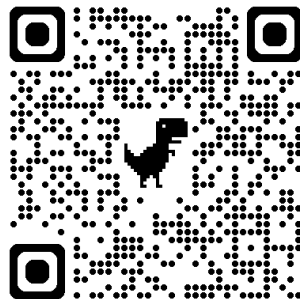# Common Core Geometry

Unit 5

Right Triangles

Mr. Schlansky

2025

Lesson 1: I can round by checking if the next digit is 5 or higher
Nearest unit (degree/inch/meter): 0 decimal places
Nearest tenth: 1 decimal place
Nearest hundredth: 2 decimal places
Nearest thousandth: 3 decimal places

-Underline the digit you are rounding to
-Draw a line after the digit you are rounding to.
-If the next digit is 5 or higher, the underlined number rounds up
*When you're rounding up a 9, look at it as one big number without the decimal point.
Example 12.3998
12399 rounds up to 12400 = 12.400

Lesson 2: I can find a missing side of a triangle using $a^2 + b^2 = c^2$.
If only sides are involved, use Pythagorean theorem! ($a^2 + b^2 = c^2$)
a,b are the legs
c is the hypotenuse (long slanted side opposite the right angle)

Lesson 3: I can set up trig ratios using SOHCAHTOA.
1) Label each side with H, A, and O
2) Use SOHCAHTOA ($\sin\theta = \dfrac{O}{H}$, $\cos\theta = \dfrac{A}{H}$, $\tan\theta = \dfrac{O}{A}$)

Lesson 4: I can find missing sides/angles using SOHCAHTOA.
If an angle is involved, use SOHCAHTOA
1) Label each side with H, A, and O
2) Determine whether to use sine, cosine, or tangent (Which two are involved?)
3) Substitute into appropriate formula
*If finding a side, cross multiply and solve
*If finding an angle, use $\sin^{-1}$, $\cos^{-1}$, or $\tan^{-1}$

Lesson 5: I can find missing sides and angles of right triangles using SOHCAHTOA and Pythagorean Theorem.
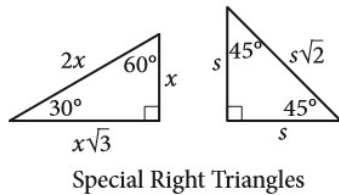If angle involved: SOHCAHTOA
*Refer to Lesson 4
If no angle involved: Pythagorean Theorem
*Refer to Lesson 2

Lesson 6: I can find missing sides of 30, 60, 90 and 45, 45, 90 triangles using $x, 2x, x\sqrt{3}$ and $x, x, x\sqrt{2}$

Special Right Triangles

30, 60, 90
The hypotenuse is double the short leg
The large leg is the short leg $\sqrt{3}$

45, 45, 90
The two legs are the same
The hypotenuse is the leg $\sqrt{2}$

If given the side containing the radical and it's not a radical, to find the small leg:
  1) Divide that number by the radical
  2) Rationalize (Multiply top and bottom by the radical)

Lesson 7: I can solve right triangle word problems using SOHCAHTOA.
Read carefully! Follow the same steps as lessons 1, 2, and 3.
The angle of elevation = the angle of depression

Lesson 8: I can solve right triangle word problems without pictures using SOHCAHTOA.
Draw a picture. Make your picture look like the situation. Follow the same steps as lessons 1, 2, and 3.

Lesson 9: I can solve compound right triangle problems using Subtraction Method
Compound Right Triangle Problems
Procedure 1: Subtraction: Find corresponding parts of the two triangles and subtract them.

Lesson 10: I can solve compound right triangle problems using Reflexive Method.
Procedure 2: Reflexive: Find a side/angle that's in both triangles. Use that new side/angle to find what you are looking for.

Lesson 11: I can solve complex right triangle problems using SOHCAHTOA and Pythagorean Theorem.
Problem solve and incorporate SOHCAHTOA and Pythagorean Theorem

Lesson 12: I can complete questions regarding acute angles of a right triangle using $\sin A = \cos B$ **and** $A + B = 90$.
$\sin A = \cos B$ **: In a right triangle, the sine of one acute angle is equal to the cosine of the other acute angle**
$A + B = 90$ **: The two acute angles in a right triangle are complementary**
A and B are the ACUTE ANGLES!!!!

Lesson 13: I can complete Trigonometry problems using similar triangles by drawing the triangles separately, transferring the corresponding values, and using SOHCAHTOA/sinA=cosB.
1) Draw the triangles separately
2) Transfer the corresponding values to both triangles
3) Apply SOHCAHTOA or $\sin A = \cos B$ depending on the problem.

Lesson 14: I can prepare for my exam by practicing!

Mr. Schlansky

Rounding

Round 104.9437 to the nearest:

1. Unit: 2. Tenth: 3. Hundredth: 4. Thousandth:

Round 28.3518 to the nearest:

5. Degree: 6. Tenth: 7. Hundredth: 8. Thousandth:

Round 54.8561 to the nearest:

9. Meter: 10. Tenth: 11. Hundredth: 12. Thousandth:

13. Round 59.61 to the nearest inch   14. Round 124.95 to the nearest tenth

15. Round 91.8995 to the nearest hundredth   16. Round 2.1999 to the nearest thousandth

Round the following numbers to the nearest unit

17. 12.92   18. 102.4   19. 47.251   20. 49.75

Round the following numbers to the nearest tenth

21. 15.718   22. 105.519   23. 89.253   24. 235.983

Round the following numbers to the nearest hundredth

25. 29.6901   26. 328.297   27. 181.406   28. 2.4951

Round the following numbers to the nearest thousandth

29. 209.6749   30. 0.57813   31. 111.1142   32. 3.1499

Pythagorean Theorem

Find the missing side of each right triangle rounding to the nearest tenth if necessary

1.

4, X, 3

2.

12, X, 5

3.

8, x, 17

4.

25, X, 7

5.

13, 10, x

6.

x, 15, 5
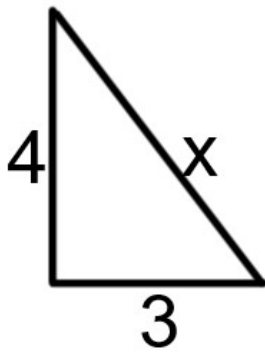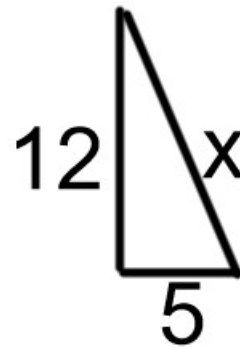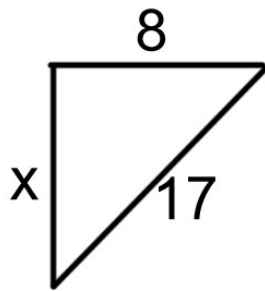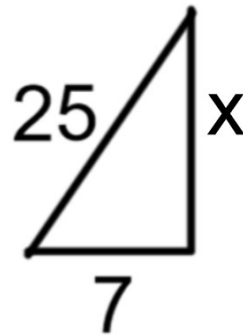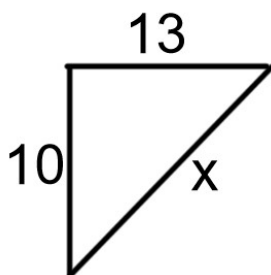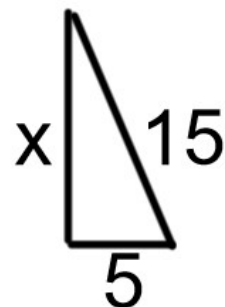
7. Tanya runs diagonally across a rectangular field that has a length of 40 yards and a width of 30 yards, as shown in the diagram below.
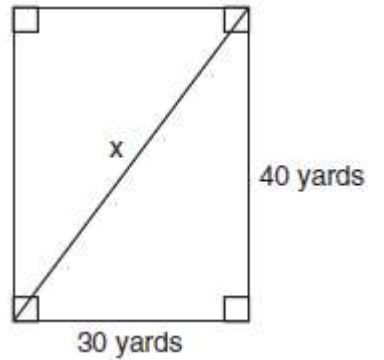
What is the length of the diagonal, in yards, that Tanya runs?
1) 50   3) 70
2) 60   4) 80

8. What is the value of x, in inches, in the right triangle below?
1) $\sqrt{15}$ 3) $\sqrt{34}$
2) 8   4) 4
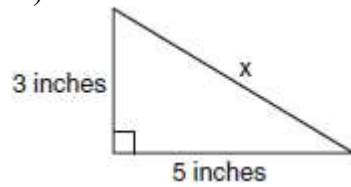
9. Nancy's rectangular garden is represented in the diagram below.

If a diagonal walkway crosses her garden, what is its length, in feet?
1) 17   3) $\sqrt{161}$
2) 22   4) $\sqrt{529}$
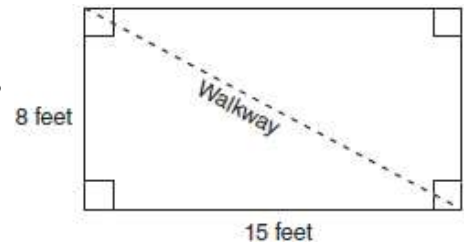
10. The end of a dog's leash is attached to the top of a 5-foot-tall fence post, as shown in the diagram below. The dog is 7 feet away from the base of the fence post.

