Geometry
Chapter 7
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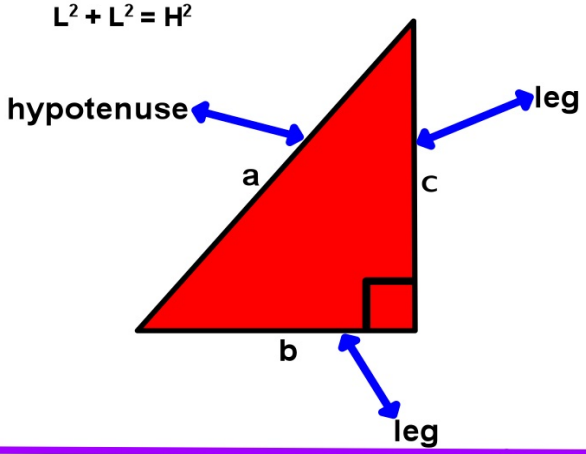
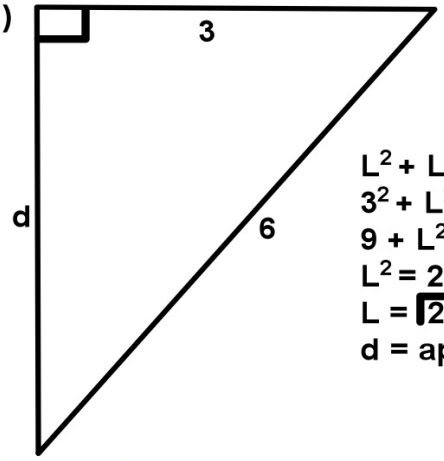
CHAPTER 7.2 PYTHAGOREN THEOREM

OBJECTIVE: TSW use the Pythagorean Theorem and it's converse.

$L^2 + L^2 = H^2$



ex. 1)



$L^2 + L^2 = H^2$

$3^2 + L^2 = 6^2$

$9 + L^2 = 36$

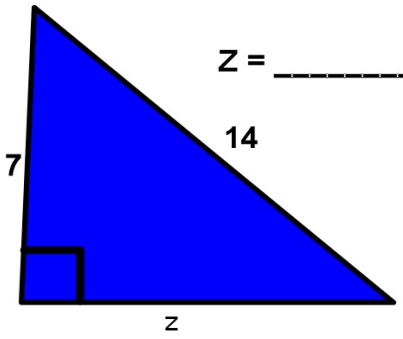
$L^2 = 27$

$L = \sqrt{27}$ or

d = approx. 5.2

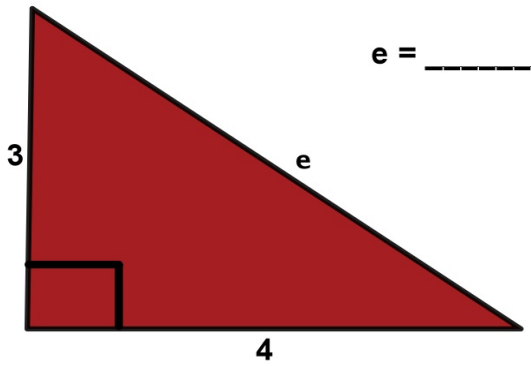
ex.2

Z = _____



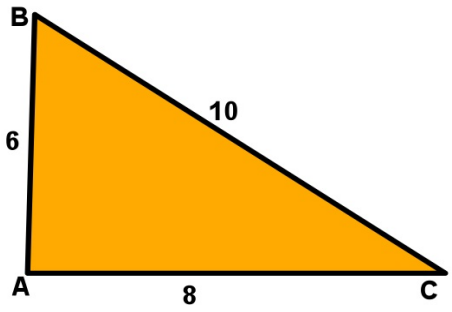
ex. 3)

e = _____



The converse of the Pythagoren Theorem is also true, i.e. if i am given a triangle i can check to see if it is really a right triangle.

Theorem: If the sum of the squares of two sides of a triangle is equal to the square of the longest side then it is a right triangle.



If $6^2 + 8^2 = 10^2$ then $\triangle ABC$ is a right triangle

Pythagoren Triple: Three <u>whole numbers</u> that satisfy the equation $L^2 + L^2 = H^2$

ex. 4) Determine if each set of measures are the sides of a right triangle. If so, do they form a pythagoren triple?

