

Special Right Triangles and Trigonometry (Sin, Cos, Tan)

Date	Topic/Assignment
Thursday January 21	45-45-90 Triangles Notes Pages 1-3
Friday January 22	30-60-90 Triangles Notes Pages 4-6
Monday January 25	Mixed review of both 45-45-90 and 30-60-90 Triangles Pages 7-10
Tuesday January 26	QUIZ Intro to Sin, Cos, Tan Pages 11-14
Wednesday January 27	Finding missing sides of right triangles using trigonometry Pages 15-17
Thursday January 28	Finding missing angles of right triangles using trigonometry Pages 18-19
Friday January 29	Mixed review of finding missing sides and angles Page 20
Monday February 1	Review QUIZ
Tuesday February 2	Word Problems Pages 21-23
Wednesday February 3	Word Problems Pages 24-25
Thursday February 4	Review
Friday February 5	TEST

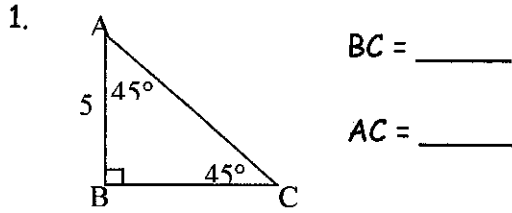
Notes

Geometry 5.8

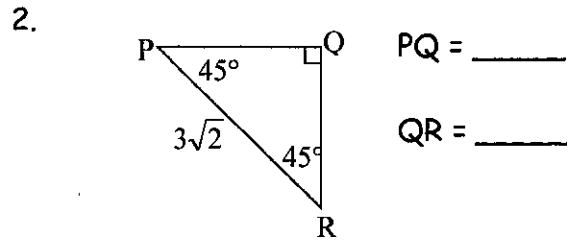
Name _____

Worksheet: Special Right Triangles 45-45-90

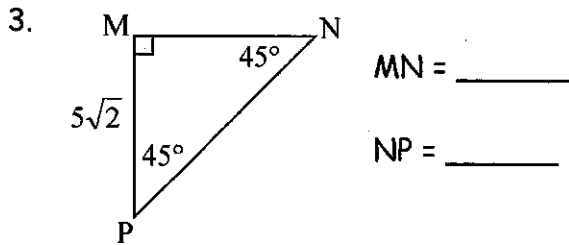
Find the lengths of the indicated sides. SHOW ALL WORK.



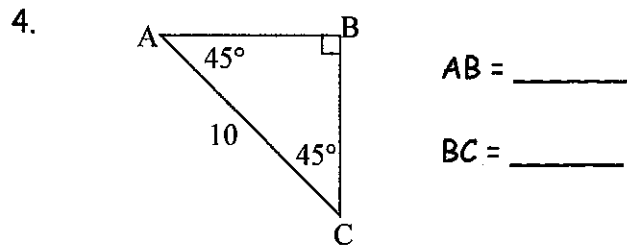
Leg(x)	Leg(x)	Hypotenuse($x\sqrt{2}$)



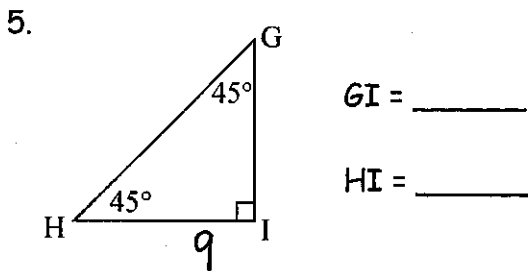
Leg(x)	Leg(x)	Hypotenuse($x\sqrt{2}$)



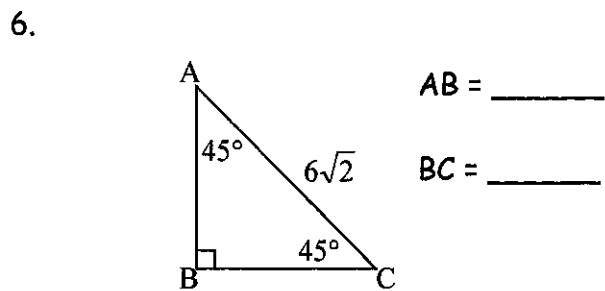
Leg(x)	Leg(x)	Hypotenuse($x\sqrt{2}$)



Leg(x)	Leg(x)	Hypotenuse($x\sqrt{2}$)



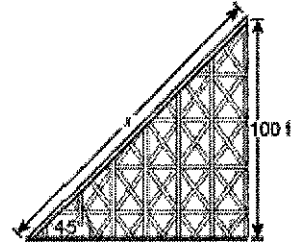
Leg(x)	Leg(x)	Hypotenuse($x\sqrt{2}$)



Leg(x)	Leg(x)	Hypotenuse($x\sqrt{2}$)

7. Matt wants to design the first section of a roller coaster track. He wants the ramp section to rise at 45° with the horizontal and connect at the top of a segment 100 feet high. Find x , the length of the ramp Matt needs to complete his section of the coaster track?

Leg(x)	Leg (x)	Hypotenuse ($x\sqrt{2}$)



8. A square has a perimeter of 32 inches. How long is the diagonal?

Leg(x)	Leg (x)	Hypotenuse ($x\sqrt{2}$)

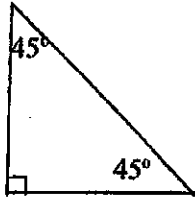
9. A square has side lengths of 23 inches. How long is each diagonal?