How long is the leash, to the *nearest tenth of a foot*?
1) 4.9
2) 8.6
3) 9.0
4) 12.0

8
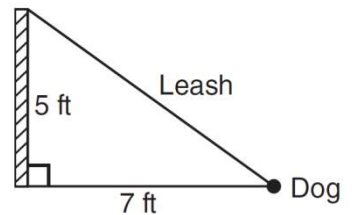
Trigonometric Ratios

1. Find the following trig ratios for the given triangle.

$\sin A$

$\cos A$

$\tan A$

$\sin B$

$\cos B$

$\tan B$
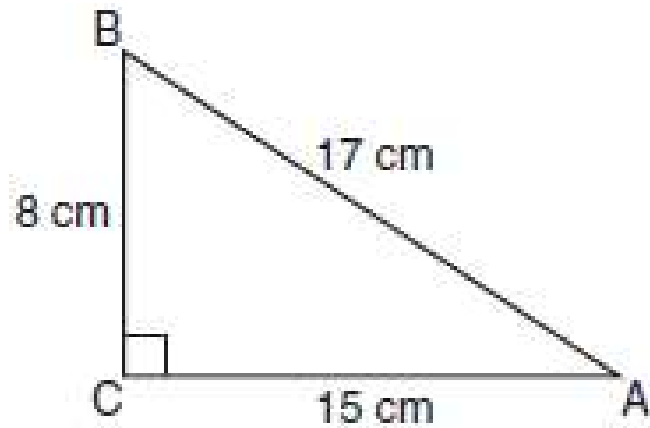
2. Find the following trig ratios for the given triangle.

$\sin J$

$\cos J$

$\tan J$
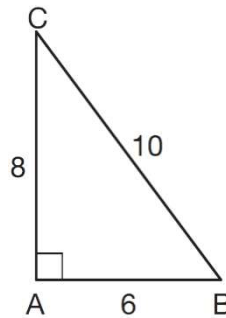
$\sin L$

$\cos L$

$\tan L$

9
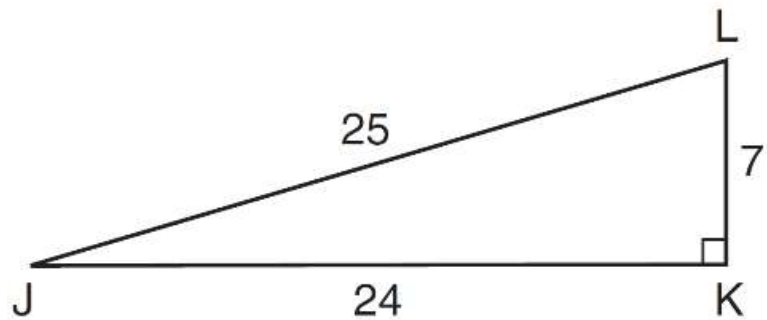
3. The diagram below shows right triangle UPC.
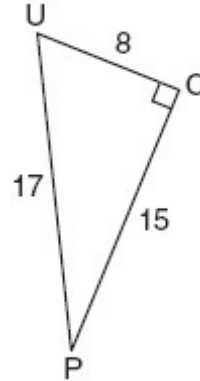
Which ratio represents the sine of $\angle U$?
1) $\dfrac{15}{8}$

2) $\dfrac{15}{17}$

3) $\dfrac{8}{15}$

4) $\dfrac{8}{17}$

4. In $\triangle ABC$ below, the measure of $\angle A = 90°$, $AB = 6$, $AC = 8$, and $BC = 10$.

Which ratio represents the sine of $\angle B$?
1) $\dfrac{10}{8}$

2) $\dfrac{8}{6}$

3) $\dfrac{6}{10}$

4) $\dfrac{8}{10}$

5. Which ratio represents the tangent of $\angle ABC$?
1) $\dfrac{5}{13}$

2) $\dfrac{5}{12}$

3) $\dfrac{12}{13}$

4) $\dfrac{12}{5}$
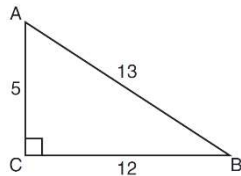
6. Which ratio represents $\sin x$ in the right triangle shown below?
1) $\dfrac{28}{53}$

3) $\dfrac{45}{53}$

2) $\dfrac{28}{45}$

4) $\dfrac{53}{28}$
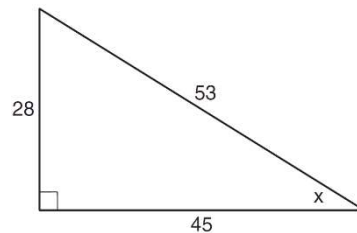
7. Which equation could be used to find the measure of one acute angle in the right triangle shown below?

1) $\sin A = \dfrac{4}{5}$

2) $\tan A = \dfrac{5}{4}$

3) $\cos B = \dfrac{5}{4}$

4) $\tan B = \dfrac{4}{5}$
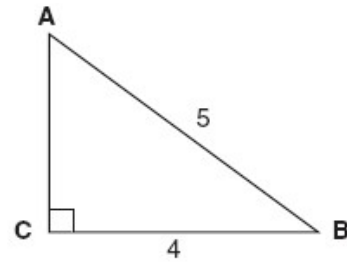
8. Which equation shows a correct trigonometric ratio for angle A in the right triangle below?

1) $\sin A = \dfrac{15}{17}$

2) $\tan A = \dfrac{8}{17}$

3) $\cos A = \dfrac{15}{17}$

4) $\tan A = \dfrac{5}{8}$
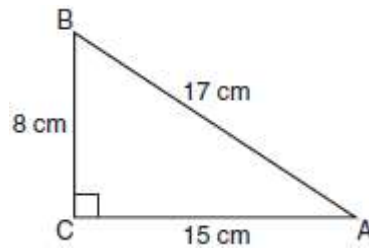
9. In right triangle JKL in the diagram below, $KL = 7$, $JK = 24$, $JL = 25$, and $\angle K = 90°$.

Which statement is *not* true?

1) $\tan L = \dfrac{24}{7}$

2) $\cos L = \dfrac{24}{25}$

3) $\tan J = \dfrac{7}{24}$

4) $\sin J = \dfrac{7}{25}$
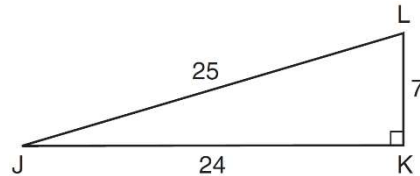
10. In right triangle ABC shown below, $AC = 12$, $BC = 16$, and $AB = 20$.

Which equation is *not* correct?

1) $\cos A = \dfrac{12}{20}$

2) $\tan A = \dfrac{16}{12}$

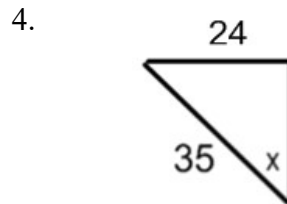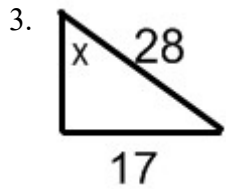3) $\sin B = \dfrac{12}{20}$

4) $\tan B = \dfrac{16}{20}$
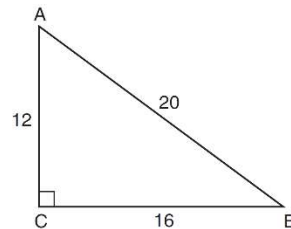
Finding Sides/Angles With Trig

Find the angle measure to the nearest degree

1.

10
x
12

2.

10   x   7

3.

x   28
17

4.

24
35   x

5.

3
6
x

6.

11   x   14

12
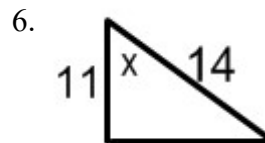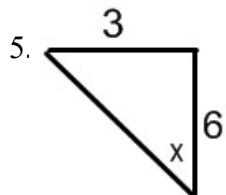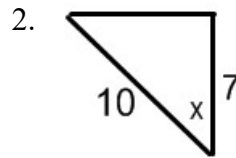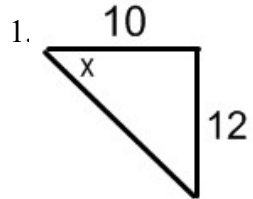
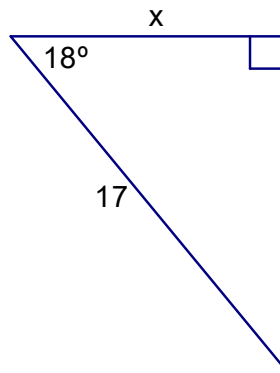**Find the missing side to the nearest tenth**

7.