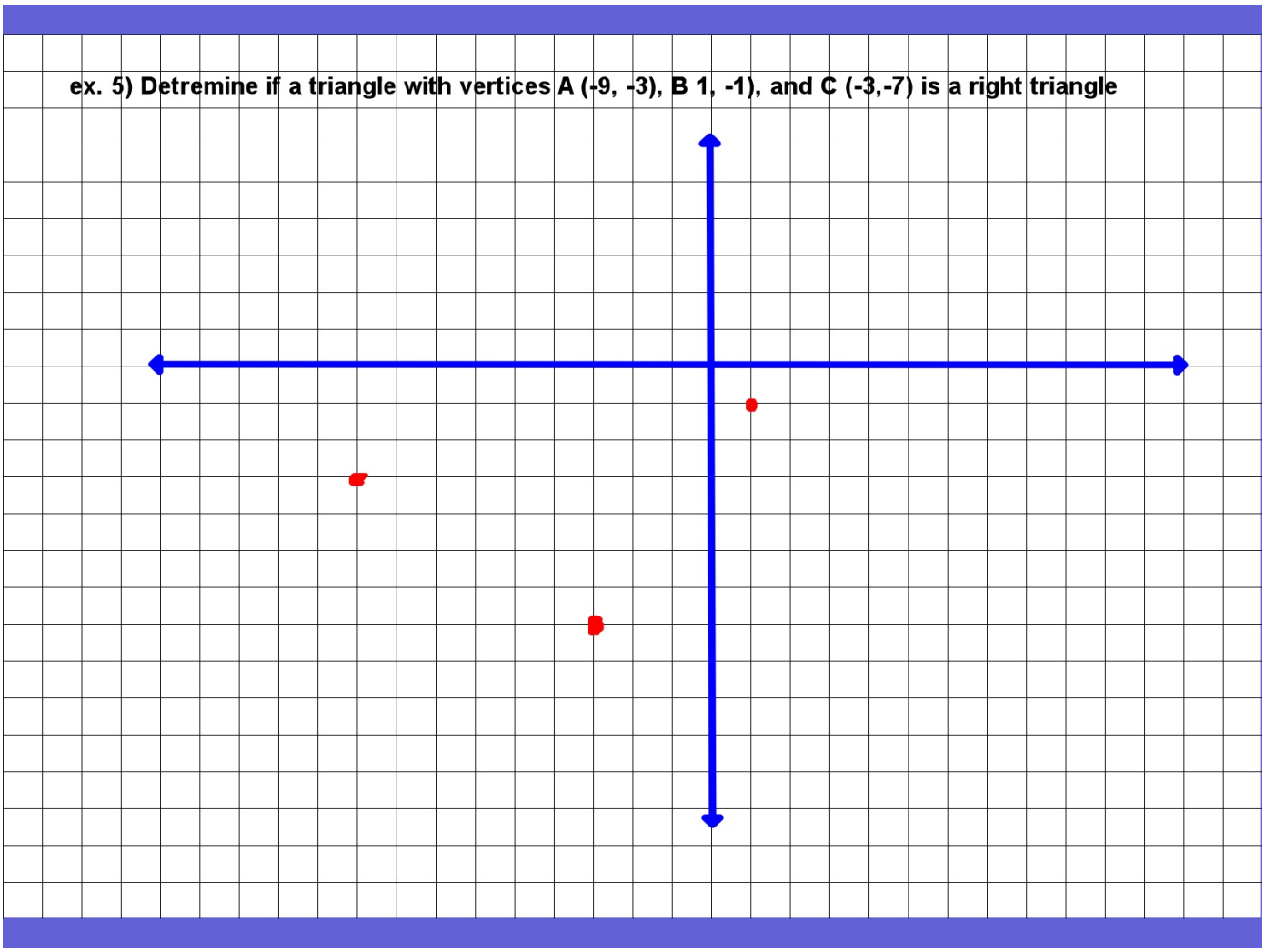
a) 9, 12, 15

b) 21, 42, 54

c) 1.2, 1.6, 2

d) 3/5, 4/5, 1

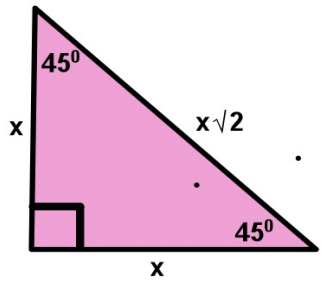
ex. 5) Detremine if a triangle with vertices A (-9, -3), B 1, -1), and C (-3,-7) is a right triangle



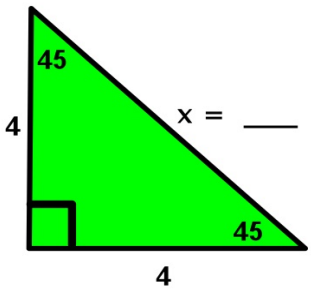
7.3 Special RIght Triangles

OBJECTIVE: TSW use properties of 45-45-90 and 30-60-90 triangles.

