

26.

$\sin 37 = \frac{x}{12}$

27.

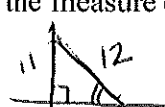$\cos x = \frac{6.5}{10}$

28.

$\tan x = \frac{47}{25}$
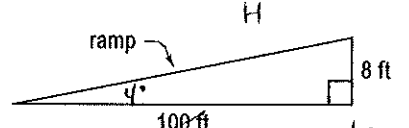
29. An architect includes wheelchair ramps in her plans for the entrance to a new museum. She wants the angle that the ramp makes with level ground to measure 4°. Will the dimensions shown in the figure work? If not, what change should she make?

No change dist. to 114.4 ft

$\tan 4 = \frac{8}{x}$
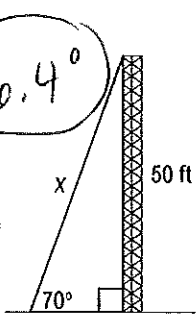
30. A 12-ft ladder is propped against a vertical wall. The top end is 11 ft above the ground. What is the measure of the angle formed by the ladder with the ground?

$\sin x = \frac{11}{12}$

$\boxed{66.4°}$

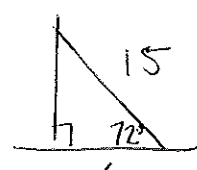31. How long is the guy wire shown in the figure if it is attached to the top of a 50-ft antenna and makes a 70° angle with the ground? Round to the nearest tenth.

$\sin 70 = \frac{50}{x}$

$\boxed{53.21 \text{ ft}}$

32. A 15-ft ladder is propped against a vertical wall and makes a 72° angle with the ground. How far is the foot of the ladder from the base of the wall? Round to the nearest tenth.
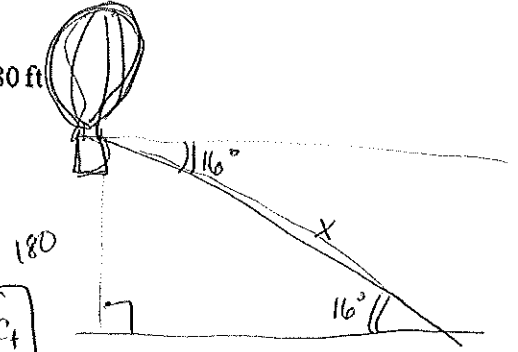
Lessons 8-4

Solve each problem. Round your answers to the nearest foot.

33. A couple is taking a balloon ride. After 25 minutes aloft, they measure the angle of depression from the balloon to its launch place as 16°. They are 180 ft above ground. Find the distance from the balloon to its launch place.
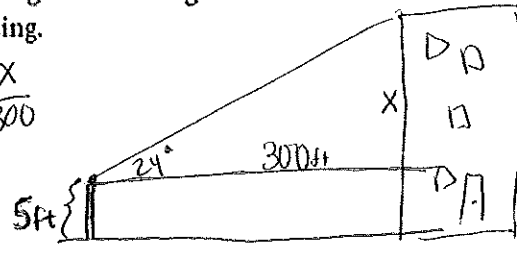
$$\frac{\sin 16}{1} = \frac{180}{x}$$

$$653.03 \approx \boxed{653 \text{ ft}}$$

34. A surveyor is 300 ft from the base of an apartment building. The angle of elevation to the top of the building is 24°, and her angle-measuring device is 5 ft above the ground. Find the height of the building.
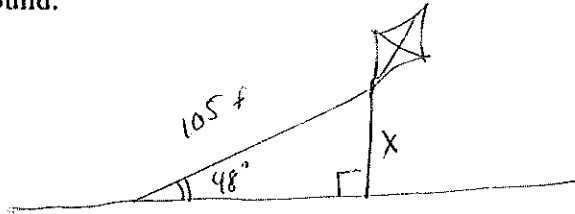
$$\frac{\tan 24}{1} = \frac{x}{300}$$

$$133.57$$
$$+ \quad 5$$
$$138.57 \approx \boxed{139 \text{ ft}} \quad 5\text{ft}$$