Leg(x)	Leg (x)	Hypotenuse ($x\sqrt{2}$)

10. Sam's square bedroom has a diagonal of $9\sqrt{2}$ feet. What is the length of each side?

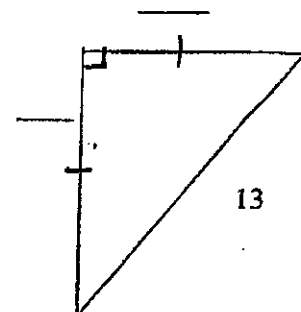
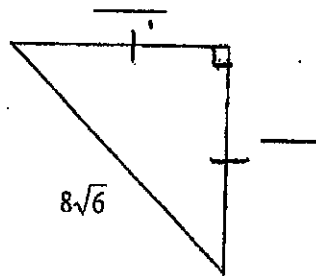
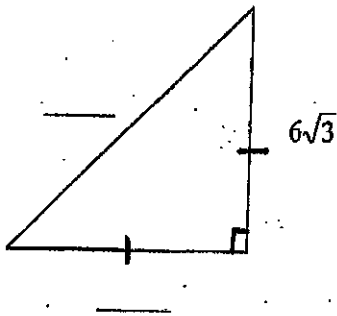
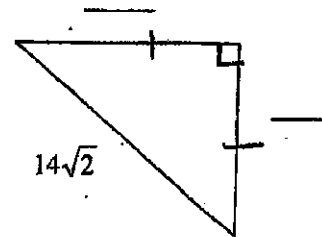
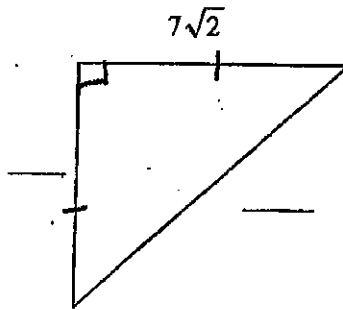
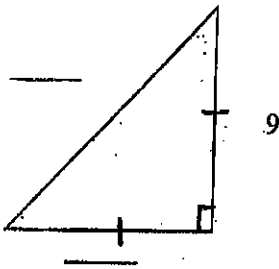
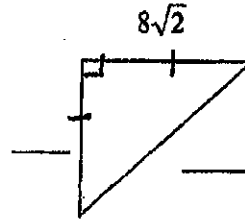
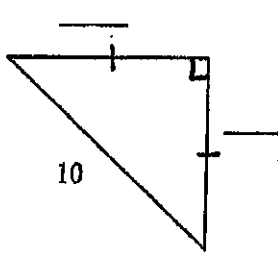
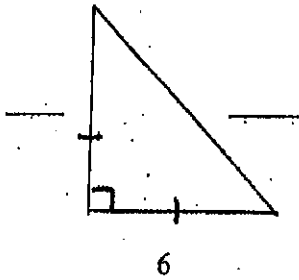
Leg(x)	Leg (x)	Hypotenuse ($x\sqrt{2}$)

WORKSHEET #2: 45-45-90° TRIANGLES



Hypotenuse = leg * $\sqrt{2}$

Find the missing sides of the triangles. Each triangle measures 45-45-90°. Leave answers in simplified radical form.



Notes

ACC Alg/Geo

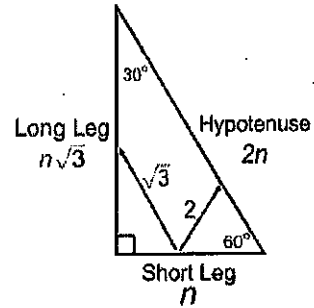
Name: _____

Period: _____

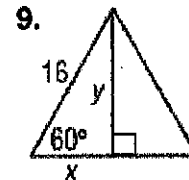
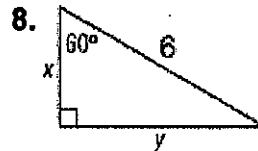
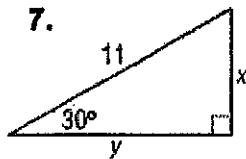
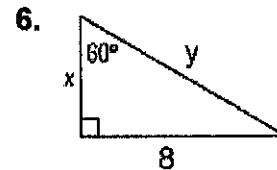
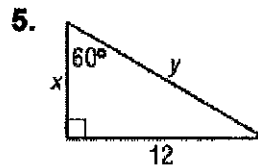
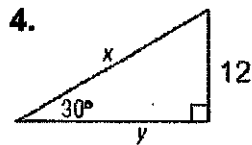
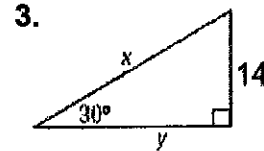
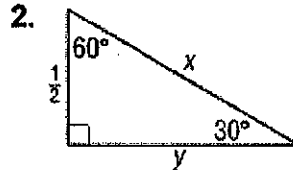
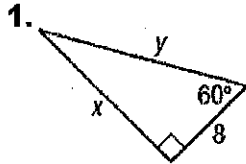
Special Right Triangles: 30° - 60° - 90°

Hypotenuse = 2 * Short Leg

Long Leg = Short Leg * $\sqrt{3}$



Find the value of x and y in each triangle.



Sketch the figure that is described. Then, find the requested measure.

10. An equilateral triangle has a side length of 10 inches. Find the length of the triangle's altitude.

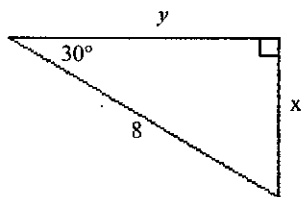
11. The altitude of an equilateral triangle is 18 inches. Find the length of a side.

Name: _____

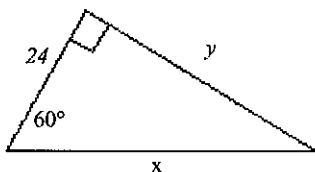
Worksheet 4: Special 30-60-90 Triangles

Find the missing measures. Write all radicals in simplest form.