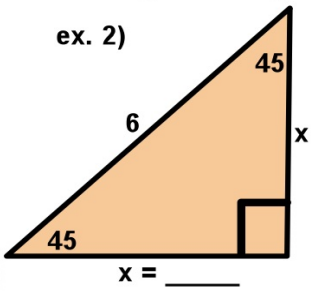
Theorem: In a 45-45-90 triangle the length of the hypotneuse is $\sqrt{2}$ times the length of a leg



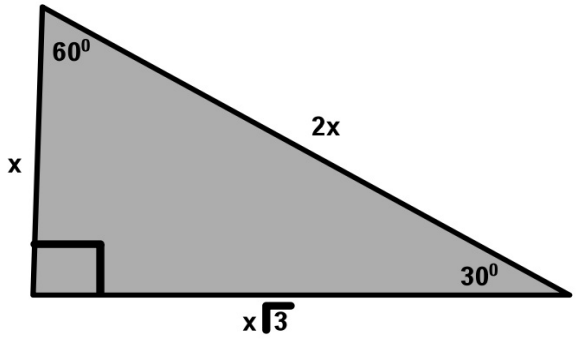
ex.1)



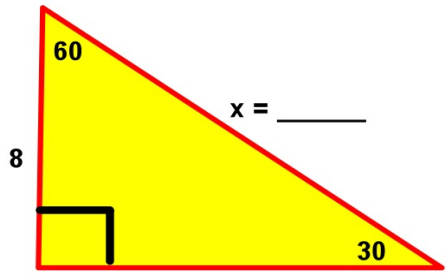
ex. 2)



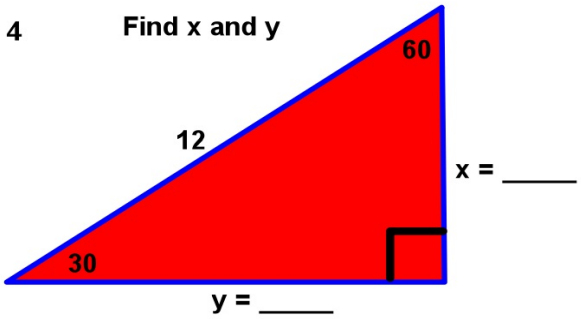
Theorem: In a 30-60-90 triangle the length of the hypotneuse is twice the length of the shortest leg and the longer leg is $\sqrt{3}$ times the length of the shorter leg.



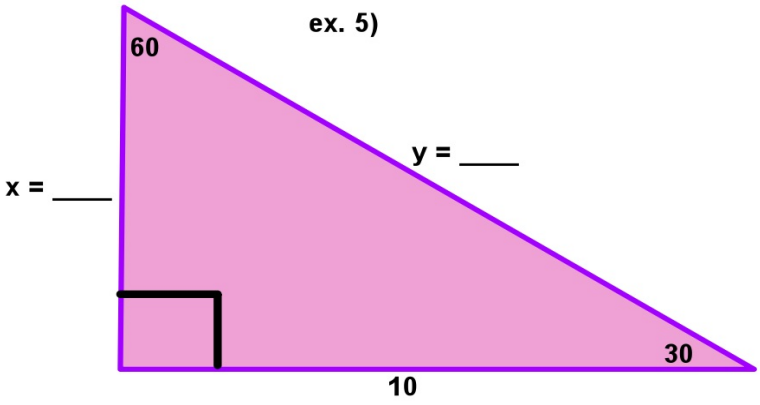
ex. 3)