35. Your friend is flying a kite. She lets out 105 ft of string and anchors it to the ground. She determines that the angle of elevation of the kite is 48°. Find the height the kite is from the ground.
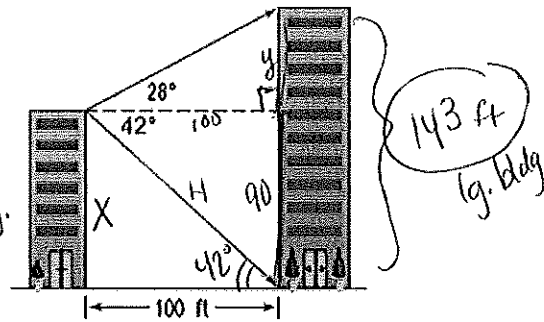
$$78.03 \approx \boxed{78 \text{ ft}}$$

$$\frac{\sin 48}{1} = \frac{x}{105}$$

36. Two office buildings are 100 ft apart. From the edge of the shorter building, the angle of elevation to the top of the taller building is 28°, and the angle of depression to the bottom is 42°. How tall is each building? Round to the nearest foot.

$$\frac{\tan 42}{1} = \frac{x}{100} \qquad 100 \tan 42 = \boxed{90 \text{ ft}} \text{ sm. bldg.}$$

$$\frac{\tan 28}{1} = \frac{y}{100} = 53.17$$

$$\boxed{143 \text{ ft}} \text{ lg. bldg}$$

37. A plane flying at 10,000 ft spots a hot air balloon in the distance. The balloon is 9000 ft above ground. The angle of depression from the plane to the balloon is 30°. Find the distance from the plane to the balloon.

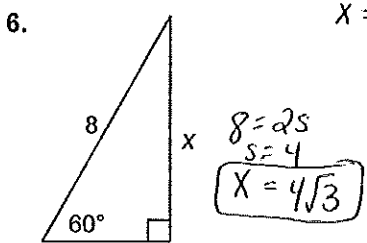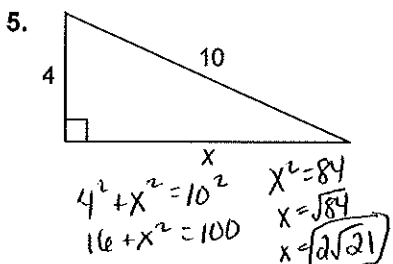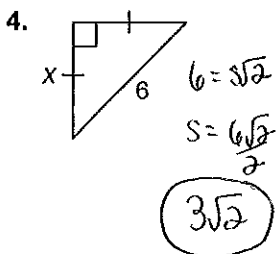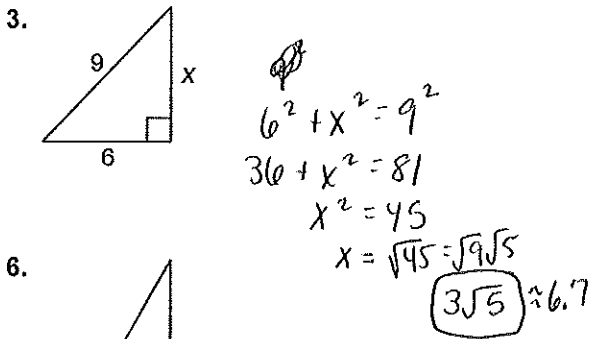$$\frac{\sin 30}{1} = \frac{1000}{x}$$
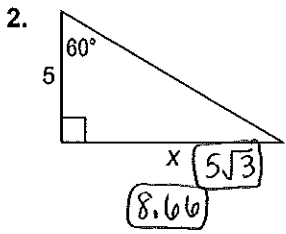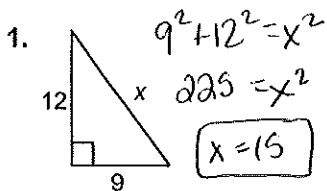
$$\boxed{2000 \text{ ft}}$$
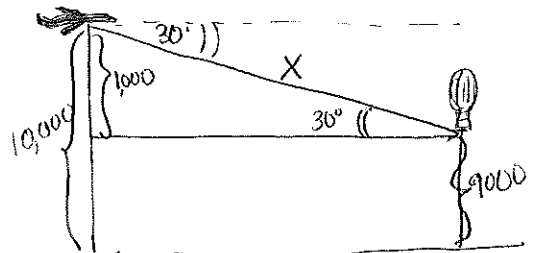
Extra Practice