18

23º

x

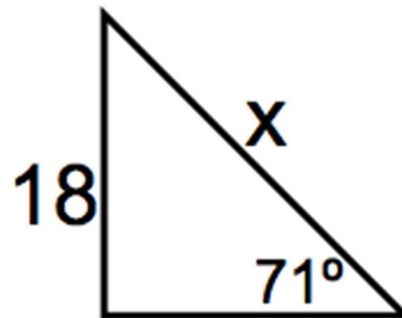8.

x

18º

17

9.

x

12

23º

10.

x

26º

14

11.

x

58º

12

12.

18

X

71º
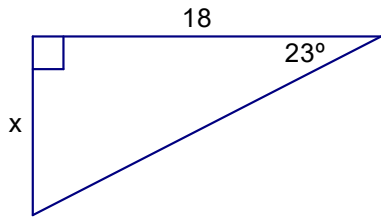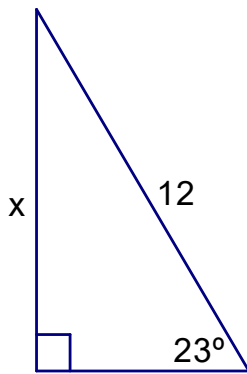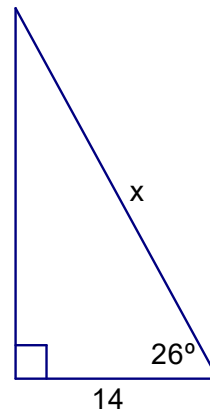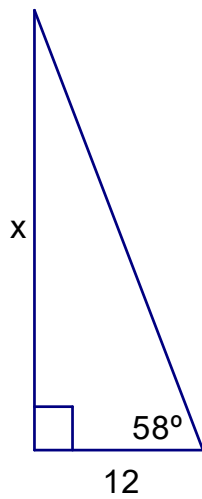
Right Triangles Practice

In each example, find the value of x and round to the nearest tenth if necessary

1.

x

26°

14

2.

10

x

6

3.

26

x°

10

4.

x

58°

12

5.

10

4

x

6.

17

x°

8

7.

18

23°

x

8.

41

9

x°

9.

x

12

23°

10.

x

18°

17

11.

6

x°

8

12.

10

x

12
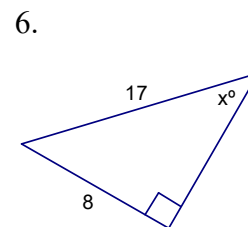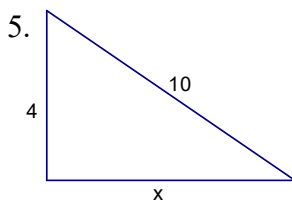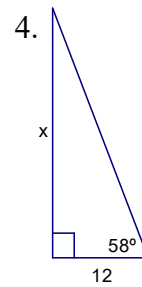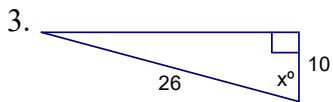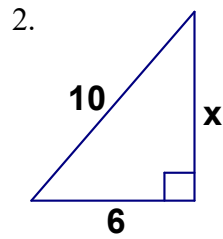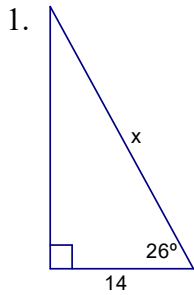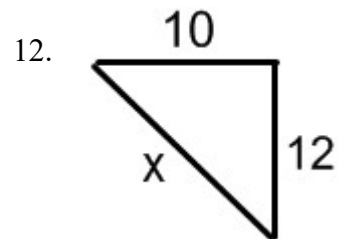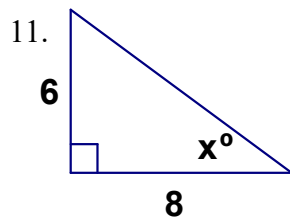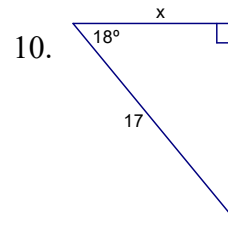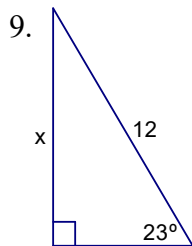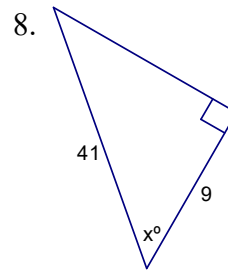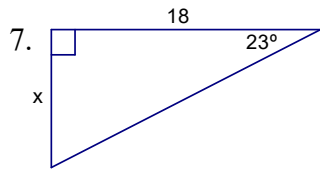
13. Answer the following questions using the diagram below:

D

12

13

G   5   B

a) cos D =

b) sin D =

c) tan D =

d) tan B =

e) sin B =

f) cos B =
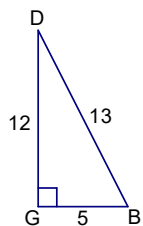
Special Right Triangles

Fill in the two missing sides of each of the following triangles.

1.

A right triangle with a $45°$ angle at top, a $45°$ angle at bottom right, the right angle at bottom left, and the bottom leg labeled 3.

2.

A right triangle with a $45°$ angle at top, the left side labeled 7, the right angle at bottom left, and a $45°$ angle at bottom right.

3.

A right triangle with a $45°$ angle at top, the hypotenuse labeled $10\sqrt{2}$, the right angle at bottom left, and a $45°$ angle at bottom right.

4.

A right triangle with a $30°$ angle at top, the right angle at bottom left, a $60°$ angle at bottom right, and the bottom leg labeled 5.

5.

A right triangle with a $30°$ angle at top, the hypotenuse labeled 20, the right angle at bottom left, and a $60°$ angle at bottom right.

6.

A right triangle with a $30°$ angle at top, the left side labeled $8\sqrt{3}$, the right angle at bottom left, and a $60°$ angle at bottom right.

7.

8.

9.

10.

11.

12.

13.

14.

15.

16.

17.

18.
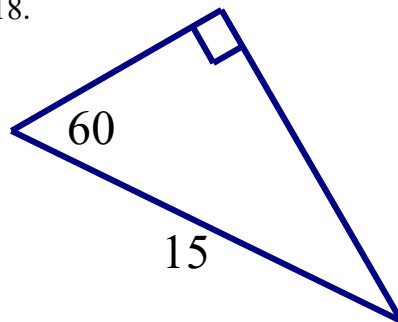
19. In right triangle ABC below, $m\angle C = 90°$, $m\angle B = 30°$, and $CB = 6\sqrt{3}$

The length of $\overline{AB}$ is
1) $3\sqrt{3}$
2) 9

3) 12
4) $12\sqrt{3}$
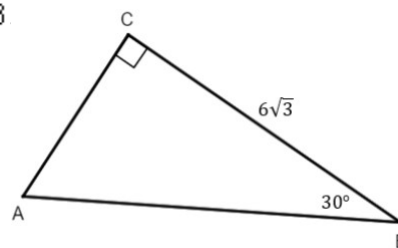
20. In right triangle NIX below, $m\angle I = 90°$, $m\angle X = 45°$, and $\overline{NX} = 6\sqrt{2}$. Find $\overline{IX}$.

1) $6\sqrt{2}$

2) 6

3) $12\sqrt{2}$

4) 12
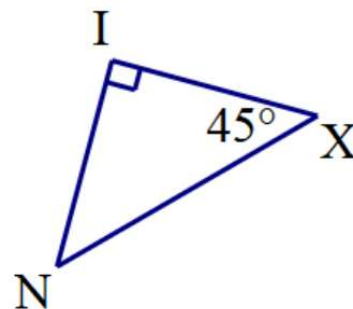
21. In right triangle BOE below, $m\angle O = 90°$, $m\angle B = 45°$, and $\overline{OE} = 12$. Find $\overline{BE}$.

1) 12

2) $12\sqrt{3}$

3) $12\sqrt{2}$

4) 24
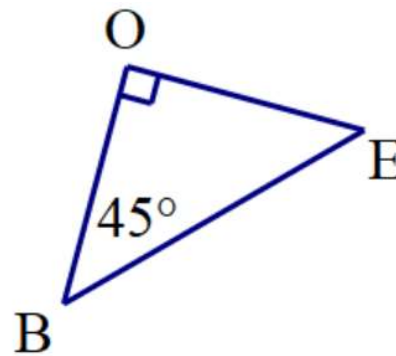
22. In right triangle BOE below, $m\angle L = 90°$, $m\angle E = 60°$, and $\overline{IE} = 20$. Find $\overline{LI}$.