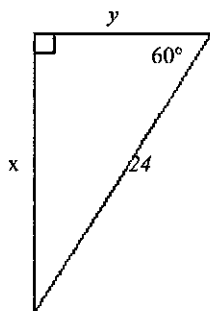
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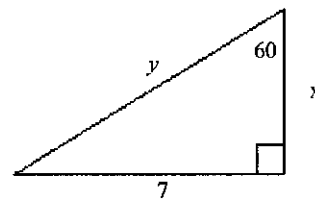
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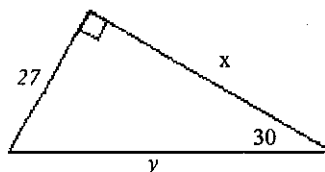
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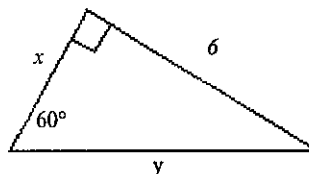
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5.

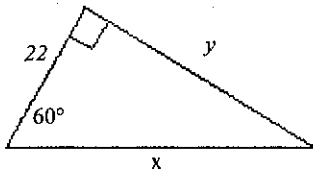


6.

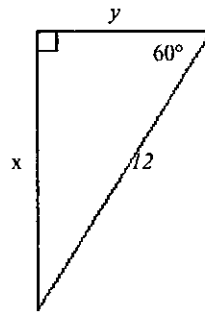


7. Before going to problem 8 on the reverse side, have your answers checked.

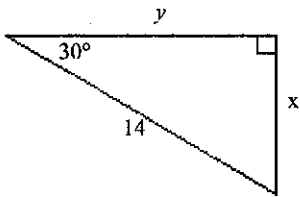
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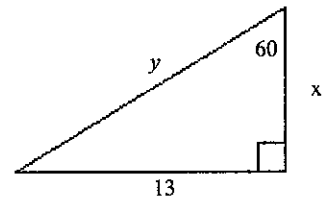
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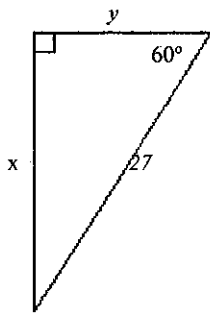
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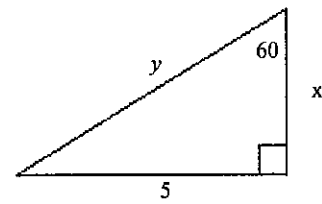
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10.



13.



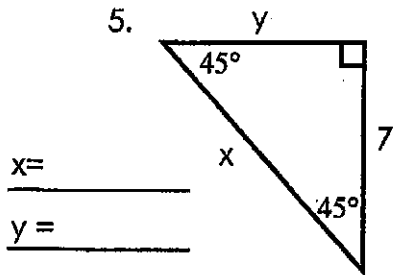
Acc. Alg/Geo A - Right Triangle Trig Extra Practice

smiles when _____
 Period: _____ Date: _____

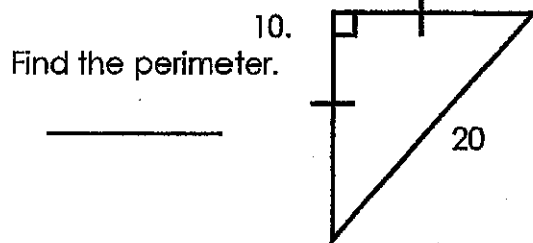
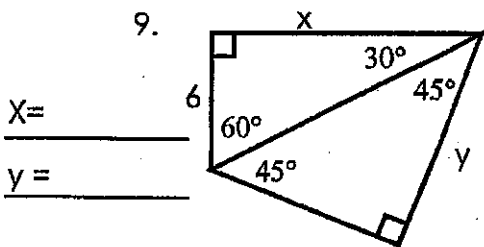
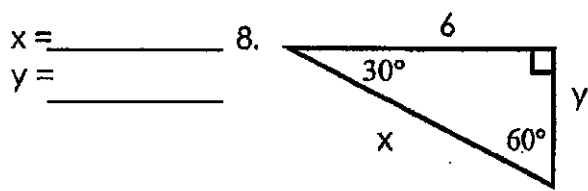
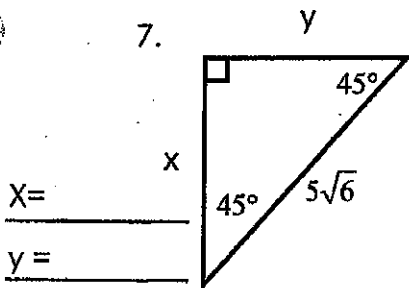
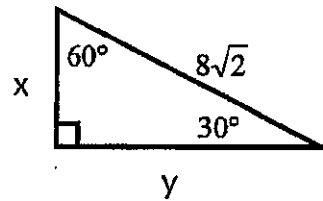
1 - 4: Fill in the following table. (6 pts)

30-60-90	Δ #1	Δ #2	Δ #3
Length of small side	8		
Length of longer side		$\sqrt{15}$	
Hypotenuse			20

Find the missing measures. Write all radicals in simplest form. (2 pts each)