Chapter 8

Lessons 8-1 and 8-2

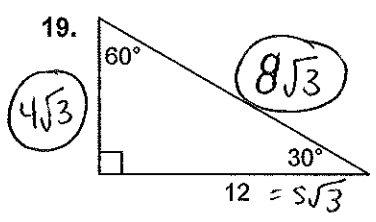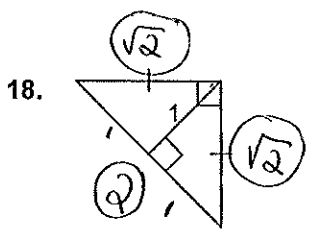Find the value of x. If your answer is not a whole number, leave it in simplest radical form.

1.

$9^2 + 12^2 = x^2$

$225 = x^2$

$\boxed{x = 15}$

12   x 9

2.

60°

5   x $\boxed{5\sqrt{3}}$

$\boxed{8.66}$

3.

9   x

6

$6^2 + x^2 = 9^2$

$36 + x^2 = 81$

$x^2 = 45$

$x = \sqrt{45} = \sqrt{9\sqrt{5}}$

$\boxed{3\sqrt{5}} \approx 6.7$

4.

x 6

$6 = s\sqrt{2}$

$s = \dfrac{6\sqrt{2}}{2}$

$\boxed{3\sqrt{2}}$

5.

4   10

x

$4^2 + x^2 = 10^2$ $x^2 = 84$

$16 + x^2 = 100$ $x = \sqrt{84}$

$\boxed{x = 2\sqrt{21}}$

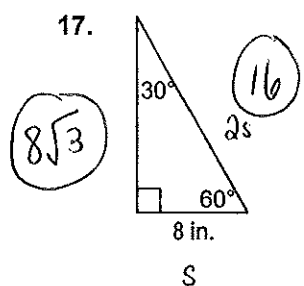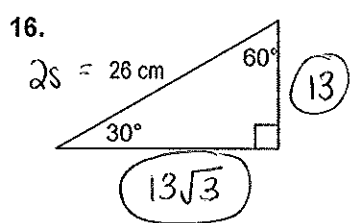**6.**

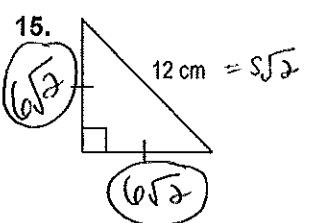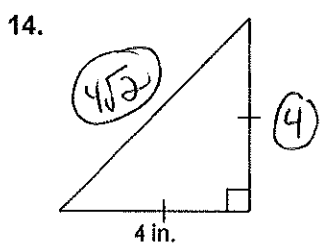8 x

60°

$8 = 2s$

$s = 4$

$\boxed{X = 4\sqrt{3}}$

7. A rectangular lot is 165 feet long and 90 feet wide. How many feet of fencing are needed to make a diagonal fence for the lot? Round to the nearest foot.

165   90   90

$90^2 + 165^2 = d^2$

$8100 + 27225 = d^2$

$d = \sqrt{35325}$

$\approx \boxed{188}$
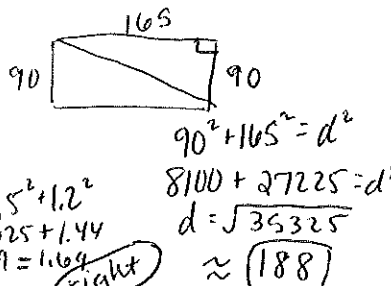
The lengths of the sides of a triangle are given. Classify each triangle as *acute*, *right*, or *obtuse*.

8. 3, 5, 7 7^2 ⃝ $3^2 + 5^2$ (obtuse) $49 > 9 + 25 = 34$

9. 8, 9, 11 11^2 ⃝ $8^2 + 9^2$ (acute) $121 < 64 + 81 = 145$

10. 0.5, 1.2, 1.3 $(1.3)^2$ ⃝ $5^2 + 1.2^2$ $.25 + 1.44$ $1.69 = 1.69$ (right)

11. $\sqrt{5}$, 4, 5 5^2 ⃝ $4^2 + \sqrt{5}^2$ (obtuse) $25 > 16 + 5 = 21$

12. $\sqrt{3}$, 3, $\sqrt{3}$ 3^2 ⃝ $(\sqrt{3})^2 + (\sqrt{3})^2$ (obtuse) $9 > 3 + 3 = 6$

13. 24, 32, 38 38^2 ⃝ $24^2 + 32^2$ (acute) $376 + 1024$ $1444 < 1600$

Find the missing side lengths. Give answers in simplest radical form if necessary.