1) $20\sqrt{3}$

2) 10

3) $10\sqrt{3}$

4) 20
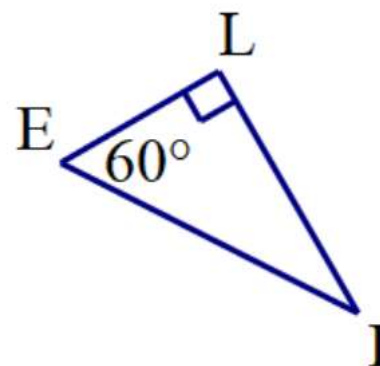
Rationalize the denominator for each of the following

23. $\dfrac{7}{\sqrt{2}}$
24. $\dfrac{2}{\sqrt{3}}$
25. $\dfrac{6}{\sqrt{2}}$
26. $\dfrac{12}{\sqrt{3}}$

Find the missing sides for each of the triangles below in simplest radical form

27.

28.

29.

30.

31.

32.
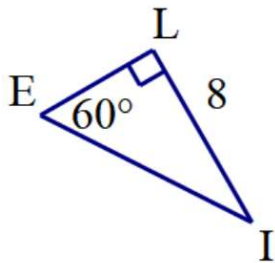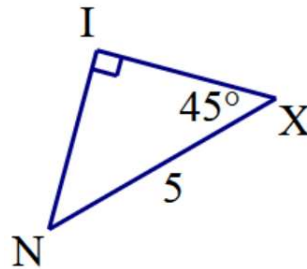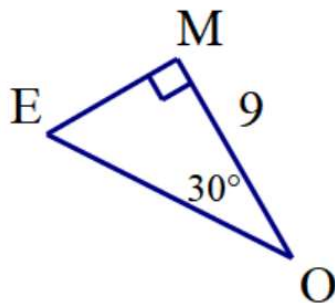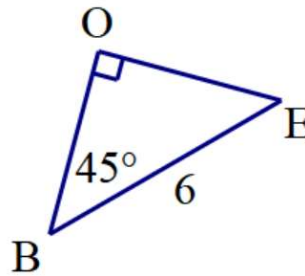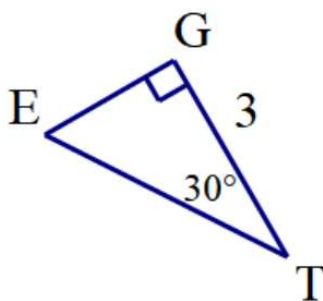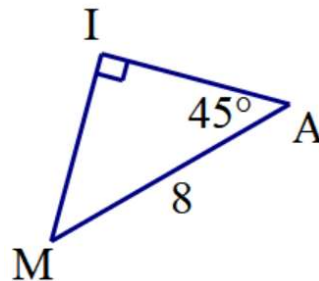
Right Triangles Word Problems

1. In the diagram below, a window of a house is 15 feet above the ground. A ladder is placed against the house with its base at an angle of 75° with the ground. Determine and state the length of the ladder to the *nearest tenth of a foot*.

15
ft

75°
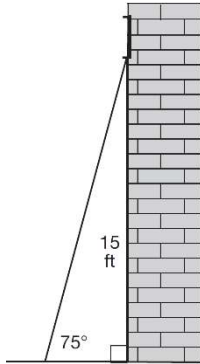
2. The top of a lighthouse, *T*, is 215 feet above sea level, *L*, as shown in the diagram below. The angle of depression from the top of the lighthouse to a boat, *B*, at sea is 26°. Determine, to the *nearest foot*, the horizontal distance, *x*, from the boat to the base of the lighthouse.

T
26°

215 ft

B   x   L
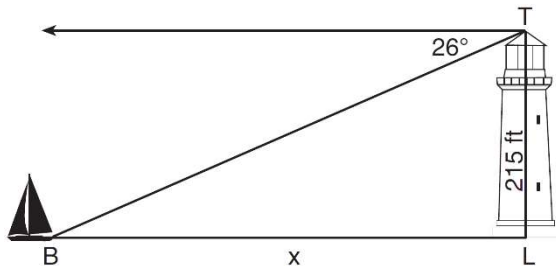
3. As shown in the diagram below, a ladder 12 feet long leans against a wall and makes an angle of 72° with the ground.

Find, to the *nearest tenth of a foot,* the distance from the wall to the base of the ladder.

12 ft

72°
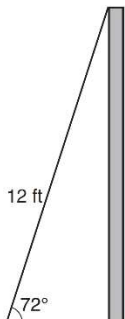
4. The diagram below shows the path a bird flies from the top of a 9.5-foot-tall sunflower to a point on the ground 5 feet from the base of the sunflower.

To the *nearest tenth of a degree*, what is the measure of angle *x*?
1) 27.8
2) 31.8
3) 58.2
4) 62.2
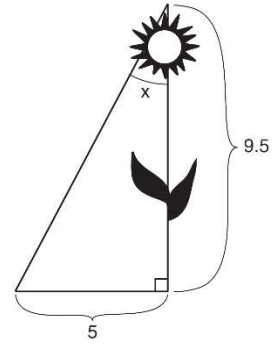
5. From the top of an apartment building, the angle of depression to a car parked on the street below is 38 degrees, as shown in the diagram below. The car is parked 80 feet from the base of the building. Find the height of the building, to the *nearest tenth of a foot*.
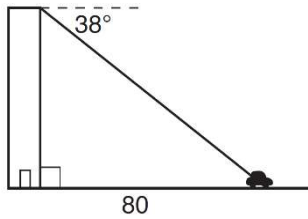
6. As shown in the diagram below, a building casts a 72-foot shadow on the ground when the angle of elevation of the Sun is 40°.

How tall is the building, to the *nearest foot*?
1) 46
2) 60
3) 86
4) 94
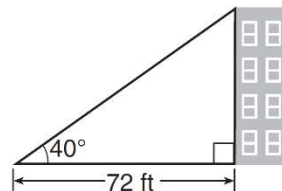
7. A carpenter leans an extension ladder against a house to reach the bottom of a window 30 feet above the ground. As shown in the diagram below, the ladder makes a 70° angle with the ground. To the *nearest foot*, determine and state the length of the ladder.
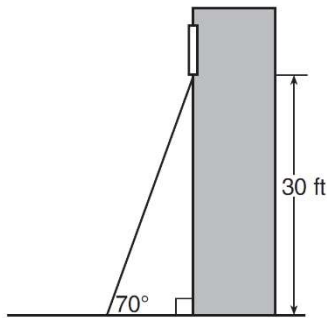
8. In the diagram of right triangle ABC shown below, $AB = 14$ and $AC = 9$.
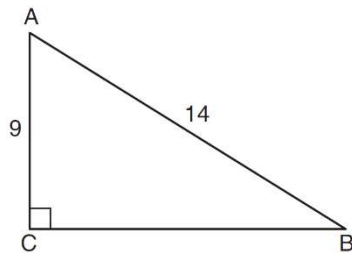
What is the measure of $\angle A$, to the *nearest degree*?
1) 33
2) 40
3) 50
4) 57
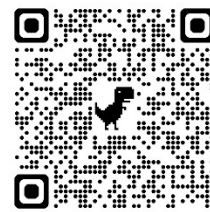
Right Triangles Word Problems (No Pictures!)

1. In triangle *MCT*, the measure of $\angle T = 90°$, $MC = 85$ cm, $CT = 84$ cm, and $TM = 13$cm. Which ratio represents the sine of $\angle C$?
1) $\dfrac{13}{85}$ 3) $\dfrac{13}{84}$

2) $\dfrac{84}{85}$ 4) $\dfrac{84}{13}$

2. A right triangle contains a 38° angle whose adjacent side measures 10 centimeters. What is the length of the hypotenuse, to the *nearest hundredth of a centimeter*?

3. An equilateral triangle has sides of length 20. To the *nearest tenth*, what is the height of the equilateral triangle?

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

5. In $\triangle ABC$, $m\angle C = 90$. If $AB = 5$ and $AC = 4$, which statement is *not* true?

1) $\cos A = \dfrac{4}{5}$ 3) $\sin B = \dfrac{4}{5}$

2) $\tan A = \dfrac{3}{4}$ 4) $\tan B = \dfrac{5}{3}$

6. 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*.

7. A 20-foot support post leans against a wall, making a 70° angle with the ground. To the *nearest tenth of a foot*, how far up the wall will the support post reach?
1) 6.8
2) 6.9
3) 18.7
4) 18.8

8. 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.

9. 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.

10. In $\triangle ABC$, the measure of $\angle B = 90°$, $AC = 50$, $AB = 48$, and $BC = 14$. Which ratio represents the tangent of $\angle A$?

1) $\dfrac{14}{50}$ 3) $\dfrac{48}{50}$

2) $\dfrac{14}{48}$ 4) $\dfrac{48}{14}$

11. In right triangle EFD, $ED = 11$, $EF = 6$, and $m\angle F = 90$. What is the measure of angle E, to the *nearest degree*?

12. 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*.

Compound Right Triangle Problems (Subtraction)

1. In the diagram below, $m\angle CAD = 35$, $m\angle ABD = 42$, and $m\overline{AD} = 60$. Find to the nearest tenth, $m\overline{BC}$.
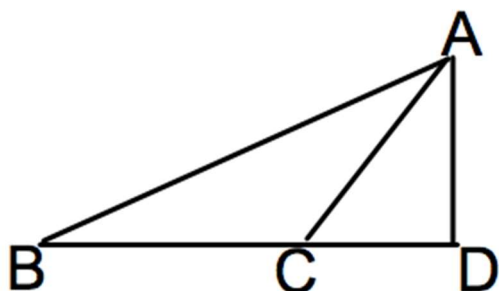
2. As shown in the diagram below, a ship is heading directly toward a lighthouse whose beacon is 125 feet above sea level. At the first sighting, point A, the angle of elevation from the ship to the light was 7°. A short time later, at point D, the angle of elevation was 16°.