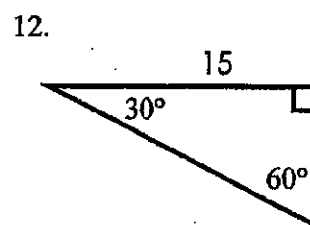
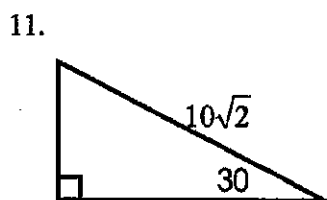
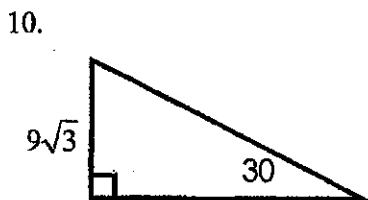
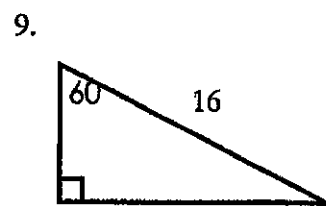
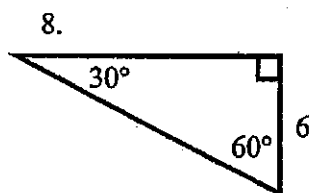
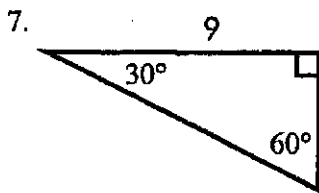
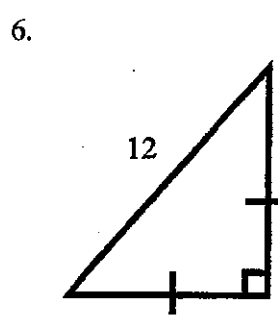
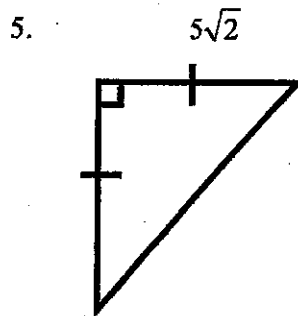
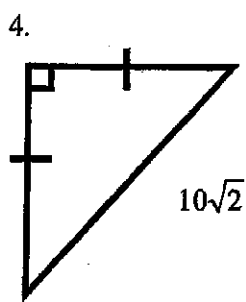
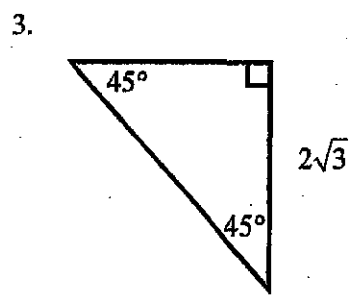
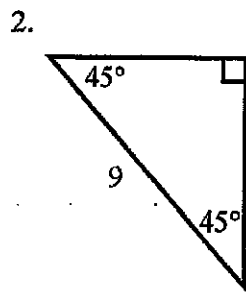
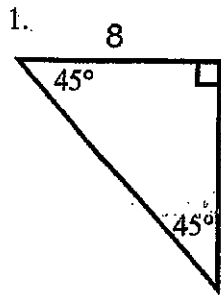


x = _____
 y = _____



11. The diagonal of a square is $10\sqrt{2}$ in. Find the area of the square. (2pts)

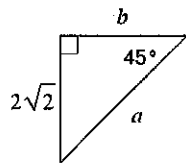
Label all the sides of the special right triangles. Put all answers in simplified radical form.



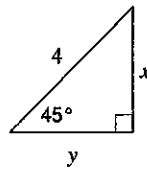
Special Right Triangles

Find the missing side lengths. Leave your answers as radicals in simplest form.

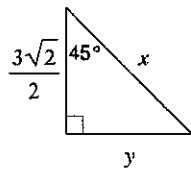
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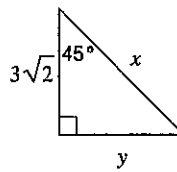
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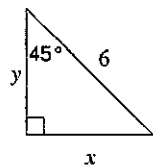
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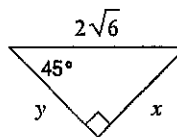
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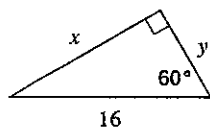
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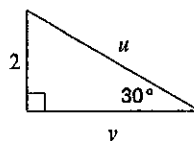
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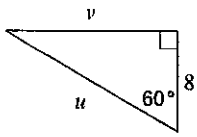
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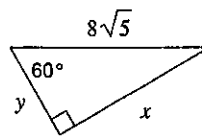
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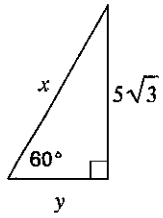
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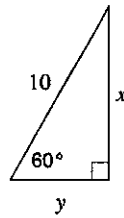
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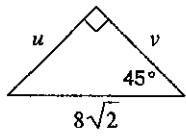
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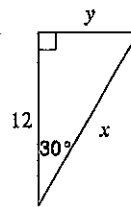
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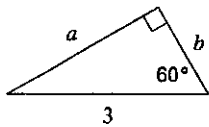
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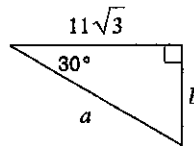
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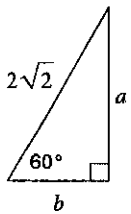
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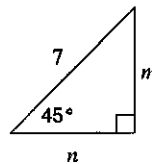
16)



17)

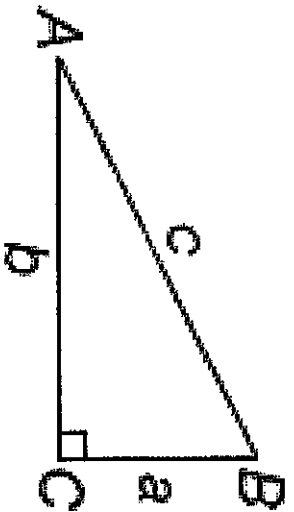


18)