14.

$\boxed{4\sqrt{2}}$ $\boxed{4}$

4 in.

15.

$\boxed{6\sqrt{2}}$ 12 cm $= s\sqrt{2}$

$\boxed{6\sqrt{2}}$

$\boxed{\sqrt{2}}$

16.

$2s = 26$ cm   60°

30°

$\boxed{13}$

$\boxed{13\sqrt{3}}$

17.

30° $\boxed{16}$

$\boxed{8\sqrt{3}}$ $2s$

60°

8 in.

s

18.

1

$\boxed{\sqrt{2}}$

$\boxed{\sqrt{2}}$ 1

19.

60°

$\boxed{4\sqrt{3}}$ $\boxed{8\sqrt{3}}$

30°

12 $= s\sqrt{3}$

$s = \dfrac{12}{\sqrt{3}} \cdot \dfrac{\sqrt{3}}{\sqrt{3}} = \dfrac{12\sqrt{3}}{3} = 4\sqrt{3}$

5) A lighthouse is 32 feet tall and someone at the top of the lighthouse sees a boat that needs help. The **angle of depression** from the top of the lighthouse is 19 . How far will the person have to row to get to the boat to help them?
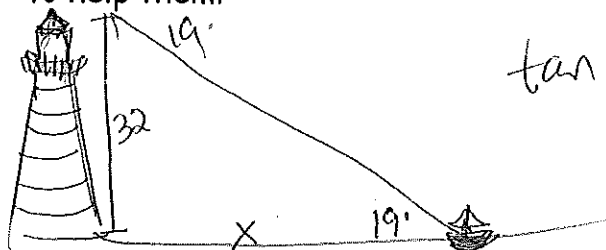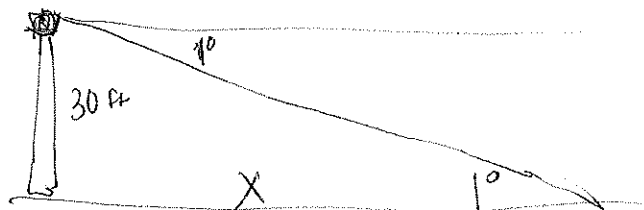
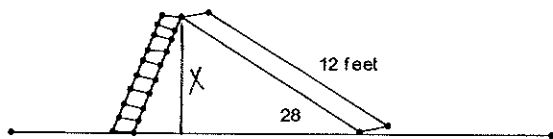

$$\tan 19 = \frac{32}{x}$$

$$x = \underline{92.93} \ ft$$

6) The height of an observation tower in a state park is 30 feet. A ranger at the top of the tower sees a fire along a line of sight that is at a 1 degree angle of depression. How far is the fire from the base of the tower?

$$\tan 1° = \frac{30}{x}$$
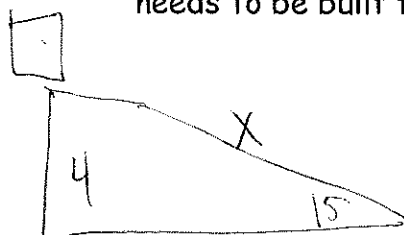

The fire is _1718.7_ feet from the base of the tower.

6) A slide is 12 feet long and meets the ground at a 28 degree angle.

$$\sin 28 = \frac{x}{12}$$
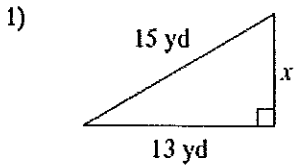
The slide is about _5.63_ feet tall.

