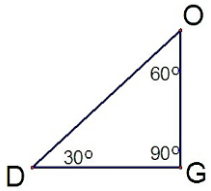
Name: _____ Block: __

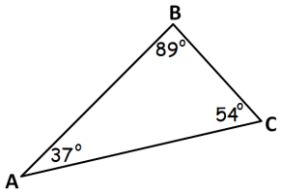
Pythagorean Theorem

Angle Side Relationship Theorem. In a triangle, the side opposite the largest angle is the largest side. The side opposite of the smallest angle is the smallest side.
- Capital letters are used to represent angles and lowercase letters are used to represent sides.

Ex.1 Label the sides. What is the smallest side?

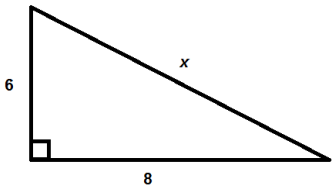


Ex.2 Label the sides. What is the longest side?

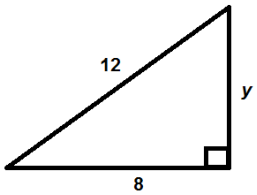


The Pythagorean Theorem – Can only be used on right triangles. It is used to find missing side lengths given two sides. $a^2 + b^2 = c^2$
- The longest side of a right triangle is called the **hypotenuse**.
- The other sides are called legs, short leg and long leg.

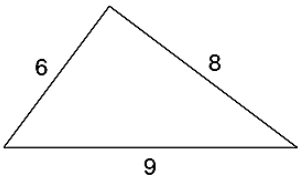
Ex.3



Ex.4



Ex.5 Determine whether the triangle is a right triangle.

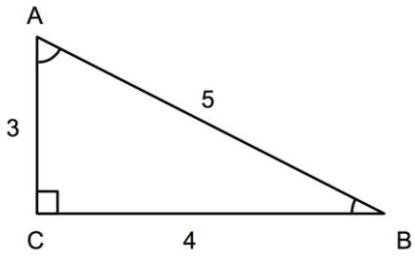


Ex.6 Determine whether the triangle is a right triangle. $a = 10, b = 24, c = 26$

Trigonometric Ratios

Trigonometry – is the study of triangles.
Ratio – the relation between two quantities.
Adjacent side – the leg next to an acute angle in a right triangle that is not the hypotenuse.
Opposite side – the side across from an angle in a triangle.

Sine = _____ Cosine = _____ Tangent = _____



$\sin A =$ _____ $\sin B =$ _____

$\cos A =$ _____ $\cos B =$ _____

$\tan A =$ _____ $\tan B =$ _____

Solving Trig Equations

Ex.1 $sinx = \frac{3}{5}$

Ex.2 $\cos\theta = \frac{2}{3}$

Ex.3 $\tan\theta = \frac{1}{4}$

Ex.4 $sin\theta = 0.6$

Ex.5 $\sin 30^o = \frac{x}{6}$

Ex.6 $\cos 71^o = \frac{x}{8}$

Ex.6 $\tan 20^o = \frac{x}{7}$

Ex.8 $\sin 54^o = \frac{3}{x}$

Ex.9 $\cos 27^o = \frac{7}{x}$

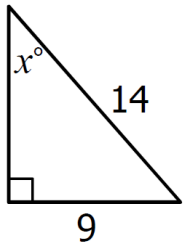
Ex.10 $\tan 45^o = \frac{6}{x}$

Right Triangle Trigonometry

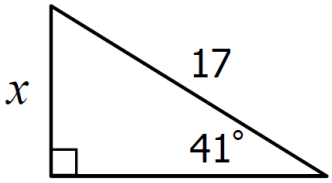
Finding missing angles
Step 1: Name the two sides we know: adjacent, opposite, and hypotenuse
Step 2: Use SOHCAHTOA to decide whether to use sine, cosine, or tangent.
Step 3: Write the trig equation
Step 4: Solve the equation

Finding missing sides
Step 1: Name the two sides we are using; one we are trying to find and one we already know.
Step 2: Use SOHCAHTOA to decide whether to use sine, cosine, or tangent.
Step 3: Write the trig equation.
Step 4: Solve the equation.

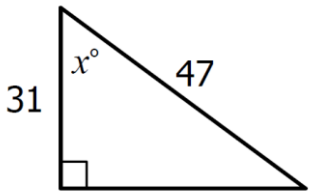
Ex.1 Solve for x.



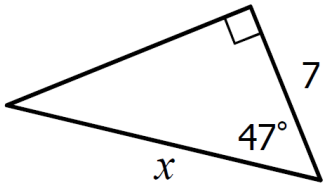
Ex.2 Solve for x.



