

4-15-19

Aim: SWBAT use the Pythagorean Theorem to solve real life problems.

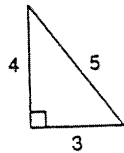
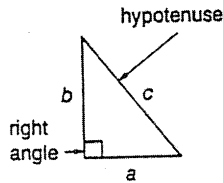
HW: Packet Pages 25 - 26, 34

Review due Tomorrow & Test Wednesday

Do Now: Packet Page 23

HW: Solving Triangles Using Pythagorean Theorem

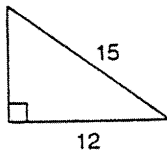
In a right triangle, the square of the hypotenuse, c , is equal to the sum of the squares of the lengths of the other two sides, a and b .



$$\begin{aligned} c^2 &= a^2 + b^2 \\ 5^2 &= 3^2 + 4^2 \\ 5^2 &= 9 + 16 \\ 25 &= 25 \end{aligned}$$

Replace the variables in $c^2 = a^2 + b^2$ by the correct values from the right triangles below.

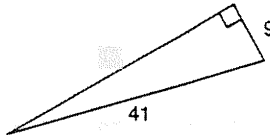
1.



$$c^2 = a^2 + b^2$$

$$15^2 = 9^2 + 12^2$$

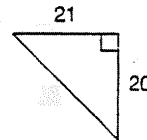
2.



$$c^2 = a^2 + b^2$$

$$41^2 = 9^2 + 40^2$$

3.

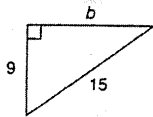


$$c^2 = a^2 + b^2$$

$$29^2 = 21^2 + 20^2$$

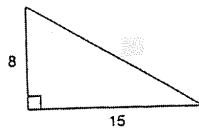
Use the Pythagorean Theorem to find the missing measure for each right triangle.

4.



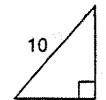
$$\begin{aligned} a^2 + b^2 &= c^2 \\ 9^2 + b^2 &= 15^2 \\ 81 + b^2 &= 225 \\ -81 & \quad -81 \\ \hline \sqrt{b^2} &= \sqrt{144} \\ b &= \pm 12 \\ & \text{reject } -12 \end{aligned}$$

5.



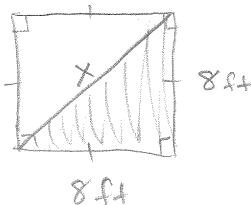
$$\begin{aligned} a^2 + b^2 &= c^2 \\ 8^2 + 15^2 &= c^2 \\ 64 + 225 &= c^2 \\ \sqrt{289} &= \sqrt{c^2} \\ \pm 17 &= c \\ & \text{reject } -17 \end{aligned}$$

6.



$$\begin{aligned} a^2 + b^2 &= c^2 \\ 8^2 + b^2 &= 10^2 \\ 64 + b^2 &= 100 \\ -64 & \quad -64 \\ \hline \sqrt{b^2} &= \sqrt{36} \\ b &= \pm 6 \\ & \text{reject } -6 \end{aligned}$$

7) Find the length of the diagonal of a square if the length of the side of the square is 8 feet. (Express your answer in simplest radical form.)



$$\begin{aligned} a^2 + b^2 &= c^2 \\ 8^2 + 8^2 &= c^2 \\ 64 + 64 &= c^2 \\ \sqrt{128} &= \sqrt{c^2} \\ \pm 8\sqrt{2} &= c \\ & \text{reject } -8\sqrt{2} \end{aligned}$$

1, 4, 9, 16, 25, 36, 64, 81

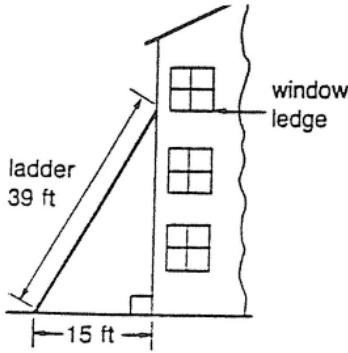
$$\begin{aligned} \sqrt{128} \\ \sqrt{64 \cdot 2} \\ \sqrt{64} \cdot \sqrt{2} \\ 8\sqrt{2} \end{aligned}$$

The diagonal is $8\sqrt{2}$ ft.

SWBAT Use the Pythagorean Theorem to solve real life problems.

Do Now:

How high is the top window ledge above the ground?