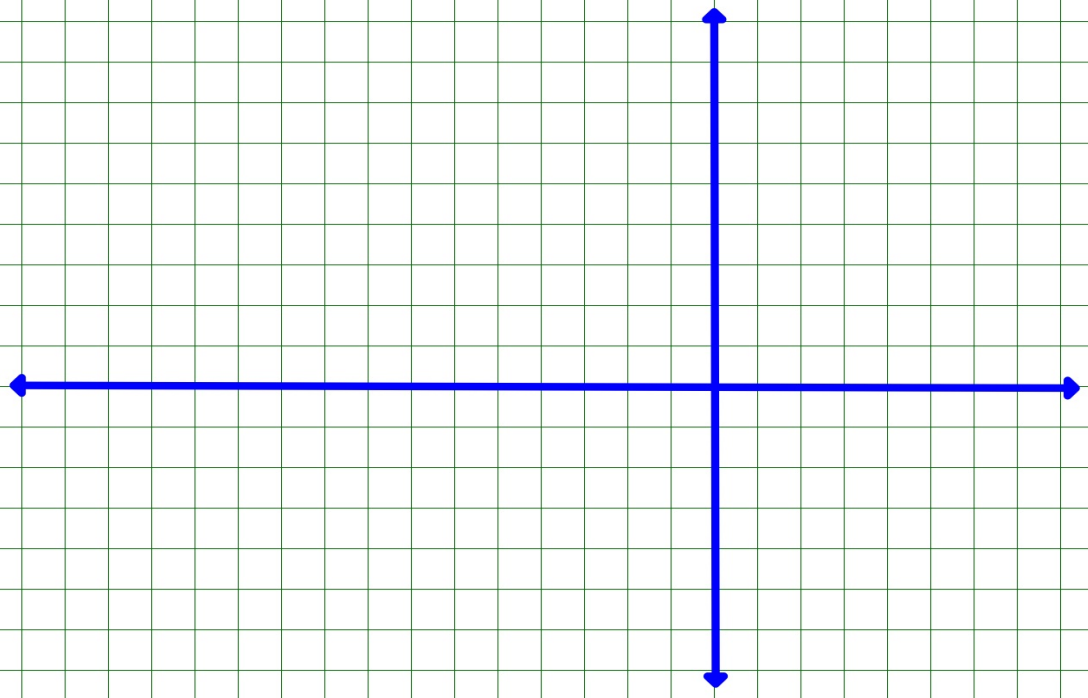
ex. 4 Find x and y



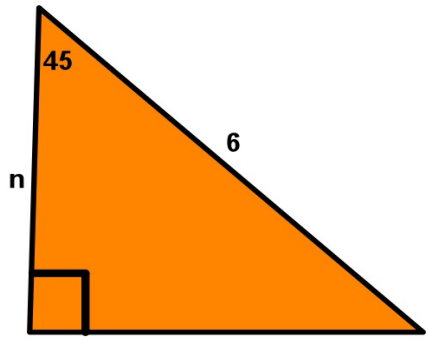
ex. 5)



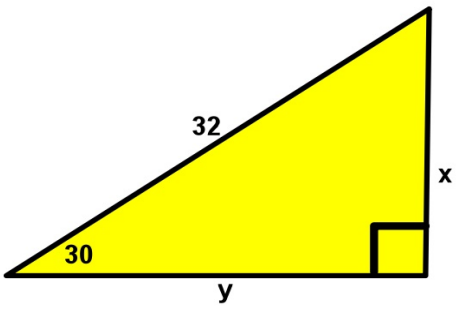
ex. 6) $\triangle WXY$ is a 30-60-90 triangle with a right angle x and WX is the longest leg. Graph points x (-2,7) and y (-7,7) and locate point w in quadrant III.