  To the *nearest foot*, determine and state how far the ship traveled from point A to point D.

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3. As modeled below, a projector mounted on a ceiling is 3.74 m from a wall, where a whiteboard is displayed. The vertical distance from the ceiling to the top of the whiteboard is 0.41 m, and the height of the whiteboard is 1.17 m. Determine and state the projection angle, θ, to the *nearest tenth of a degree*.
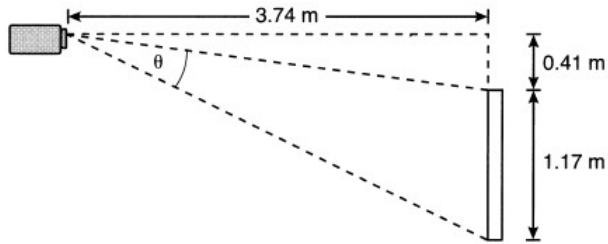
4. As modeled below, a movie is projected onto a large outdoor screen. The bottom of the 60-foot-tall screen is 12 feet off the ground. The projector sits on the ground at a horizontal distance of 75 feet from the screen.
Determine and state, to the *nearest tenth of a degree*, the measure of θ, the projection angle.
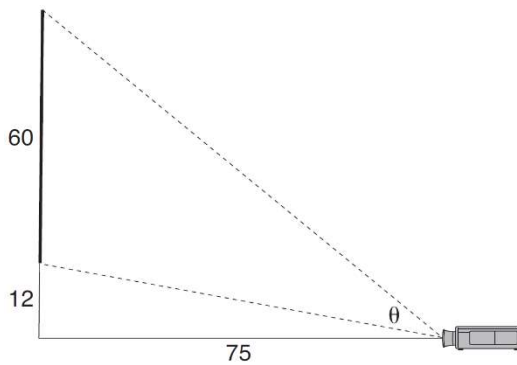
5. Cape Canaveral, Florida is where NASA launches rockets into space. As modeled in the diagram below, a person views the launch of a rocket from observation area A, 3280 feet away from launch pad B. After launch, the rocket was sighted at C with an angle of elevation of 15°. The rocket was later sighted at D with an angle of elevation of 31°. Determine and state, to the *nearest foot*, the distance the rocket traveled between the two sightings, C and D.
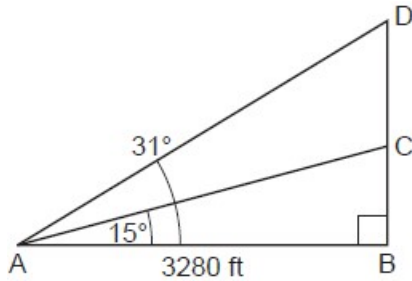
6. Find the measure of $\angle KXN$ below the *nearest degree*.

Compound Right Triangle Problems (Reflexive)

1. The map of a campground is shown below. Campsite C, first aid station F, and supply station S lie along a straight path. The path from the supply station to the tower, T, is perpendicular to the path from the supply station to the campsite. The length of path $\overline{FS}$ is 400 feet. The angle formed by path $\overline{TF}$ and path $\overline{FS}$ is 72°. The angle formed by path $\overline{TC}$ and path $\overline{CS}$ is 55°. Determine and state, to the *nearest foot*, the distance from the campsite to the tower.

Campground Map

Tower

C /55°   F /72°   S
                —400 ft—

Campsite   First aid   Supply station
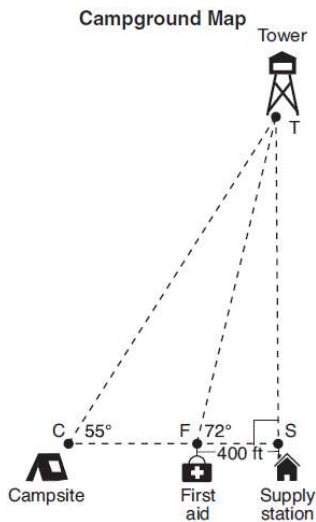
2. Find the measure of $\angle TCA$ in the diagram of right triangle TAO below to the nearest tenth of a degree.

T

82

30

A   36   C   O
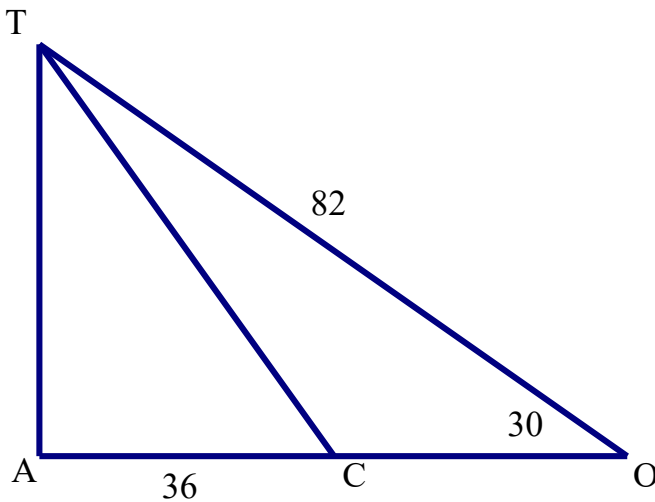
3. Find the measure of $\overline{SP}$ in the diagram of right triangle SEP below to the nearest unit.
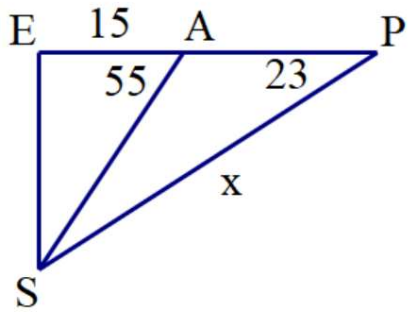
4. Find the measure of $\overline{HT}$ in the diagram of right triangle HAT below to the nearest unit.
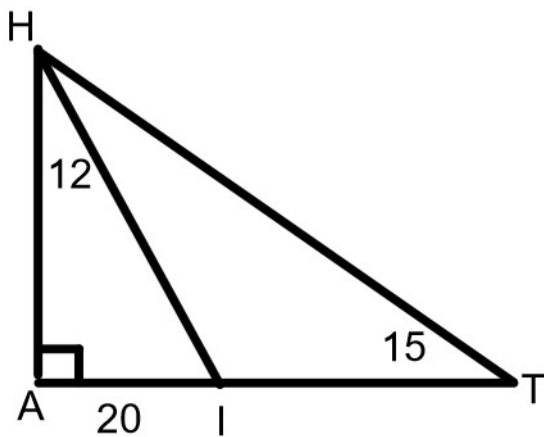
Name _____   Date _____
Mr. Schlansky   Geometry

