Special Right Triangles

Name_____

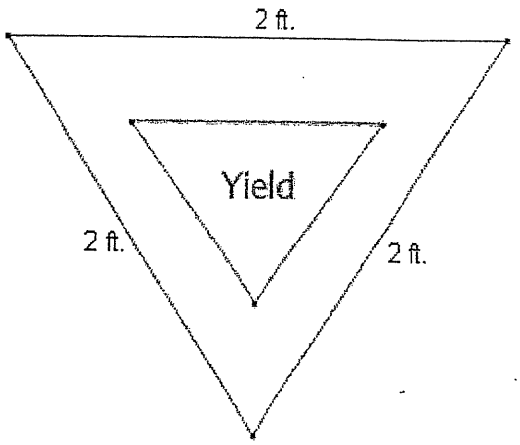
1.) Adam, a construction manager, needs to check the uniformity of Yield signs around the state and is checking the heights (altitudes) of the Yield signs. Yield signs are of course equilateral triangles. Draw the altitude of this triangle to the right, and let that altitude split this into 2 right triangles. Focus on just one of the right Δ's.

What's the length of the hypotenuse?

What's the length of the shorter leg?

What's the length of the longer leg?

The 2-foot sign



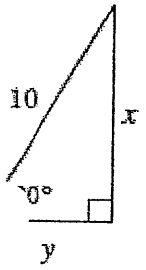
2.) Fill in the chart so that Adam knows the measurements (in feet) for all the different signs he has to measure.

Side Length of the Sign	Hypotenuse Length	Shorter Leg Length	Longer Leg Length
2 ft sign			
4 ft sign			
6 ft sign			
ft sign			

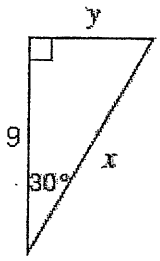
3.) Explain your conclusion:

Try these examples. One is simple to do. The other one isn't as simple...
Find the missing side lengths.

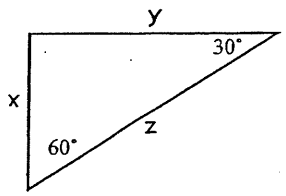
4.)



5.)



1. Find the missing sides for the 30°–60°–90° triangle below.

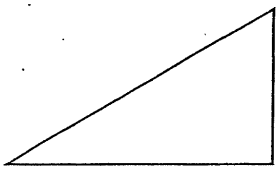


a. $x = 9$ b. $y = 5\sqrt{3}$ c. $z = 32\sqrt{2}$

d. $x = \frac{19}{2}$ e. $y = \frac{\sqrt{3}}{2}$ f. $z = 10$

2. A road sign is shaped like an equilateral triangle. Use your knowledge of 30°–60°–90° triangles to find the approximately area of the road sign. The length of the base of the equilateral triangle is 36 inches.

3. Find the area of the 30°–60°–90° triangle with an hypotenuse of 12 feet. Round decimal answers to the nearest tenth



5. The bases on a softball field form a square with a side length of 60 feet. You throw a softball from first base to third base. How far do you throw the softball?

Special Right Triangles

Name Key Mon 8/17/15

1.) Adam, a construction manager, needs to check the uniformity of Yield signs around the state and is checking the heights (altitudes) of the Yield signs. Yield signs are of course equilateral triangles. Draw the altitude of this triangle to the right, and let that altitude split this into 2 right triangles. Focus on just one of the right Δ's.

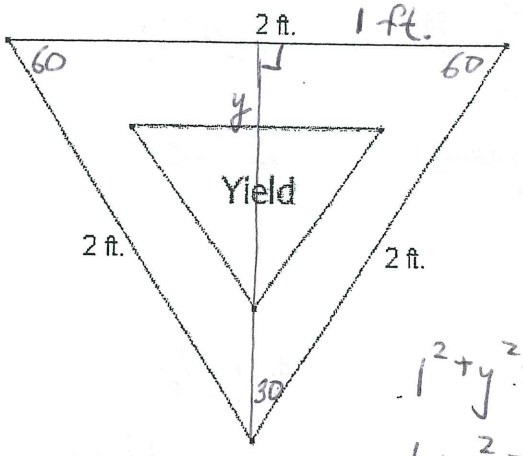
equal angles, equal sides

What's the length of the hypotenuse? 2 ft.

What's the length of the shorter leg? 1 ft

What's the length of the longer leg? $\sqrt{3}$ ft.