7) A handicap ramp needs to meet the ground at a 15 degree angle. A ramp needs to be built to a door that is 4 feet off the ground.
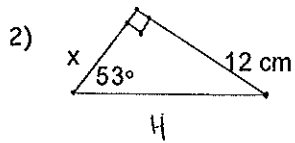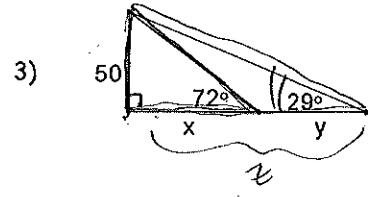

The ramp must be _15.45_ feet long.

$$\sin 15 = \frac{4}{x}$$
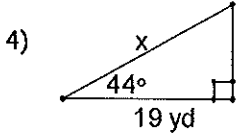
Mixed Practice: *Find the missing side lengths:*

1)

15 yd, 13 yd, x

equation $\dfrac{13^2 + x^2 = 15^2}{x^2 = 56}$ $x = \boxed{3\sqrt{6}}$ (7.48)

2)

x, 53°, 12 cm, H

equation $\dfrac{\tan 53 = \dfrac{12}{x}}{1}$ $x = \boxed{9.04}$

$12 \div \tan 53$

3)

50, 72°, 29°, x, y, z

(x) equation $\dfrac{\tan 72 = \dfrac{50}{x}}{1}$ $x = \boxed{16.25}$

(y) equation $\dfrac{\tan 29}{1} = \dfrac{50}{z}$ $y = \boxed{73.95}$

90.2

4)

x, 44°, 19 yd

equation $\dfrac{\cos 44 = \dfrac{19}{x}}{1}$ $x = \boxed{26.41}$

5)

42, 68°, 24°, x, y

$z = 94.33$
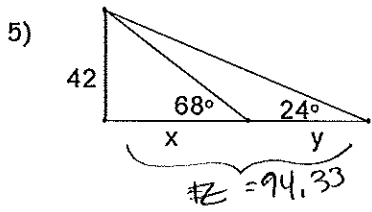
(x) equation $\dfrac{\tan 68 = \dfrac{42}{x}}{1}$ $x = \boxed{16.97}$

(y) equation $\dfrac{\tan 24}{1} = \dfrac{42}{x}$ $y = \boxed{77.36}$

6)

24 in, 7
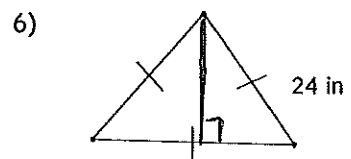
find the height of this triangle

(to the nearest tenth) $\underline{12\sqrt{3}}$

$\boxed{20.78}$

30

Find the value of each variable. If your answer is not an integer, express it in simplest radical form.

7.

45° 45°, $b = 20\sqrt{2}$, a, 45°, 45°, $20\sqrt{2}$, c

$\dfrac{s\sqrt{a}}{\sqrt{3}} = \dfrac{20}{\sqrt{3}}$

$\dfrac{20\sqrt{2}}{2}$

$a = \dfrac{20\sqrt{2}}{2} = \boxed{10\sqrt{2}}$

$b = 2(10\sqrt{2}) = \boxed{20\sqrt{2}}$

8.

$18\sqrt{2}$, a, $c = 6\sqrt{3}$, 18, 45°, 60°, 18, b

$18 = s\sqrt{3}$ $b = 6\sqrt{3}$

$s = \dfrac{18\sqrt{3}}{3}$ $c = 12\sqrt{3}$

$s = 6\sqrt{3}$

9.

$5\sqrt{3}$, 60°, $30 - 5\sqrt{3}$, 15, $\dfrac{5\sqrt{3}}{3}$, $a = \boxed{15}$
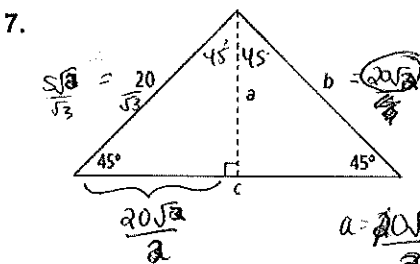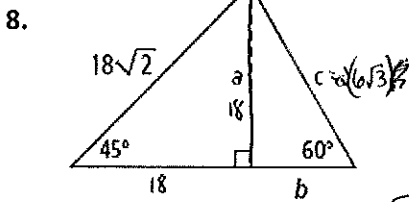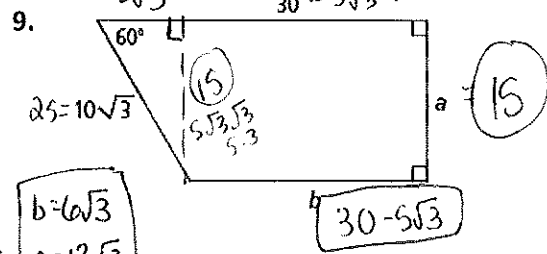
$25 = 10\sqrt{3}$
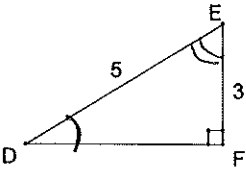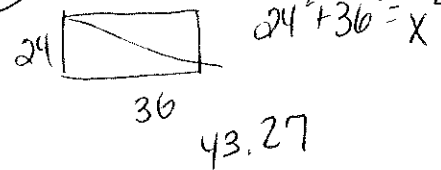
$b = \boxed{30 - 5\sqrt{3}}$