Compound Right Triangle Problems (Subtraction/Reflexive) Practice

1. Nick wanted to determine the length of one blade of the windmill pictured below. He stood at a point on the ground 440 feet from the windmill's base. Using surveyor's tools, Nick measured the angle between the ground and the highest point reached by the top blade and found it was 38.8°. He also measured the angle between the ground and the lowest point of the top blade, and found it was 30°. Determine and state a blade's length, x, to the *nearest foot*.
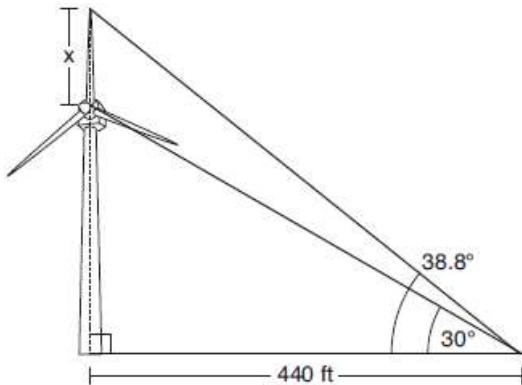
2. In the diagram below, a boat at point A is traveling toward the most powerful waterfall in North America, the Horseshoe Falls. The Horseshoe Falls has a vertical drop of 188 feet. The angle of elevation from point A to the top of the waterfall is 15°. After the boat travels toward the falls, the angle of elevation at point B to the top of the waterfall is 23°. Determine and state, to the *nearest foot*, the distance the boat traveled from point A to point B.
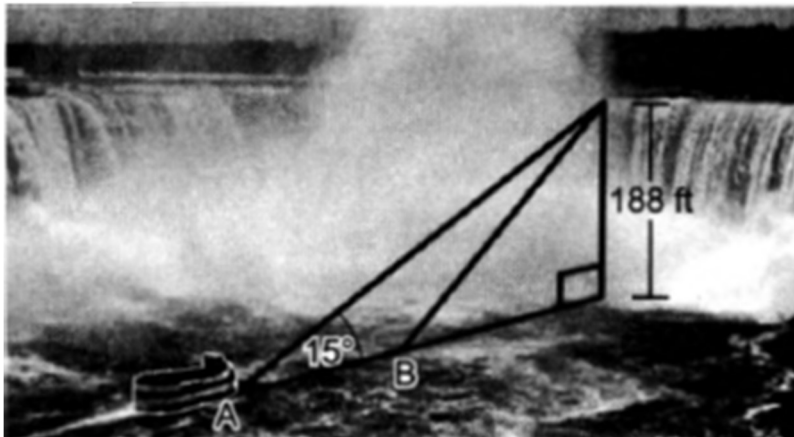
3. As modeled in the diagram below, a building has a height of 50 meters. The angle of depression from the top of the building to the top of the tree, *T*, is 13.3°. The angle of depression from the top of the building to the bottom of the tree, *B*, is 22.2°. Determine and state, to the *nearest meter*, the height of the tree.
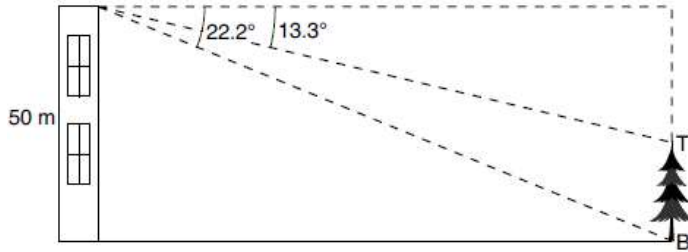
4. A drone is used to measure the size of a brush fire on the ground. Segment *AB* represents the width of the fire, as shown below. The drone calculates the distance to point *B* to be 1076 feet at an angle of depression of 25°. At the same point, the drone calculates the distance to point *A* to be 774 feet at an angle of depression of 36°. Determine and state the width of the fire, $\overline{AB}$, to the *nearest foot*.
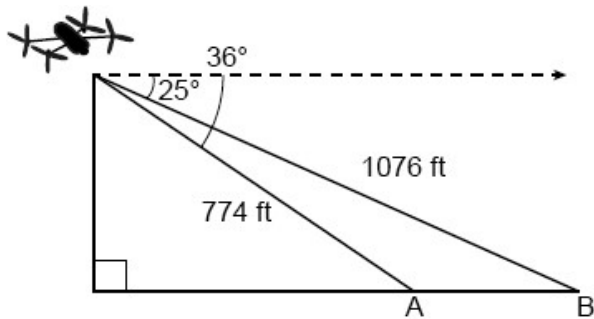
5. Find the measure of $\overline{OW}$ in the diagram of right triangle MEW below to the nearest unit.
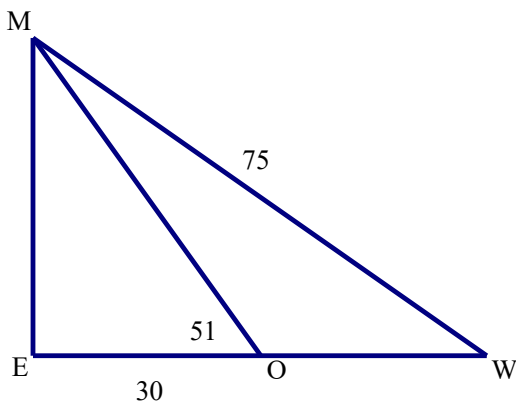
Compound Right Triangle Problems (Other)

1. As modeled in the diagram below, an access ramp starts on flat ground and ends at the beginning of the top step. Each step is 6 inches tall and 8 inches deep. If the angle of elevation of the ramp is 4.76°, determine and state the length of the ramp, to the *nearest tenth of a foot*. Determine and state, to the *nearest tenth of a foot*, the horizontal distance, *d*, from the bottom of the stairs to the bottom of the ramp.
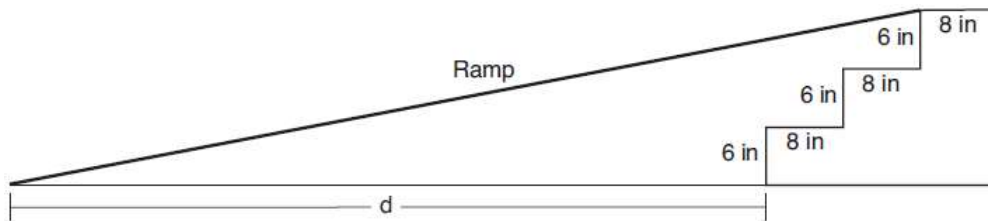
2. A homeowner is building three steps leading to a deck, as modeled by the diagram below. All three step rises, $\overline{HA}$, $\overline{FG}$, and $\overline{DE}$, are congruent, and all three step runs, $\overline{HG}$, $\overline{FE}$, and $\overline{DC}$, are congruent. Each step rise is perpendicular to the step run it joins. The measure of $\angle CAB = 36°$ and $\angle CBA = 90°$.

If each step run is parallel to $\overline{AB}$ and has a length of 10 inches, determine and state the length of each step rise, to the *nearest tenth of an inch*. Determine and state the length of $\overline{AC}$, to the *nearest inch*.
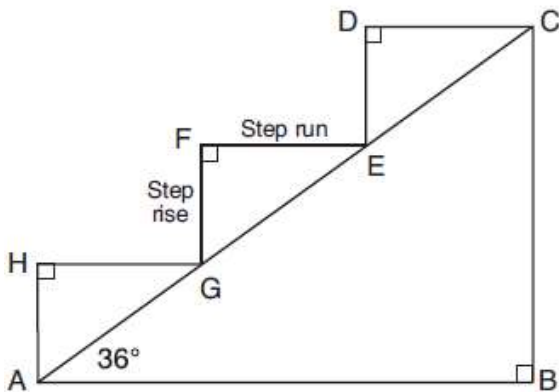
3. Barry wants to find the height of a tree that is modeled in the diagram below, where $\angle C$ is a right angle. The angle of elevation from point A on the ground to the top of the tree, H, is 40°. The angle of elevation from point B on the ground to the top of the tree, H, is 80°. The distance between points A and B is 85 feet. Barry claims that $\triangle ABH$ is isosceles. Explain why Barry is correct. Determine and state, to the *nearest foot*, the height of the tree.
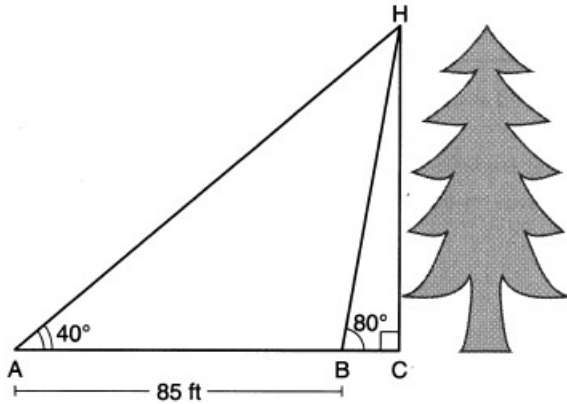
4. David has just finished building his treehouse and still needs to buy a ladder to be attached to the ledge of the treehouse and anchored at a point on the ground, as modeled below. David is standing 1.3 meters from the stilt supporting the treehouse. This is the point on the ground where he has decided to anchor the ladder. The angle of elevation from his eye level to the bottom of the treehouse is 56 degrees. David's eye level is 1.5 meters above the ground. Determine and state the minimum length of a ladder, to the *nearest tenth of a meter*, that David will need to buy for his treehouse.
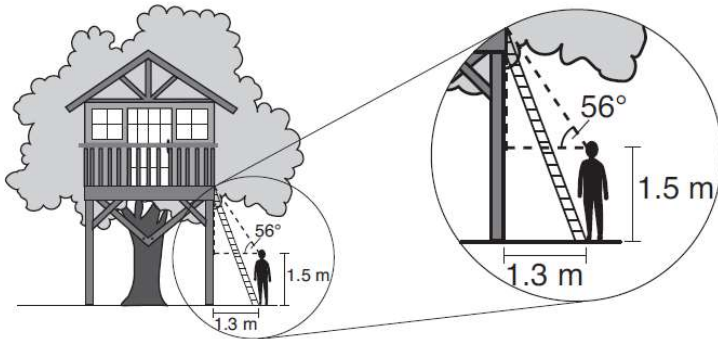
Acute Angles in a Right Triangle

1. In scalene triangle ABC shown in the diagram below, $m\angle C = 90°$.

Which equation is always true?
1) $\sin A = \sin B$
2) $\cos A = \cos B$
3) $\cos A = \sin C$
4) $\sin A = \cos B$
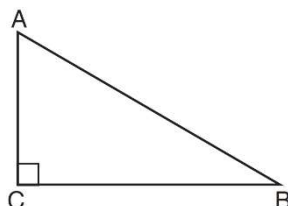
2. Right triangle TMR is a scalene triangle with the right angle at M. Which equation is true?
1) $\sin M = \cos T$
2) $\sin R = \cos R$
3) $\sin T = \cos R$
4) $\sin T = \cos M$

3. Right triangle ACT has $m\angle A = 90°$. Which expression is always equivalent to $\cos T$?
1) $\cos C$
2) $\sin C$
3) $\tan T$
4) $\sin T$

4. In right triangle ABC, $m\angle C = 90°$. If $\cos B = \frac{5}{13}$, which function also equals $\frac{5}{13}$?

1) $\tan A$
2) $\tan B$
3) $\sin A$
4) $\sin B$

5. In right triangle ABC, $m\angle C = 90°$ and $AC \neq BC$. Which trigonometric ratio is equivalent to $\sin B$?
1) $\cos A$
2) $\cos B$
3) $\tan A$
4) $\tan B$

6. In right triangle ABC with the right angle at C, $\sin A = 2x + 0.1$ and $\cos B = 4x - 0.7$. Determine and state the value of x. Explain your answer.