Sine

$$\sin A = \frac{\text{opposite leg}}{\text{hypotenuse}}$$



$$\sin A = \frac{a}{c}$$

Cosine

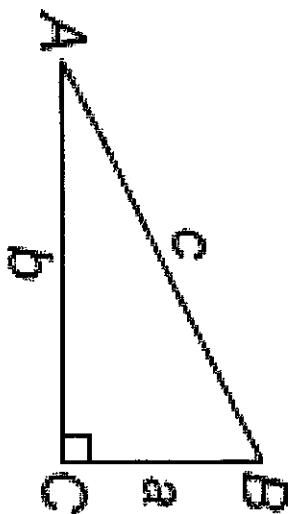
$$\cos A = \frac{\text{adjacent leg}}{\text{hypotenuse}}$$



$$\cos A = \frac{b}{c}$$

Tangent

$$\tan A = \frac{\text{opposite leg}}{\text{adjacent leg}}$$

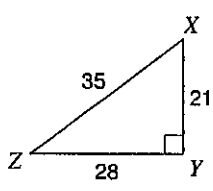


$$\tan A = \frac{a}{b}$$

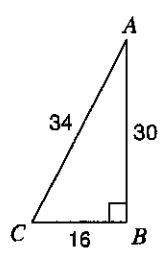
Trigonometric Ratios

Find the value of each trigonometric ratio.

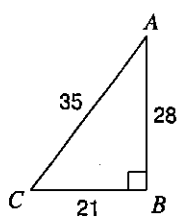
1) $\tan Z$



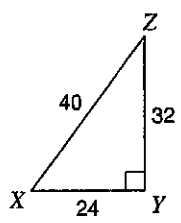
2) $\cos C$



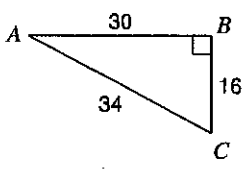
3) $\sin C$



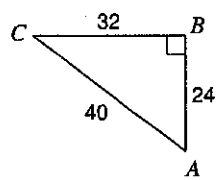
4) $\tan X$



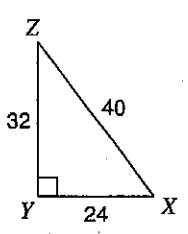
5) $\cos A$



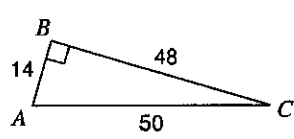
6) $\sin A$



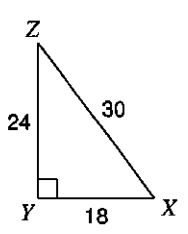
7) $\sin Z$



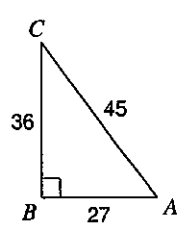
8) $\sin C$



9) $\cos Z$

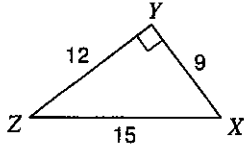


10) $\tan C$

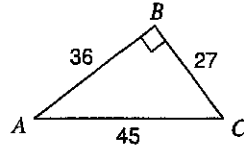


Find the value of each trigonometric ratio to the nearest ten-thousandth.