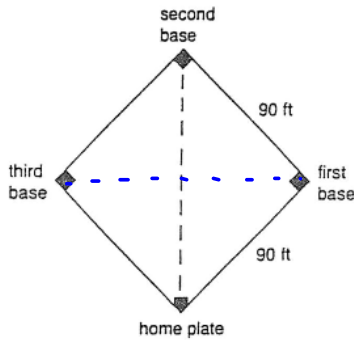


$$\begin{aligned}
 a^2 + b^2 &= c^2 \\
 a^2 + 15^2 &= 39^2 \\
 a^2 + 225 &= 1521 \\
 -225 &-225 \\
 \hline
 a^2 &= \sqrt{296} \\
 a &= \pm 36
 \end{aligned}$$

The window ledge is 36 ft off the ground.

There are many "real life" situations for which the Pythagorean Theorem can be used to solve problems. When a situation is modeled by the Pythagorean Theorem, draw a diagram with the given information to help you set up and solve the problem.

- 1) A catcher throws a baseball from home plate to second base. How many feet does the ball travel? (Round answer to the nearest foot.)



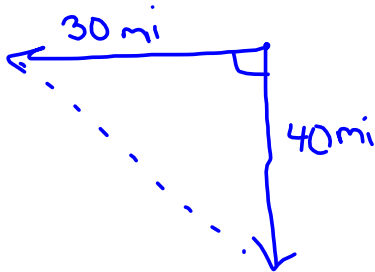
$$\begin{aligned}
 a^2 + b^2 &= c^2 \\
 90^2 + 90^2 &= c^2 \\
 8100 + 8100 &= c^2 \\
 \sqrt{16200} &= \sqrt{c^2} \\
 \pm 127.279... &= c
 \end{aligned}$$

The ball will travel about 127 ft.

- 2) Look at the baseball diamond in Exercise 1 above. What is the shortest distance from third base to first base (nearest foot)?

Same work as #1

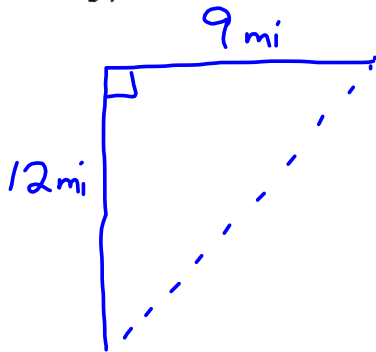
- 3) Mindy and Christine started from the same point. Christine traveled west at a rate of 30 miles per hour. Mindy travelled south at a rate of 40 miles per hour. How far apart were they at the end of one hour?



$$\begin{aligned}
 a^2 + b^2 &= c^2 \\
 30^2 + 40^2 &= c^2 \\
 900 + 1600 &= c^2 \\
 \sqrt{2500} &= \sqrt{c^2} \\
 \pm 50 &= c
 \end{aligned}$$

They are 50 miles apart.

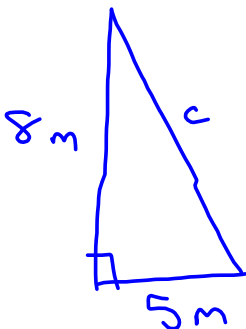
- 4) A helicopter flies 9 miles due west, and then 12 miles due south. How far is it from its starting point?



$$\begin{aligned}
 a^2 + b^2 &= c^2 \\
 9^2 + 12^2 &= c^2 \\
 81 + 144 &= c^2 \\
 \sqrt{225} &= \sqrt{c^2} \\
 \pm 15 &= c
 \end{aligned}$$

It's 15 miles from its starting point.

- 5) A utility pole is 8 meters high. A cable is stretched from the top of the pole to a point on the ground that is 5 meters from the bottom of the pole. How long is the cable?
(Round to the nearest meter)



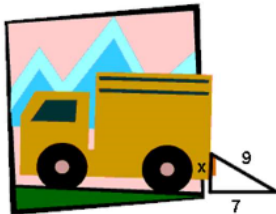
$$\begin{aligned}
 a^2 + b^2 &= c^2 \\
 8^2 + 5^2 &= c^2 \\
 64 + 25 &= c^2 \\
 \sqrt{89} &= \sqrt{c^2} \\
 \pm 9.433... &= c
 \end{aligned}$$

The cable is about 9 meters long.

HW: Solving real life problems using the Pythagorean Theorem.

1) A triangle has sides 6, 7 and 10. Is it a right triangle? Show or explain your work.