The 2-foot sign



$1^2 + y^2 = 2^2$

$1 + y^2 = 4$

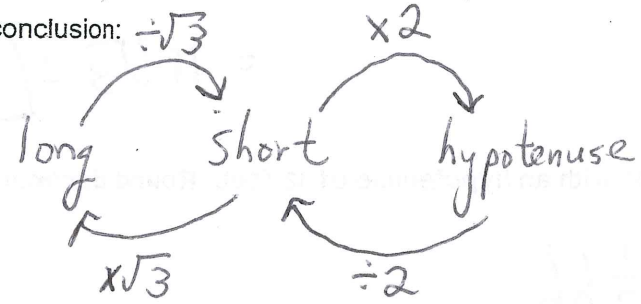
$y^2 = 3$

$y = \sqrt{3}$

2.) Fill in the chart so that Adam knows the measurements (in feet) for all the different signs he has to measure.

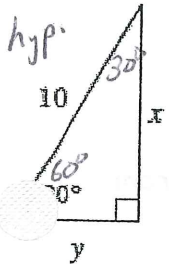
Side Length of the Sign	Hypotenuse Length	Shorter Leg Length	Longer Leg Length
2 ft sign	2	1	$\sqrt{3}$
4 ft sign	4	2	$2\sqrt{3}$
6 ft sign	6	3	$3\sqrt{3}$
8 ft sign	7	4	$4\sqrt{3}$

3.) Explain your conclusion:



Try these examples. One is simple to do. The other one isn't as simple…
Find the missing side lengths.

4.)



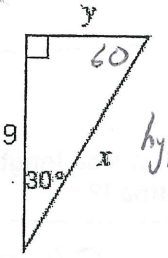
Long

Short

$y = 5$

$x = 5\sqrt{3}$

5.)

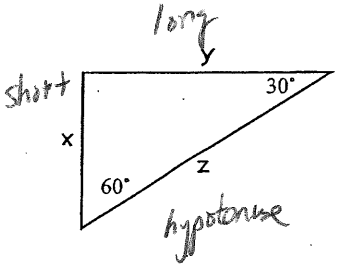


$y = \frac{9}{\sqrt{3}} = \frac{9\sqrt{3}}{3} = 3\sqrt{3}$

$x = 6\sqrt{3}$

$y = 3\sqrt{3}$

1. Find the missing sides for the 30°–60°–90° triangle below.



a. $x = 9$

$y = 9\sqrt{3}$

$z = 18$

b. $y = 5\sqrt{3}$

$x = 5$

$z = 10$

c. $z = 32\sqrt{2}$

$x = 16\sqrt{2}$

$y = 16\sqrt{6}$

d. $x = \frac{19}{2}$

$y = \frac{19}{2}\sqrt{3}$

$z = 19$

e. $y = \frac{\sqrt{3}}{2}$

$x = 1/2$

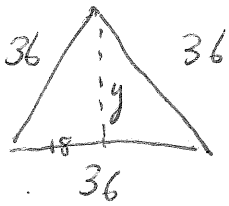
$z = 1$

f. $z = 10$

$x = 5$

$y = 5\sqrt{3}$

2. A road sign is shaped like an equilateral triangle. Use your knowledge of 30°–60°–90° triangles to find the approximately area of the road sign. The length of the base of the equilateral triangle is 36 inches.



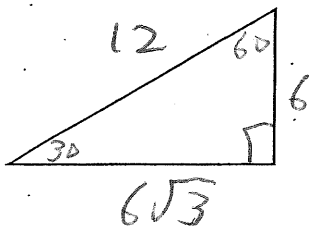
$y = 18\sqrt{3}$

$\text{Area} = \frac{1}{2}bh$

$= \frac{1}{2}(36)(18\sqrt{3})$

$= 18^2\sqrt{3} = \boxed{324\sqrt{3}}$

3. Find the area of the 30°–60°–90° triangle with an hypotenuse of 12 feet. Round decimal answers to the nearest tenth



$A = \frac{1}{2}bh$

$= \frac{1}{2}(6\sqrt{3})(6)$

$= \boxed{18\sqrt{3} \approx 31.177}$

5. The bases on a softball field form a square with a side length of 60 feet. You throw a softball from first base to third base. How far do you throw the softball?

$\boxed{60\sqrt{2} \text{ ft} \approx 84.853 \text{ ft.}}$