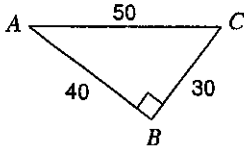
11) $\cos Z$



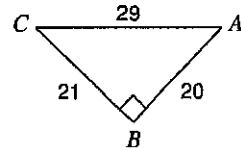
12) $\cos C$



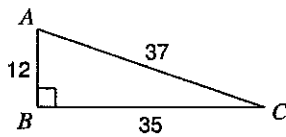
13) $\tan C$



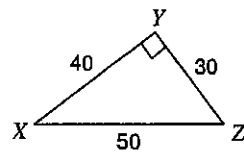
14) $\tan A$



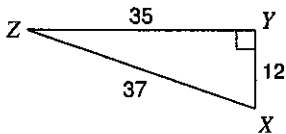
15) $\tan C$



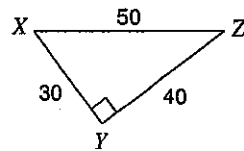
16) $\tan X$



17) $\sin Z$



18) $\sin Z$



19) $\sin 48^\circ$

20) $\sin 38^\circ$

21) $\cos 61^\circ$

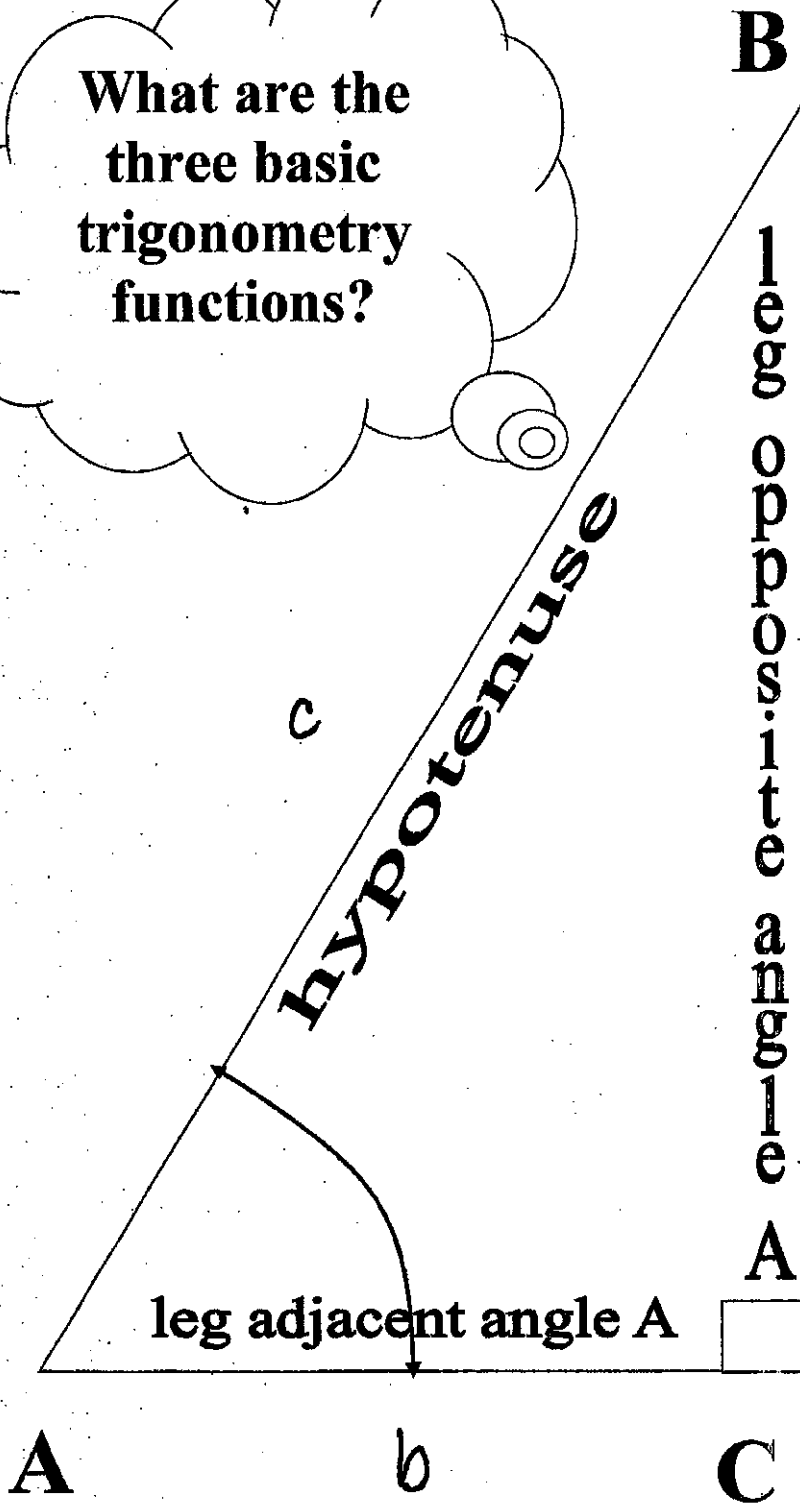
22) $\cos 51^\circ$

Critical thinking questions:

23) Can the sine of an angle ever equal 2? Why or why not?

24) $\sin x = \frac{1}{3}$
Find $\cos x$.

What are the three basic trigonometry functions?



$$\sin A = \frac{\text{opposite leg}}{\text{hypotenuse}}$$

$$\sin A = \underline{\hspace{2cm}}$$

$$\sin B = \underline{\hspace{2cm}}$$

$$\cos A = \frac{\text{adjacent leg}}{\text{hypotenuse}}$$

$$\cos A = \underline{\hspace{2cm}}$$

$$\cos B = \underline{\hspace{2cm}}$$

$$\tan A = \frac{\text{opposite leg}}{\text{adjacent leg}}$$

$$\tan A = \underline{\hspace{2cm}}$$

$$\tan B = \underline{\hspace{2cm}}$$



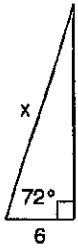
Chief Sohcatoa

Graphic Organizer by Dale Graham and Linda Meyer
 Thomas County Central High School
 Thomasville, Ga.

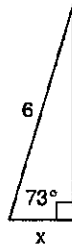
Solving Right Triangles

Find the missing side. Round to the nearest tenth.

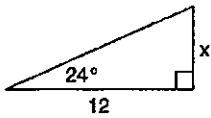
1)



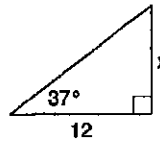
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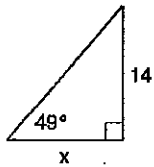
3)



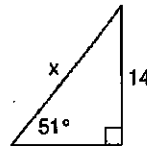
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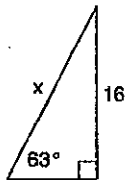
5)



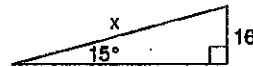
6)



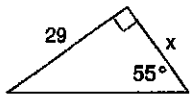
7)



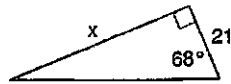
8)



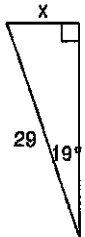
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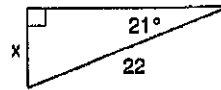
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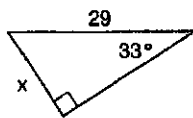
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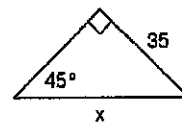
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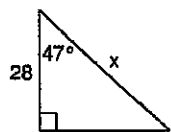
13)



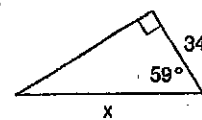
14)



15)



16)



Critical thinking question:

17) Write a new problem that is similar to the others on this worksheet. Solve the question you wrote.

Inverse Trigonometric Ratios

Find each angle measure to the nearest degree.

1) $\sin B = 0.4848$

2) $\sin A = 0.5150$

3) $\cos A = 0.7431$

4) $\cos W = 0.6157$

5) $\cos A = 0.5878$

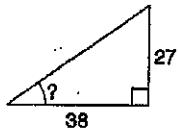
6) $\tan W = 19.0811$

7) $\cos A = 0.4226$

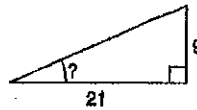
8) $\tan W = 0.5317$

Find the measure of the indicated angle to the nearest degree.