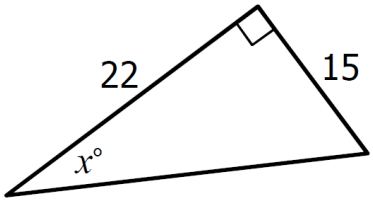
Ex.3



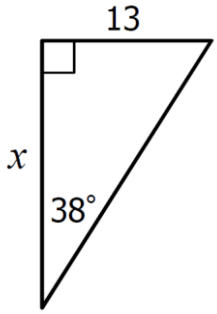
Ex.4



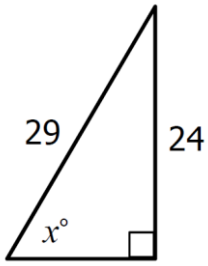
Ex.5



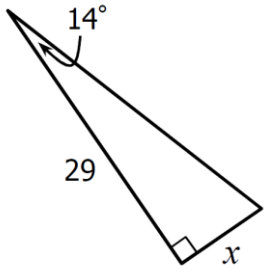
Ex.6



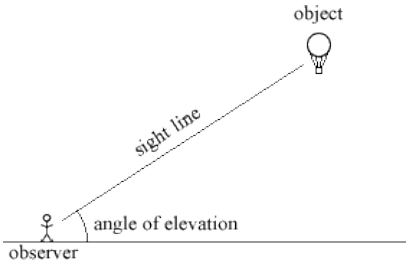
Ex.7

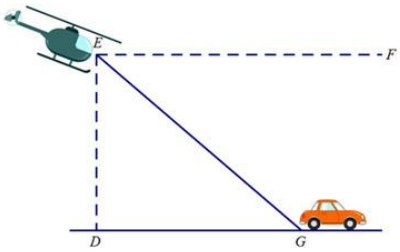


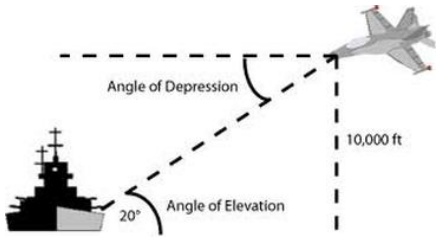
Ex.8



Application







Angles of elevation

Ex.1 Jack is at the zoo looking up at a monkey sitting on top of a pole. If Jack is standing 24 feet from the foot of the pole and the angle of elevation from Jack to the top of the pole is 23^o, find the height of the pole.

Ex.2 The angle of elevation from Allison to the top of the Statue of Liberty is 70^0. If the Statue of Liberty is 305 feet, how far is Allison standing from its base?

Ex.3 Katelyn's Mom is standing at the bottom of a water slide waiting for Katelyn to slide down. If the top of the slide is 40 feet from the ground and the slide is 487 feet long, what is the angle of elevation from Katelyn's Mom to Katelyn?

Ex.4 Jaden is looking up at the top of a 56-foot rock climbing the wall. If Jaden is standing 15-feet from the base of the wall, what is the angle of elevation from Jaden to the top of the wall?

Angles of depression

Ex.5 The angle of depression from a helicopter to a landing pad is 37^o. If the helicopter is 1,250 feet from the ground, what is the horizontal distance from the helicopter to the landing pad?

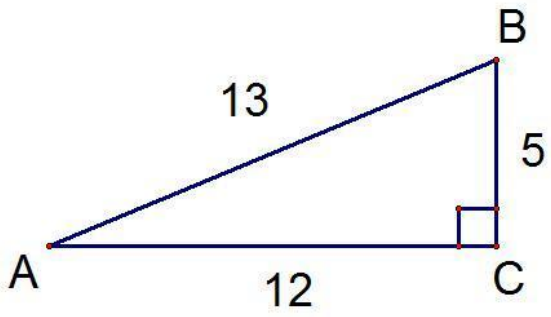
Ex.6 Claire climbed to the top of a 164 feet lighthouse and spotted a water fountain on the ground below. If the angle of depression from the lighthouse to the fountain is 54^o, how far is the fountain from the base of the lighthouse?

Ex.7 While on a hot air balloon ride over Washington D.C., Xavier spots the White House below. If the horizontal distance from the White House to the hot air balloon is 1,475 feet and the hot air balloon is 1,109 feet from the ground, what is the angle of depression from Xavier to the White House?

Ex.8 Michael is standing on the top of the bleachers watching the football team play. He spots the team mascot on the field. If the bleachers are 40 feet tall and the horizontal distance from Michael to the mascot is 68 feet, what is the angle of depression from Michael to the Mascot?

Complements

RECALL: Complementary angles are angles that add to be 90^o.



$\sin A = \_\_\_\_\_$ $\quad\quad$ $\cos B = \_\_\_\_\_$

$\cos A = \_\_\_\_\_$ $\quad\quad$ $\sin B = \_\_\_\_\_$

$\tan A = \_\_\_\_\_$ $\quad\quad$ $\tan B = \_\_\_\_\_$

$$If\ A + B = 90^o, then\ \sin A = cosB$$

Ex.1 $sin30^o = \cos \_\_\_\_\_$	Ex.2 $cos25^o = \sin \_\_\_\_\_$
Ex.3 $sin9^o = \sin \_\_\_\_\_$	Ex.4 $sin9^o = \cos \_\_\_\_\_$
Ex.5 $sin44^o + cos10^o = cos46^o + \sin \_\_\_\_\_$	Ex.6 $cos28^o + cos31^o = \sin 62^o + \sin \_\_\_\_\_$