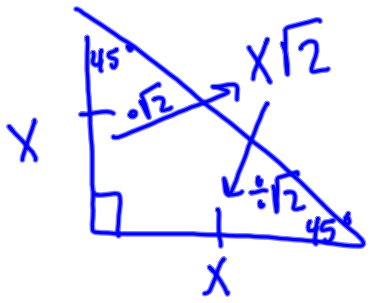
8.3 - I will find the side lengths of special right triangles

real life example:

As part of a packet for students attending a regional student council meeting, Lyndsay orders triangular highlighters. She wants to buy rectangular boxes for the highlighters and other items, but she is concerned that the highlighters will not fit in the box she has chosen. If she knows the length of a side of the highlighter, Lyndsay can use the properties of special right triangles to determine if it will fit in the box.

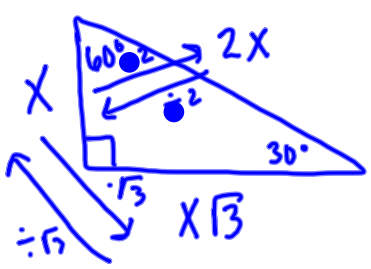
Thm 8.8: 45°- 45°- 90°Triangle Thm

In a 45°- 45°- 90°triangle, the legs are congruent and the hypotenuse is √2 times as long as each leg.

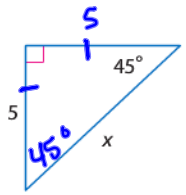


Thm 8.9: 30°- 60°- 90° Triangle Thm

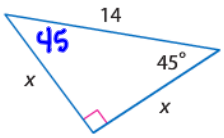
In a 30 - 60 - 90 triangle, the hypotenuse is twice as long as the shorter leg, and the longer leg is √3 times as long as the shorter leg.



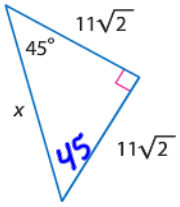
Start w/ shortleg!



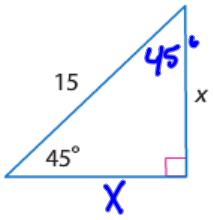
$X = 5\sqrt{2}$



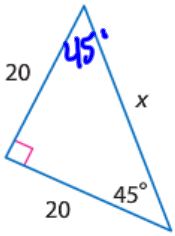
$X = \frac{14}{\sqrt{2}} = \frac{14\sqrt{2}}{2} = 7\sqrt{2}$



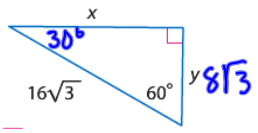
$X = 11\sqrt{2} \cdot \sqrt{2} = 11 \cdot 2 = 22$



$X = \frac{15}{\sqrt{2}} = \frac{15\sqrt{2}}{2}$

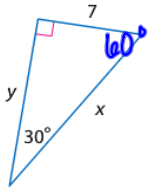


$X = 20\sqrt{2}$



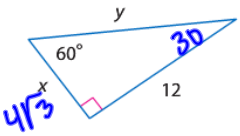
$y = \frac{16\sqrt{3}}{2} = 8\sqrt{3}$

$x = 8\sqrt{3} \cdot \sqrt{3} = 8 \cdot 3 = 24$



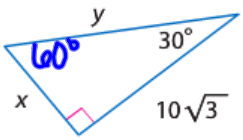
$x = 7(2) = 14$

$y = 7\sqrt{3}$



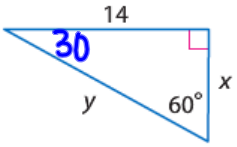
$x = \frac{12 \cdot \sqrt{3}}{\sqrt{3} \cdot \sqrt{3}} \quad \frac{12\sqrt{3}}{3} = 4\sqrt{3}$

$y = 2(4\sqrt{3}) = 8\sqrt{3}$



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

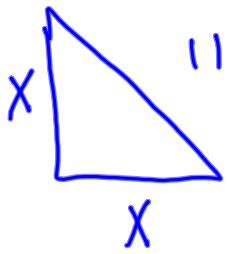
$y = 2(10) = 20$



$x = \frac{14}{\sqrt{3}} = \frac{14\sqrt{3}}{3}$

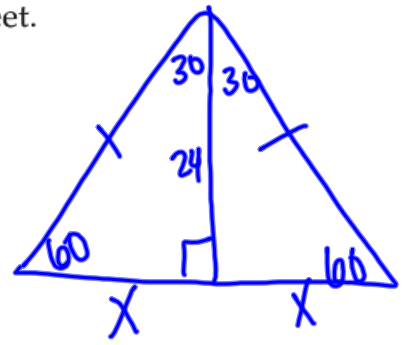
$y = 2\left(\frac{14\sqrt{3}}{3}\right) = \frac{28\sqrt{3}}{3}$

Determine the length of the leg of a 45°-45°-90° triangle with a hypotenuse length of 11.



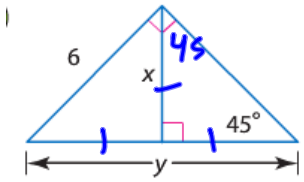
$X = \frac{11}{\sqrt{2}} = \frac{11\sqrt{2}}{2}$

Find the length of the side of an equilateral triangle that has an altitude length of 24 feet.



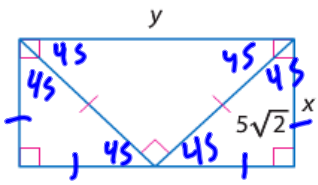
$X = \frac{24}{\sqrt{3}} = \frac{24\sqrt{3}}{3} = 8\sqrt{3}$

$2(8\sqrt{3}) = 16\sqrt{3}$



$X = \frac{6}{\sqrt{2}} = \frac{6\sqrt{2}}{2} = 3\sqrt{2}$

$y = 2(3\sqrt{2}) = 6\sqrt{2}$



$X = \frac{5\sqrt{2}}{\sqrt{2}} = 5$

$y = 5\sqrt{2} \cdot \sqrt{2} = 5 \cdot 2 = 10$

pg. 562 #8-14 even, 18-24 even, 28, 30