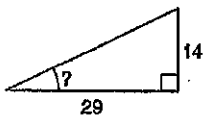
9)



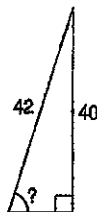
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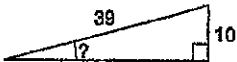
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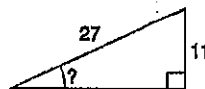
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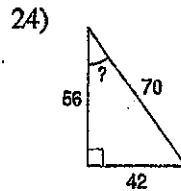
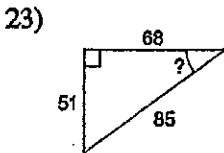
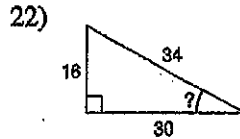
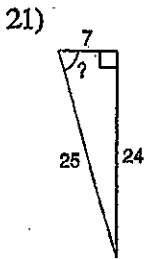
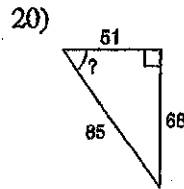
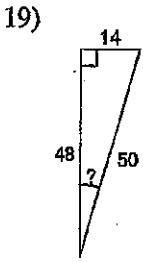
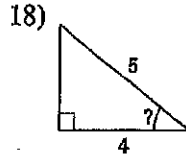
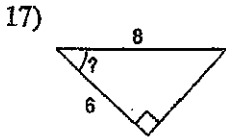
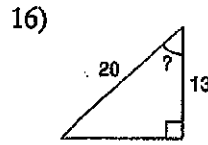
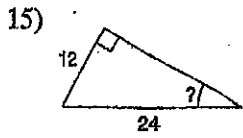


13)



14)

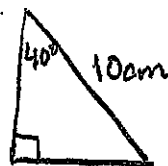




Critical thinking questions:

25) Find an angle x where $\sin x = \cos x$.

26) Draw and label all three sides of a right triangle that has a 40° angle and a hypotenuse of 10 cm.



MAKING PRACTICE FUN 83

Right Triangle Problems

For use after Lesson 14-4

NAME _____

DATE _____

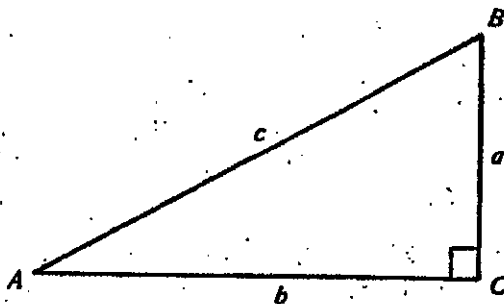
Hidden Message

1. Work each exercise.
2. Shade in the block that contains the answer.
3. Read the message in the unshaded blocks.

Exercises



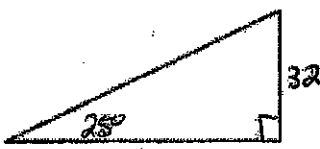

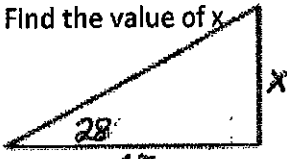

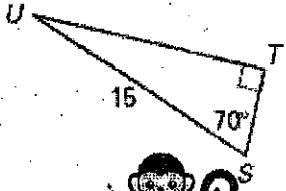

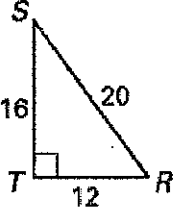

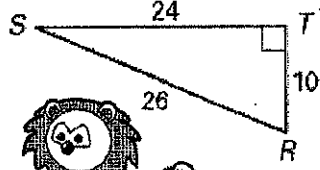
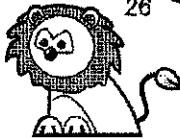
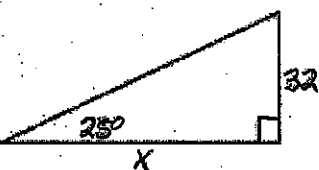

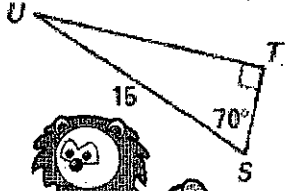

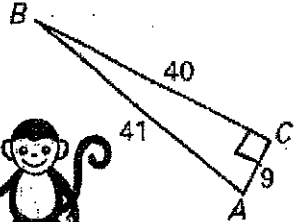




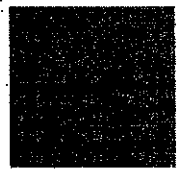
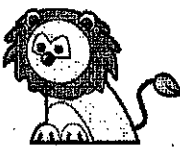


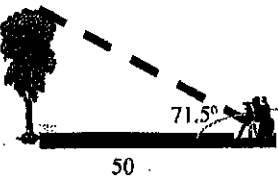

Find angles to the nearest degree. Find sides to the nearest tenth.