Solve.

10. If the diagonal of a square is 9 units long, how long is each side? $\dfrac{9\sqrt{2}}{2}$ $\boxed{9}$

11. If the side of a square is 7 units long, how long is the diagonal? $\underline{7\sqrt{2}}$

12. A rectangular suitcase measures 2 feet by 3 feet. Can an umbrella that is 42 inches long be packed lying flat in the suitcase? $\boxed{yes}$

24, 36, $24^2 + 36^2 = x^2$ 43.27

Find each angle measure:

E, 5, 3, D, F

$\sin \angle D = \dfrac{3}{5}$ $\cos \angle E = \dfrac{3}{5}$

$\sin^{-1}\left(\dfrac{3}{5}\right)$ $\cos^{-1}\left(\dfrac{3}{5}\right)$

13) m < D = $\boxed{38.87°}$ 14) m< E = $\boxed{53.13°}$

$\ast$ inverse button!

Name _____

Applications of Trigonometry
8.3-8.4

Use the diagrams below to solve:

1)

B

17

8

A   15   C
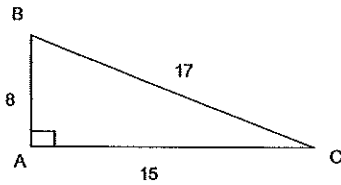
$\sin B = \underline{15/17}$ $\cos B = \underline{8/17}$ $\tan B = \underline{15/8}$

$m < B = \underline{61.9}°$ $m < C = \underline{28.1}°$ $\sin C = 8/17$

2)

20

52   36

x   y

$\tan 52 = \dfrac{20}{x}$ $\tan 36 = \dfrac{20}{w}$ $x = \underline{15.63}$ $y = \underline{11.90}$

27.53
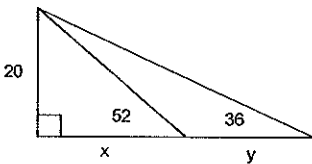
3)

An ornithologist is taking pictures of puffins on the edge of a cliff. To find the hight of the puffins above the water, she measures a 28 **angle of elevation** of her line of sight to the puffins. If her position is about 15 feet above the water and about 40 feet from the cliff, how high above the water are the puffins?

B ← puffins

photographer

X   28° C

40 ft   15 ft

A   D
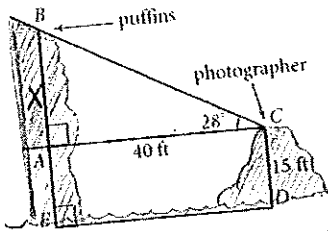
$\tan 28 = \dfrac{x}{40}$

$21.27 + 15$

The puffins are about __36.27__ above the water.

4)   An engineer stands 50 feet away from a building and sights the top of the building with a surveying device mounted on a tripod that is 5 feet tall. If the angle of elevation is 50°, how tall is the building?

X

50°

5   50
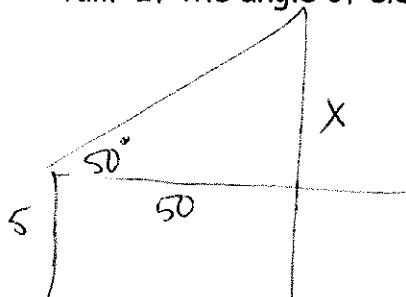
$\tan 50 = \dfrac{x}{50}$ 59.59 $+ 5$

The building is about __64.59 ft__ tall.