7. If $\sin(3x + 2)° = \cos(4x - 10)°$, what is the value of x to the *nearest tenth*?

(1) 7.6   (2) 12.0   (3) 14.0   (4) 26.9

8. If $\sin(2x + 7)° = \cos(4x - 7)°$, what is the value of x?
1) 7
2) 15
3) 21
4) 30

9. In a right triangle, $\sin(40 - x)° = \cos(3x)°$. What is the value of x?
1) 10   3) 20
2) 15   4) 25

10. In a right triangle, the acute angles have the relationship $\sin(2x + 4) = \cos(46)$. What is the value of x?
1) 20
2) 21
3) 24
4) 25

11. Which expression is always equivalent to $\sin x$ when $0° < x < 90°$?
1) $\cos(90° - x)$
2) $\cos(45° - x)$
3) $\cos(2x)$
4) $\cos x$

12. Which of the following is equivalent to $\sin 40$?
1) $\sin 50$ 2) $\cos 50$ 3) $\cos 40$ 4) $\tan 50$

13. Which of the following is equivalent to $\cos 57$?
1) $\sin 57$ 2) $\sin 33$ 3) $\cos 33$ 4) $\cos 123$

14. Which expression is equal to $\sin 30°$?
1) $\tan 30°$ 3) $\cos 60°$
2) $\sin 60°$ 4) $\cos 30°$

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15. Given: Right triangle ABC with right angle at C. If $\sin A$ increases, does $\cos B$ increase or decrease? Explain why.
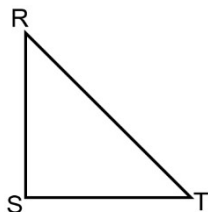
16. If $\sin 2x = \cos(x+15)$, determine the value of x.

17. If $\cos(x+8) = \sin(2x+7)$, determine the value of x.

18. In right triangle DAN, $m\angle A = 90°$. Which statement must always be true?
1) $\cos D = \cos N$ 3) $\sin A = \cos N$
2) $\cos D = \sin N$ 4) $\cos A = \tan N$

19. In right triangle RST shown below, which of the following must be true?
I: $\sin R = \cos S$
II: $\cos T = \sin R$
III: $\sin T = \cos R$
IV: $\tan R = \tan S$

1) I and IV   3) I, II, and III
2) II and III   4) III only

Trigonometry with Similar Triangles

1. In the diagram below, $\triangle DOG \sim \triangle CAT$, where $\angle G$ and $\angle T$ are right angles.
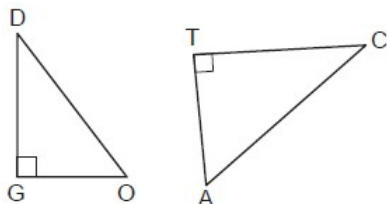
Which expression is always equivalent to $\sin D$?
1) $\cos A$ 3) $\tan A$
2) $\sin A$ 4) $\cos C$

2. If scalene triangle XYZ is similar to triangle QRS and $m\angle X = 90°$, which equation is always true?
1) $\sin Y = \sin S$ 3) $\cos Y = \sin Q$
2) $\cos R = \cos Z$ 4) $\sin R = \cos Z$

3. In the diagram below, right triangle PQR is transformed by a sequence of rigid motions that maps it onto right triangle NML. What ratio is equal to cos L?
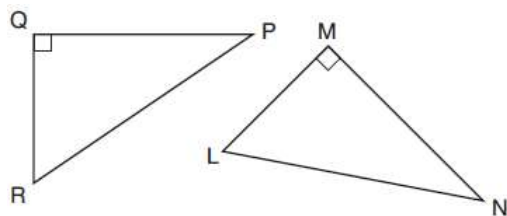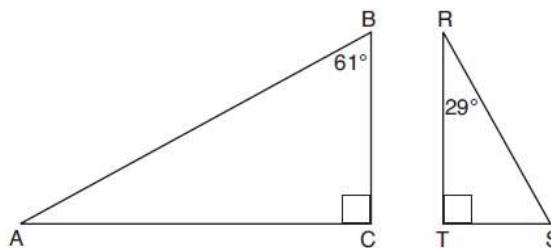

1) $\sin R$
2) $\cos R$
3) $\sin P$
4) $\cos P$

4. Given right triangle ABC with a right angle at C, $m\angle B = 61°$. Given right triangle RST with a right angle at T, $m\angle R = 29°$.
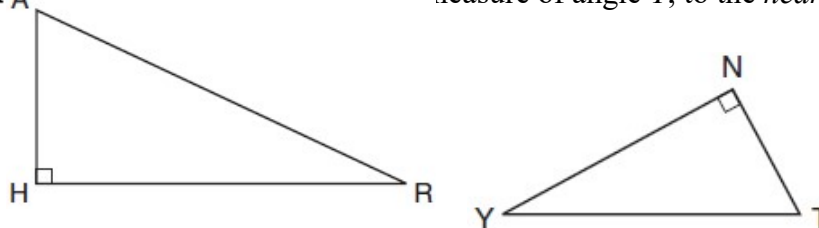Which of the following statements is true?
1) $\sin A = \cos C$
2) $\sin B = \cos R$
3) $\sin S = \cos B$
4) $\sin C = \cos T$

5. In the diagram below of $\triangle HAR$ and $\triangle NTY$, angles H and N are right angles, and $\triangle HAR \sim \triangle NTY$. If ⌐A̶ ⌐⌐⌐⌐ ⌐⌐⌐⌐⌐⌐ ⌐⌐⌐⌐⌐⌐⌐⌐ measure of angle Y, to the *nearest degree*?
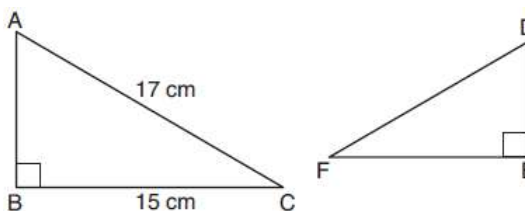1) 23°
2) 25°
3) 65°
4) 67°

6. Kayla was cutting right triangles from wood to use for an art project. Two of the right triangles she cut are shown below.

If $\triangle ABC \sim \triangle DEF$, with right angles B and E, $BC = 15$ cm, and $AC = 17$ cm, what is the measure of $\angle F$, to the *nearest degree*?
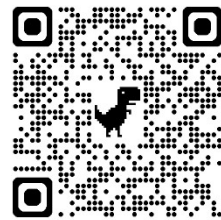1) 28°
2) 41°
3) 62°
4) 88°

7. Scalene triangle XYZ is similar to triangle QRS and $m\angle X = 90°$. If $\overline{XY} = 10$ and $\overline{ZY} = 15$, find the measure of $\angle S$ to the *nearest tenth of a degree*.
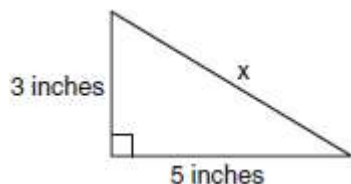
Right Triangles Review Sheet

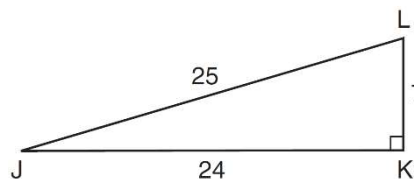1. What is the value of *x*, in inches, in the right triangle below?

3 inches

x

5 inches

2. Nancy's rectangular garden is represented in the diagram below.
If a diagonal walkway crosses her garden, what is its length, in feet?

8 feet

Walkway

15 feet

3. In right triangle *JKL* in the diagram below, $KL = 7$, $JK = 24$, $JL = 25$, and $\angle K = 90°$.
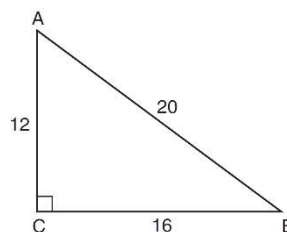Which statement is *not* true?