1. $\angle A = 40^\circ, b = 10, a = ?$ 8.4
2. $\angle B = 60^\circ, c = 15, b = ?$
3. $b = 4.908, c = 5, \angle A = ?$
4. $a = 1.710, c = 5, \angle B = ?$
5. $a = 1.4, b = 2, \angle A = ?$
6. $\angle A = 34^\circ, c = 100, b = ?$
7. $\angle B = 53^\circ, c = 10, a = ?$
8. $\angle A = 25^\circ, c = 12, a = ?$
9. $\angle B = 45^\circ, a = 16, b = ?$
10. $a = 3, c = 5, \angle A = ?$
11. $a = 4, b = 9, \angle A = ?$
12. $\angle B = 70^\circ, b = 93.9, c = ?$
13. $\angle B = 51^\circ, b = 8, c = ?$
14. $\angle A = 14^\circ, a = 11, c = ?$
15. $a = 40, b = 40, \angle A = ?$
16. $b = 16.18, c = 20, \angle A = ?$



D 66°	O 45°	T 8.4	H 5.1	E 11°
H 100.0	O 10	U 16.0	R 83	E 37°
I 70°	T 45.5	N 5.2	O 36°	W 13
N 35°	I 10.3	C 6.0	E 79°	R 24°

The teacher will assign you a picture. Answer every picture.

<p>Find the value of x</p>  <p>53</p> 	<p>Find the value of x</p>  <p>32</p> 	<p>Find the value of x</p>  <p>15</p> 
<p>Find the value of ST</p>  <p>15</p> <p>70°</p> 	<p>List out the sine, cosine and tangent ratios for angle S</p>  <p>16</p> <p>20</p> <p>12</p> 	<p>List out the sine, cosine and tangent ratios for angle S and R</p>  <p>24</p> <p>26</p> <p>10</p> 
<p>Solve the triangle (find every angle and side measurement) HINT: You already found one length ;)</p>  <p>25°</p> <p>32</p> <p>x</p> 	<p>Solve the triangle (find every angle and side measurement)</p>  <p>15</p> <p>70°</p> 	<p>List out the ratios for $\sin A$, $\sin B$, $\cos A$ and $\cos B$</p>  <p>40</p> <p>41</p> <p>9</p> 
<p>A 12 foot ladder is leaning against a building. The angle of elevation from the ground is at 42°. How far up is the ladder on the building?</p> 	<p>A lighting technician needs to shine a spotlight on an actor. The light is attached to a ceiling 12 feet above the actor's head and aimed at an angle of depression of 40°. How far away should the light be moved so that it perfectly lights the actor?</p> 	<p>A large tree casts a 15 ft. shadow. You measure the angle of elevation to the top of the tree as 42°. How tall is the tree?</p> 
<p>All but two Egyptian pyramids have faces that are inclined at 52° angles. An archaeologist finds an eroding pyramid with a square base have a side length of 84 m. How tall is the pyramid if all faces are inclined at 52°</p>  	<p>Amanda and Tom are given the task of designing a ramp to the front entrance of their school. The total rise of the ramp must be 5 ft and the angle of the ramp must be 15°. How long will the ramp be?</p>  	<p>A surveyor is standing 50 feet from the base of a large tree. The surveyor measures the angle of elevation to the top of the tree as 71.5°. How tall is the tree?</p>  <p>50</p> 

12
21

Task I

Name _____

For each problem; 1) draw a picture and label appropriately, 2)set up an equation to solve for the missing piece, and 3)write you answer in sentence form.

1. A road ascends a hill at an angle of 4 degrees. For every 1000 feet of road, how many feet does the road ascend?
2. A 12-foot slide is attached to a swing set. The slide makes a 65 degree angle with the swing set. Estimate the height of the top of the slide.
3. Michelle's house is 22 miles due north of Jan's house and northeast of Richard's house. Richard's house is due west of Jan's house. How far is it from Michelle's house to Richard's house?
4. When a space shuttle returns from a mission, the angle of its descent to the ground from the final 10,000 feet above the ground is 17 degrees. Determine how far the shuttle is from its landing spot.
5. Suzie is using a clinometer to determine the height of a building. She places the clinometers 50 feet from the base of the building and measures the angle of elevation to be 72 degrees. Draw a diagram that models this situation and find the distance from the clinometer to the top of the building.
6. A ladder leaning against the side of a shed makes a 57 degree angle with the ground. How tall is the ladder and what is the angle that the ladder makes with the shed?

1.	2.
----	----

3.	4.
5.	6.

13

Applications of Right Triangles

- Read each problem carefully
 - Draw and label the triangle
 - Set up the equation and solve
1. A boy who is flying a kite lets out a 300 ft string which makes an angle of 52 degrees with the ground. Assuming that the string is stretched taut, find, to the nearest foot, how high the kite is above the ground.

 2. Find to the nearest degree the angle which the sun's rays make with the ground when a flagpole 40 feet high casts a shadow 30 feet long.

 3. An airplane rises at an angle of 14 degrees with the ground. Find, to the nearest foot, the distance it has flown when it has covered a horizontal distance of 15,000 feet.

 4. A 40 foot ladder which is leaning against a wall reaches the wall at a point 36 feet off the ground. Find, to the nearest degree, the angle which the ladder makes with the wall.

 5. In a rectangle ABCD, diagonal AC, which is 20 inches in length, makes an angle of 35 degrees with the base of AB.
 - a. Find AB, the base of the rectangle, to the nearest tenth of an inch.
 - b. Find CB, the altitude of the rectangle, to the nearest tenth of an inch.

6. At a point on the ground 40 feet from the base of a tree, the angle of elevation of the top of the tree is 42 degrees. Find the height of the tree to the nearest tenth of a foot.

7. From the top of the lighthouse 160 feet high, the angle of depression of a boat out at sea is 24 degrees. Find, to the nearest foot, the distance from the boat to the foot of the lighthouse, the foot being at sea level.

8. The hypotenuse of a right triangle measures 14 cm. One of the two acute angle measures is 34 degrees. What is the perimeter of the triangle?

9. Trains have a very difficult time climbing steep inclines. If the maximum angle that a train can climb is 3 degrees, how many miles long must the tracks be to climb a 7000 ft high mountain pass? Round to the nearest mile?