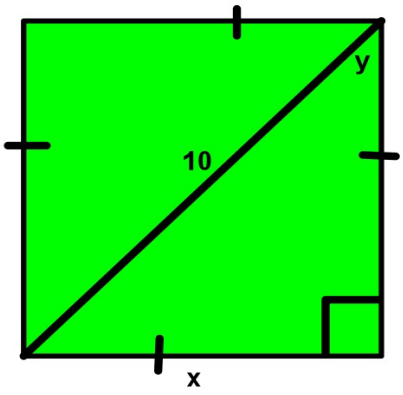
ex. 7) n = _____



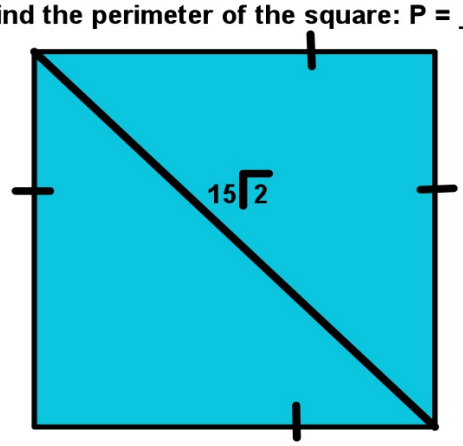
ex. 8) x = _____, y = _____



ex. 9) x = ____, y = ____

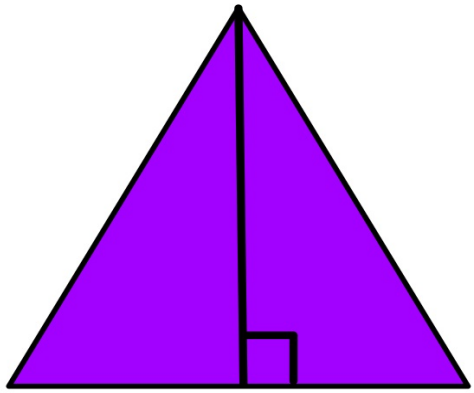


ex. 10) Find the perimeter of the square: P = _____

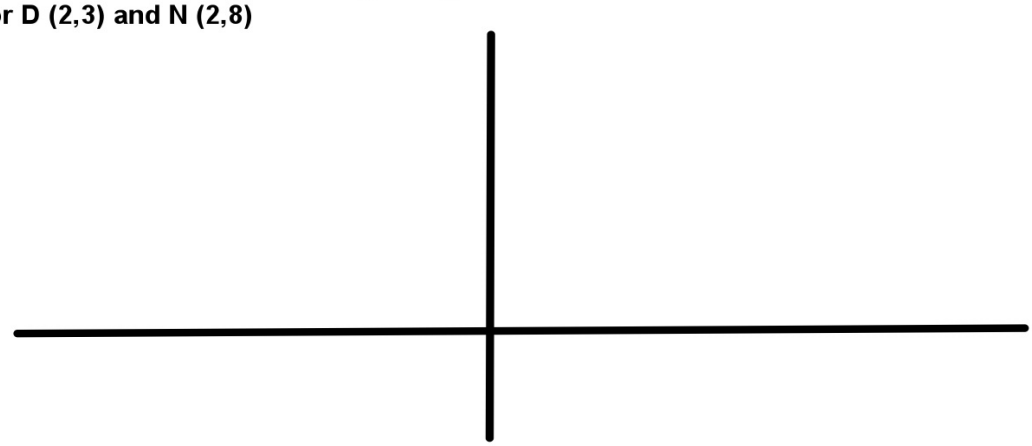


ex. 11) The side of an equlateral triangle is 21"
Find the length of the altitude of the triangle

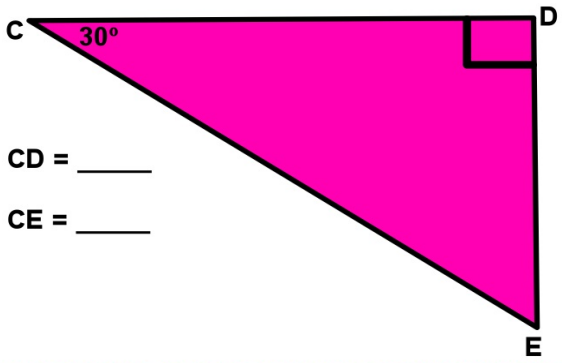
Altitude = _____"



ex. 12) Triangle MUD is a 45-45-90 triangle with right angle D. Find the coordinates of M in quadrant II for D (2,3) and N (2,8)



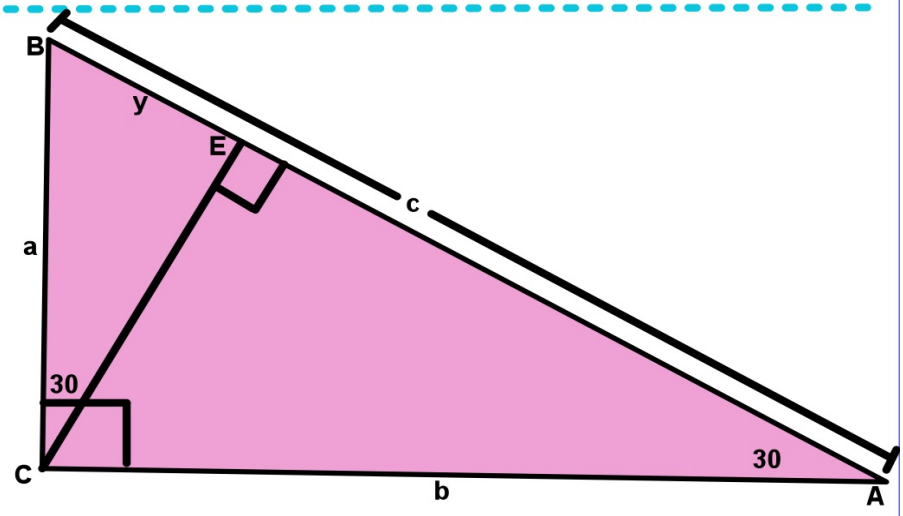
ex. 13) Find CD and CE if DE = 5



CD = _____

CE = _____

ex. 14) If a = $10\sqrt{3}$ find CE and y



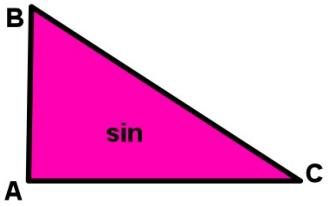
CE = ____

y = _____

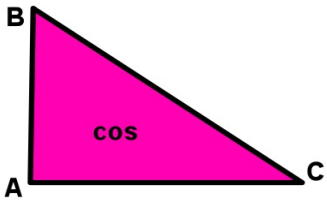
Ch 7.4 Trigonometry

OBJECTIVE: TSW find trigonometric ratios using right triangles and solve problems using trigonometric ratios