1) $\tan L = \dfrac{24}{7}$

2) $\cos L = \dfrac{24}{25}$

3) $\tan J = \dfrac{7}{24}$

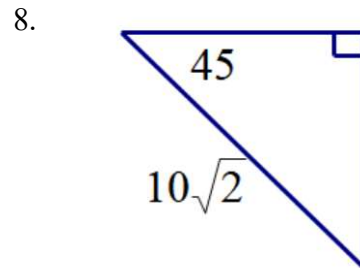4) $\sin J = \dfrac{7}{25}$

L

25

7

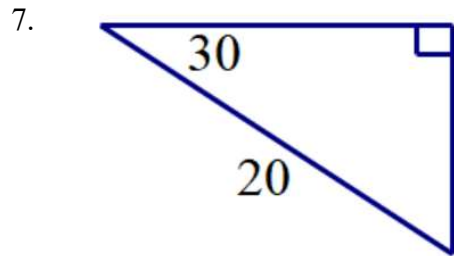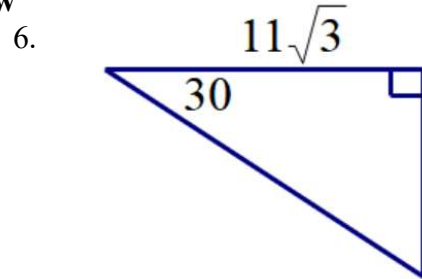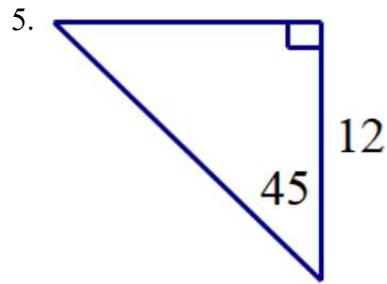J   24   K

4. In right triangle *ABC* shown below, $AC = 12$, $BC = 16$, and $AB = 20$.
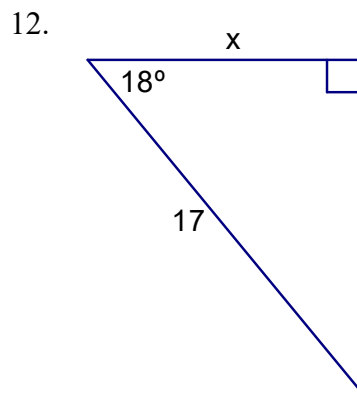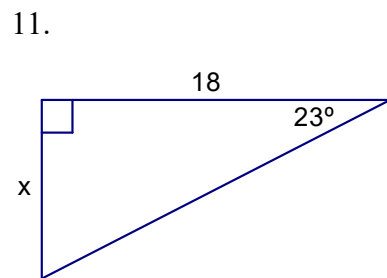
Which equation is *not* correct?

1) $\cos A = \dfrac{12}{20}$

2) $\tan A = \dfrac{16}{12}$

3) $\sin B = \dfrac{12}{20}$

4) $\tan B = \dfrac{16}{20}$

A

20

12

C   16   B
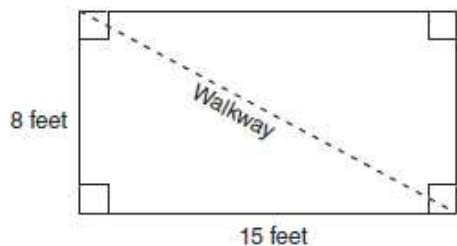
Find the missing sides of the right triangles below

5.

12

45

6.

$11\sqrt{3}$

30

7.

30

20

8.

45

$10\sqrt{2}$

Find x in the following right triangles rounded to the _nearest tenth_.

9.

3

6

x

10.

11 x 14

11.

18

23°

x

12.

x

18°

17
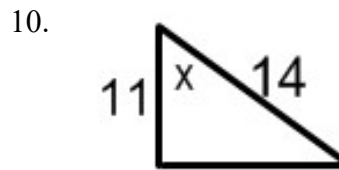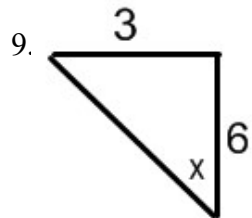
13. A 28-foot ladder is leaning against a house. The bottom of the ladder is 6 feet from the base of the house. Find the measure of the angle formed by the ladder and the ground, to the *nearest degree*.

14. A 20-foot support post leans against a wall, making a 70° angle with the ground. To the *nearest tenth of a foot*, how far up the wall will the support post reach?

15. In the diagram below, $m\angle CAD = 35$, $m\angle ABD = 42$, and $m\overline{AD} = 60$. Find to the nearest tenth, $m\overline{BC}$.
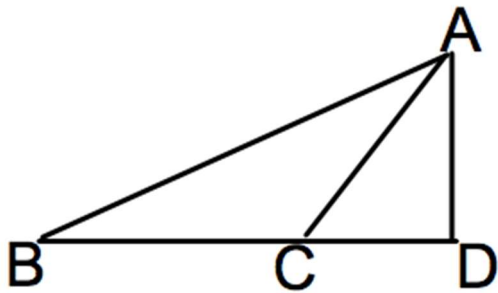
16. Nick wanted to determine the length of one blade of the windmill pictured below. He stood at a point on the ground 440 feet from the windmill's base. Using surveyor's tools, Nick measured the angle between the ground and the highest point reached by the top blade and found it was 38.8°. He also measured the angle between the ground and the lowest point of the top blade, and found it was 30°. Determine and state a blade's length, x, to the *nearest foot*.
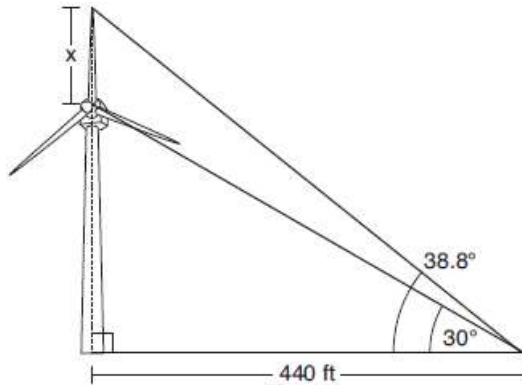
17. If $\sin(x+15) = \cos(45)$, determine the value of x.

18. If $\sin(2x + 7)° = \cos(4x - 7)°$, what is the value of x?

19. Right triangle *TMR* is a scalene triangle with the right angle at *M*. Which equation is true?
1) $\sin M = \cos T$
2) $\sin R = \cos R$
3) $\sin T = \cos R$
4) $\sin T = \cos M$

20. In right triangle *DAN*, $m\angle A = 90°$. Which statement must always be true?
1) $\cos D = \cos N$
2) $\cos D = \sin N$
3) $\sin A = \cos N$
4) $\cos A = \tan N$

21. Kayla was cutting right triangles from wood to use for an art project. Two of the right triangles she cut are shown below.

If $\triangle ABC \sim \triangle DEF$, with right angles B and E, $BC = 15$ cm, and $AC = 17$ cm, what is the measure of $\angle F$, to the *nearest degree*?

1) 28°
2) 41°
3) 62°
4) 88°
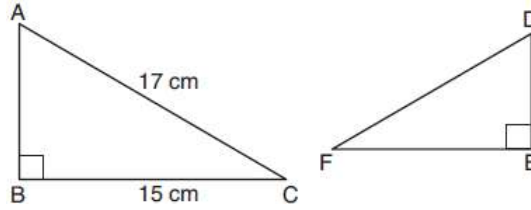
22. Scalene triangle XYZ is similar to triangle QRS and $m\angle X = 90°$. If $\overline{XY} = 10$ and $\overline{ZY} = 15$, find the measure of $\angle S$ to the *nearest tenth of a degree*.

23. In right triangle RST below, altitude $\overline{SV}$ is drawn to hypotenuse $\overline{RT}$. If $RV = 4.1$ and $TV = 10.2$, what is the length of $\overline{ST}$, to the *nearest tenth*?
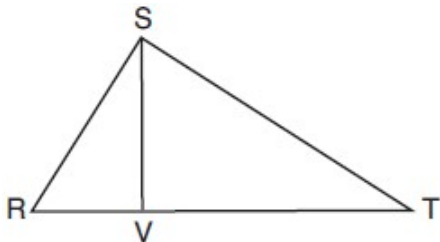
24. In right triangle *PRT*, $m\angle P = 90°$, altitude $\overline{PQ}$ is drawn to hypotenuse $\overline{RT}$, $RT = 17$, and $PR = 15$. Determine and state, to the *nearest tenth*, the length of $\overline{RQ}$.
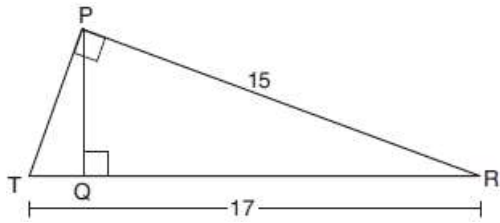
25. Which rotation would map a regular hexagon onto itself?
1) 45°   3) 240°
2) 150°   4) 315°

26. Which rotation about its center will carry a regular decagon onto itself?
1) 54°
2) 162°
3) 198°
4) 252°