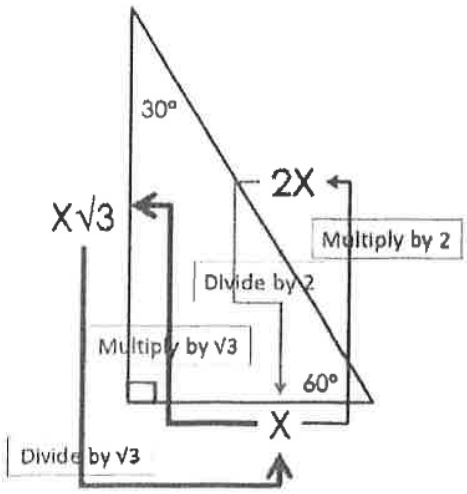
Lesson 3.6 - Special Right Triangles

Learning Objectives: SWBAT

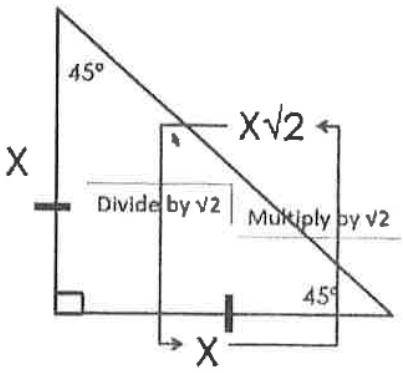
1. Use the properties of special right triangles to solve problems
   - > 45°- 45°- 90°
   - > 30° - 60° - 90°

Quick Review of the **rules/patterns** associated with these triangles:

30°,60°,90°



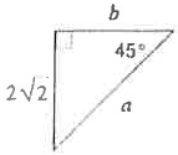
45°,45°,90°



Practice

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

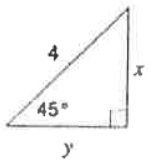
1)



a = 4

b = 2√2

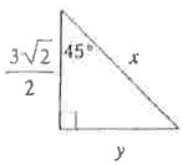
2)



x = 2√2

y = 2√2

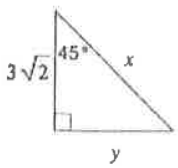
3)



x = 3

y = 3√2/2

4)



x = 6

y = 3√2

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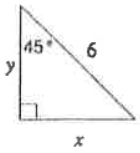
Practice

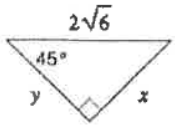
5)



$x = 3\sqrt{2}$

$y = 3\sqrt{2}$

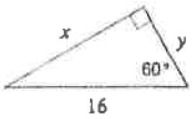
6)



$x = 2\sqrt{3}$

$y = 2\sqrt{3}$

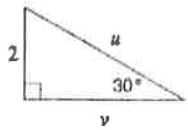
7)



$x = 8\sqrt{3}$

$y = 8$

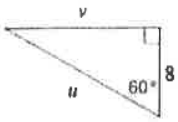
8)



$u = 4$

$v = 2\sqrt{3}$

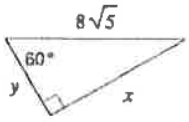
9)



$u = 16$

$v = 8\sqrt{3}$

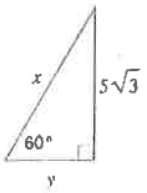
10)



$x = 4\sqrt{15}$

$y = 4\sqrt{5}$

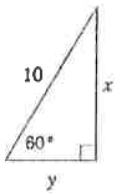
11)



$x = 10$

$y = 5$

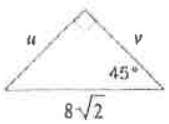
12)



$x = 5\sqrt{3}$

$y = 5$

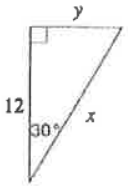
13)



$u = 8$

$v = 8$

14)



$x = 8\sqrt{3}$

$y = 4\sqrt{3}$

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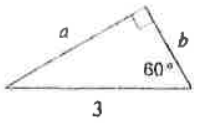
Practice

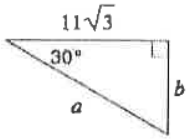
15)



$a = \frac{3\sqrt{3}}{2}$

$b = \frac{3}{2}$

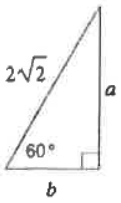
16)



$a = 22$

$b = 11$

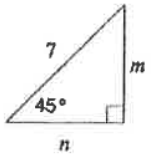
17)



$a = \sqrt{6}$

$b = \sqrt{2}$

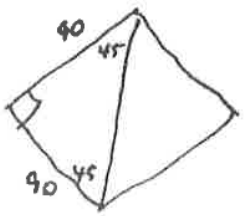
18)



$m = \frac{7\sqrt{2}}{2}$

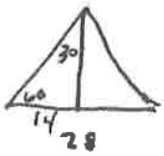
$n = \frac{7\sqrt{2}}{2}$

3. Math often shows up in sports in ways that we don't realize. Take for example the baseball diamond. It is actually a square with the bases set at 90° angles. If the bases are 90 feet apart, how far is it from home plate to second base?



$90\sqrt{2} = 127.28$ ft

21. The front wall of an A-frame house is in the shape of an equilateral triangle. If the base of the house is 28 feet, how tall is it?



$14\sqrt{3} = 24.25$ ft

22. What is the length of the altitude of an equilateral triangle whose side has length 4?

$2\sqrt{3}$

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Practice

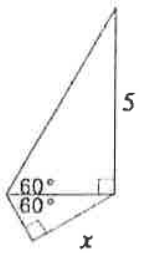
23. The perimeter of an equilateral triangle measures 18 cm. What is the length of the altitude?

$3\sqrt{3}$

4. In sailing, it is not possible to head straight into the wind. In order to get upwind, a sailboat simply sails at an angle to the wind and then turns to sail back toward where it wants to go. Assume that a boat needs to get directly upwind 6000 m. If it sails off at a 45° angle to the wind and then turns back 90° towards the original goal, how far would it have to sail to get directly upwind 6000 meters?

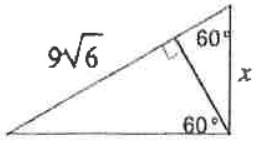
Solve for x

11)



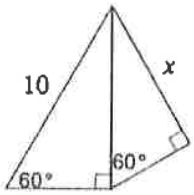
$x = \frac{5}{2}$

12)



$x = 6\sqrt{2}$

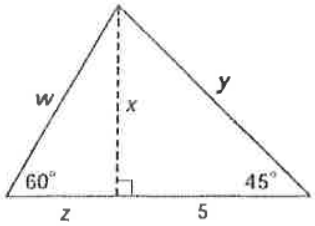
13)



$x = \frac{15}{2}$

Find the value of each variable. Leave your answer in simplest radical form.

25.



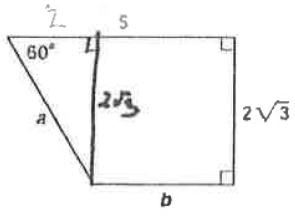
$w = \frac{10\sqrt{3}}{3}$

$x = 5$

$y = 5\sqrt{2}$

$z = \frac{5\sqrt{3}}{3}$

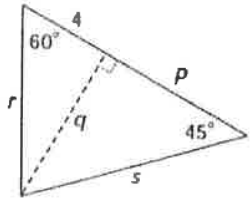
26.



$b = 4\sqrt{3}$

$a = 4$

27.



$p = 4\sqrt{3}$

$q = 4\sqrt{3}$

$r = 8$

$s = 4\sqrt{6}$