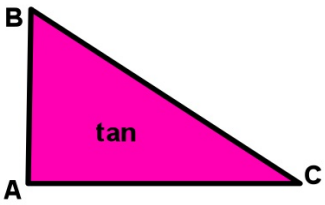
Trigonometric Ratio: a ratio of the lengths of the sides of a right triangle.
The most common are sine (sin), cosine (cos), and tangent (tan)



$$\sin = \frac{\text{measure of opposite leg}}{\text{measure of the hypotenuse}} \qquad \sin = \frac{O}{H} \qquad \frac{\text{OSCAR}}{\text{HAS}}$$



$$\cos = \frac{\text{measure of adjacent leg}}{\text{measure of the hypotenuse}} \qquad \cos = \frac{A}{H} \qquad \frac{A}{HAT}$$



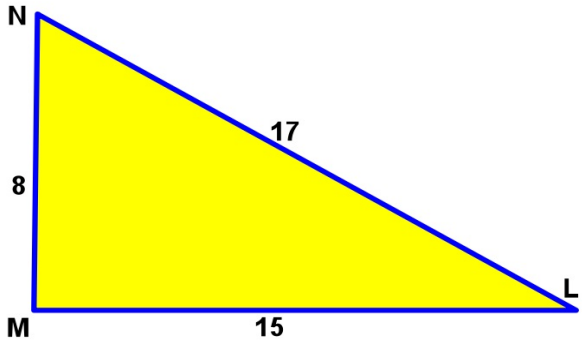
$$\tan = \frac{\text{measure of opposite}}{\text{measure of adjacent}} \qquad \tan = \frac{O}{A} \qquad \frac{\text{ON}}{\text{ALWAYS}}$$

ex. 1) Flnd sin L, cos L, tan L
sin N, cos N, tan N

sin L = _____ sin N = _____

cos L = _____ cos N = _____

tan L = _____ tan N = _____



ex. 2) Using your calculator find the following measurements to the nearest 10,000th's

tan 56° = _____ sin 67° = _____

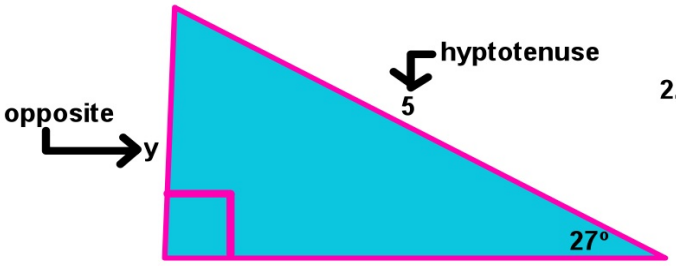
cos 89° = _____ tan 13° = _____

cos 39° = _____ sin 45° = _____

To use the trig functions
1. mode
2. degree (flashing)
3. enter
4. 2nd
5. mode

ex. 3) Find y

y = _____



STEPS:

1. determine which trig function to use
   i.e. what do we <u>know</u> or <u>want to know</u> in relation to the known angle?
   opposite, adjacent, or hypotenuse?
2. set up equation

$$\sin 27 = \frac{y}{5}$$

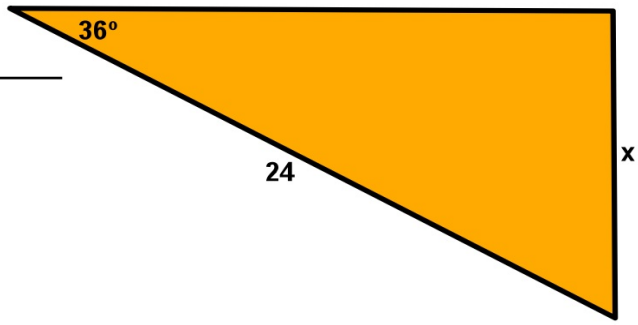
$$.4539 = \frac{y}{5}$$

$$(5)(.5439) = y$$

$$2.27 = y$$

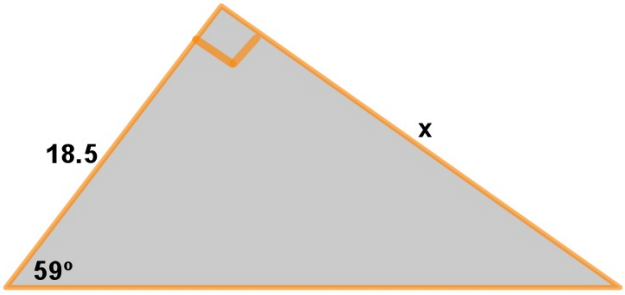
ex. 4) Find x

x = _____



ex. 5)