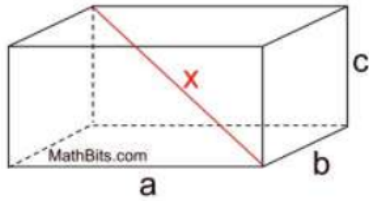
2) A ramp was constructed to load a truck. If the ramp is 9 feet long and the horizontal distance from the bottom of the ramp to the truck is 7 feet, what is the height from the ground to the top of the ramp? (*Round your answer to the nearest tenth of a foot*)



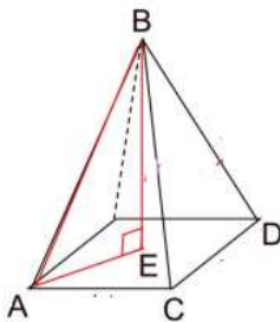
3) A computer monitor is listed as being 19 inches. This distance is the diagonal distance across the screen. If the screen measures 10 inches in height, what is the actual width of the screen to the nearest inch.

4) A ladder is leaning against the wall. The base of the ladder is 6 feet from the wall and the ladder reaches 12 feet up the wall. Find, to the nearest tenth of a foot, the length of the ladder.

**5) Find the value of x given $a = 10$ cm. , $b = 4$ cm. and $c = 5$ cm.



**6) Find the VOLUME of the square pyramid drawn below. Express your answer in simplest radical form and to the nearest tenth given $AB=13$ and $AE=5$ and $ED=5$.

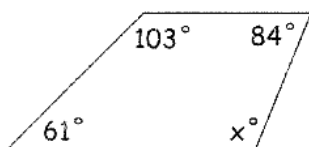


More Notes.

The SUM of the ANGLES of a QUADRILATERAL is 360°

This means when you add up the given angles you will always get 360° .

1) Find the measure of the missing angle.



$$x + 84 + 103 + 61 = 360$$

$$\begin{array}{r} x + 248 = 360 \\ - 248 \quad - 248 \\ \hline \end{array}$$

$$x = 112$$

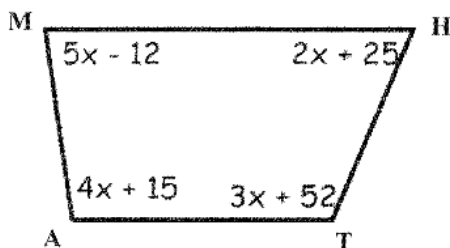
2) In parallelogram ABCD, $m\angle A$ is 74° , $m\angle B$ is 106° , $m\angle C$ is 74° , and $m\angle D$ is $(x + 22)^\circ$. Find the value of x AND the $m\angle D$.

$$x + 22 + 74 + 106 + 74 = 360$$

$$\begin{array}{r} x + 276 = 360 \\ - 276 \quad - 276 \\ \hline \end{array}$$

$$x = 84$$

3) Solve for x . Then find the measure of $\angle M$.



$$5x - 12 + 2x + 25 + 4x + 15 + 3x + 52 = 360$$

$$\begin{array}{r} 14x + 80 = 360 \\ - 80 \quad - 80 \\ \hline \end{array}$$

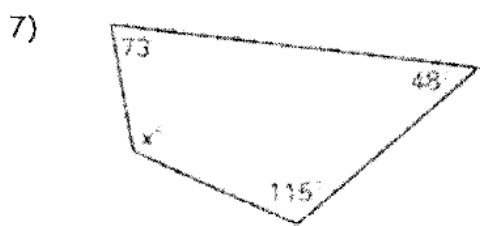
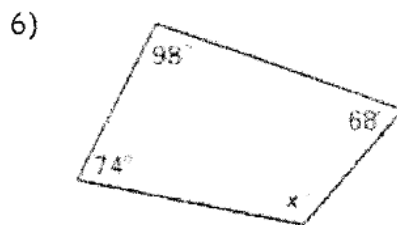
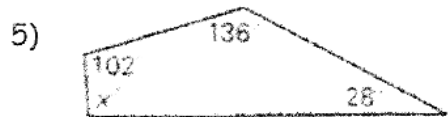
$$\begin{array}{r} 14x = 280 \\ \frac{14x}{14} = \frac{280}{14} \\ x = 20 \end{array}$$

$$5x - 12 = 88^\circ$$

$$4x + 15 = 95^\circ$$

$$2x + 25 = 65^\circ$$

$$3x + 52 = 112^\circ$$



8) The angles of a quadrilateral measure 65° , 87° , 106° and x° .

9) Find the value of x . Then find the measure of each angle.