x = _____

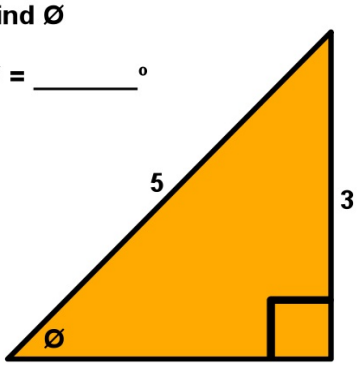


NOTE: to find the side length we use sin, cos, or tan

to find the angle measure we use the inverse of sin, cos, or tan

ex. 6) Find Ø

Ø = _____°



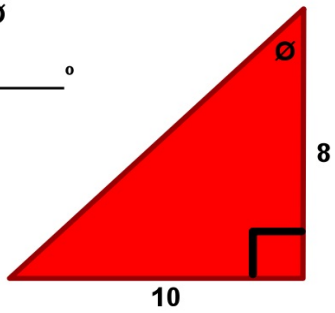
STEPS:

1. determine which trig function to use
   i.e. what do we know in
   relation to the unknown angle?
   opposite, adjacent, or hypotenuse?
2. set up equation

sin Ø = 3/5
in your calulator hit "inverse sin 3/5"
should look like: $\sin^{-1}(3/5)$
hit enter to get the angle measure of Ø

ex. 7) Find Ø

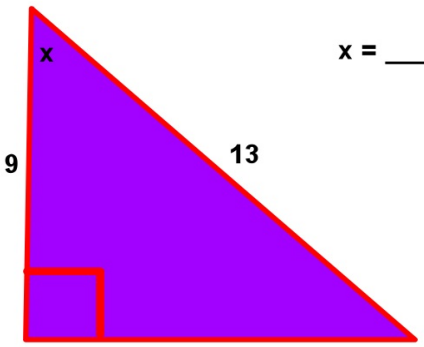
Ø = _____°



Remember when you are looking for an angle measure you must use the inverse of sin, cos, and tan.

ex. 8)

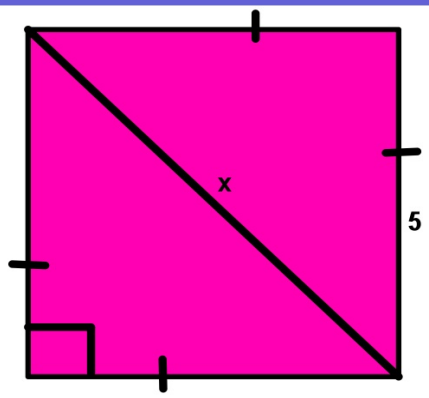
x = _____°



ex. 9) Find the measue to the nearest 10^{th} if cosB = .8926 and B is an acute angle.

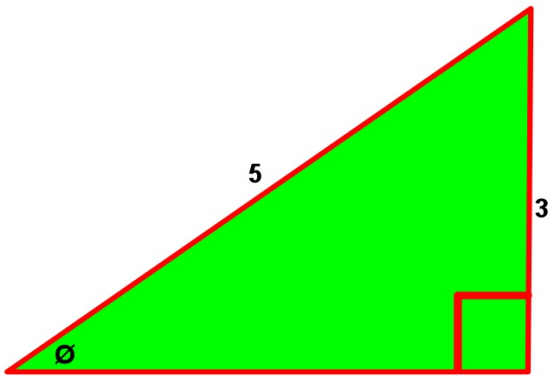
ex. 10) Find the length of the diagional

X = _____



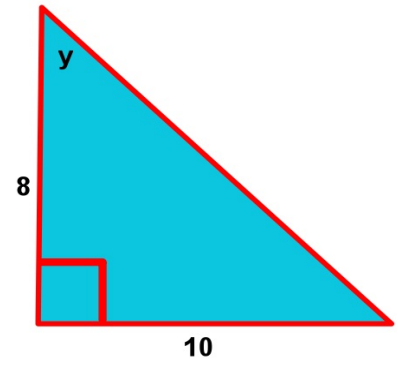
ex. 11) Find Ø

Ø = _____°



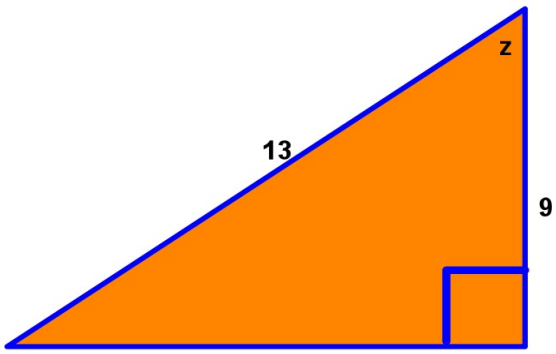
ex. 12) Find y

y =_____°



ex. 13) Find z

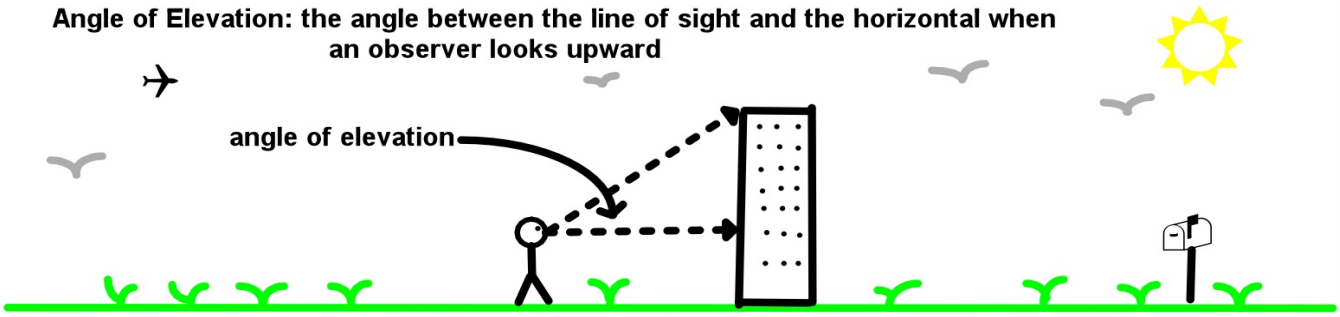
z = _____°



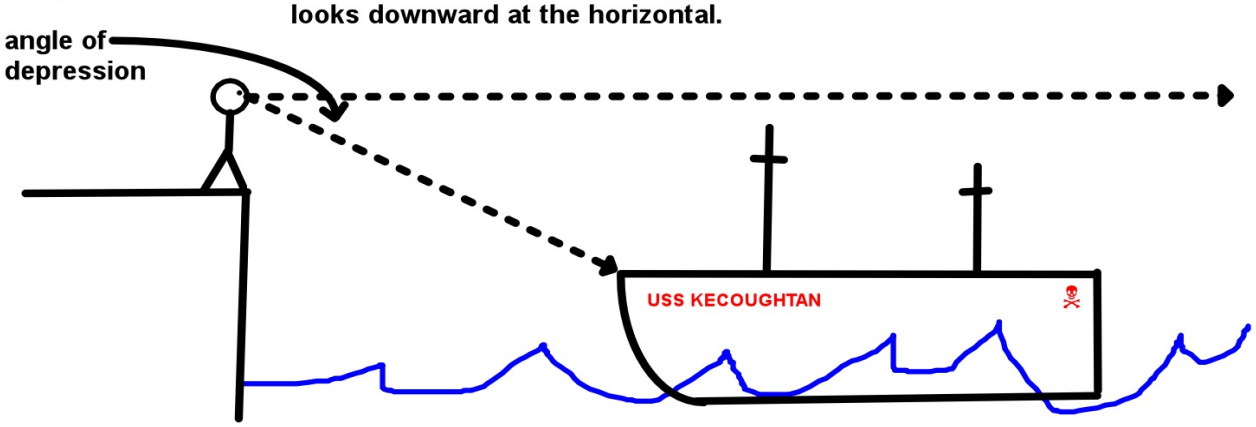
Ch. 7.5 Angles of Elevation and Depression

OBJECTIVE: TSW solve problems involving angles of elevation and angles of depression.

Angle of Elevation: the angle between the line of sight and the horizontal when an observer looks upward



Angle of Depression: the angle between a line of sight when an observer looks downward at the horizontal.



ex. 1) **At the circus a person in the audience at ground level watches the tight-rope routine. A 5'6" acrobat is standing on a platform 25' off the ground. How far is the audience member from the base of the platform if the angle of elevation from the audience members line of sight to the top of the acrobat is 27°?**

ex. 2) A wheelchair ramp is 3 meters long and inclines at 6°. FInd the height of the ramp to the nearest 1000^{th} of a meter.

ex. 3) **Kyle is on the deck of a cruise ship and abserves two dolphins following each other directly away from the ship in a straight line. The angle of depression of the two dolphins are 36º and 37º. Find the distance between the two dolphins if Kyle's position is 154 meters above sealevel.**

ex. 4) **Find the angle of the sun when a 6 meter flagpole cast a 17 meter shadow.**

ex. 5) The top of a tower is 250' above sealevel. The angle of depression from the top of the tower to a passing ship is 19°. How far is the foot of the tower from the ship?

ex. 6) Two boats are observed by a parasailer 25 meters above the lake. The angle of depression is 7° and 13°. How far apart are the boats?

ex. 7) Find the angle of depression.

angle of depression = _____°