Section 7-3 Special Right Triangles

- Facts about $45°-45°-90°$ triangles are used to solve many geometry problems.

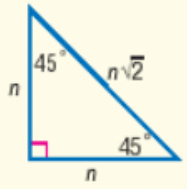
- The Pythagorean Theorem allows us to discover special relationships that exist among the sides of a $45°-45°-90°$ triangle.

- The length of the hypotenuse of any $45°-45°-90°$ triangle is $\sqrt{2}$ times the length of its leg.

- The ratio of the sides is $1:1:\sqrt{2}$

Theorem 7.6

In a 45°-45°-90° triangle, the length of the hypotenuse is $\sqrt{2}$ times the length of a leg.

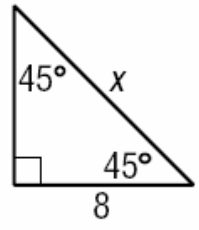


Formula for a $45°-45°-90°$ triangle:

$H = \sqrt{2}L$ where H = hypotenuse
L = leg of triangle (They both are $\cong$.

Ex 1 Find x.

a.



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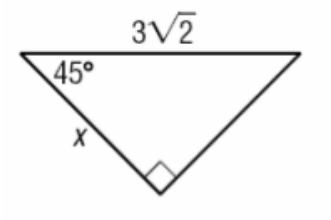

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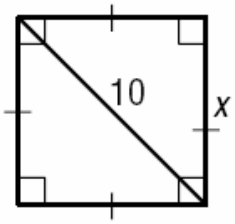

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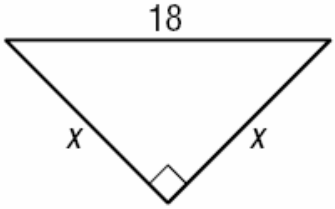

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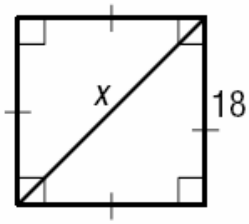

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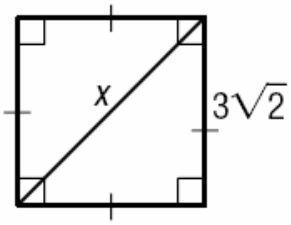


- **There is also a special relationship among the measures of the sides of a $30° - 60° - 90°$ riangle.**

- **In a $30° - 60° - 90°$ triangle, the measures of the sides are x , $x\sqrt{3}$, and $2x$.**

- **The ratios of the sides is $1 : \sqrt{3} : 2$.**

- **In a $30° - 60° - 90°$ triangle, the shorter leg is opposite the $30°$ angle, and the longer leg is opposite the $60°$ angle.**

Theorem 7.7

In a 30°-60°-90° triangle, the length of the hypotenuse is twice the length of the shorter leg, and the length of the longer leg is $\sqrt{3}$ times the length of the shorter leg.

Formula for a $30° - 60° - 90°$ triangle:

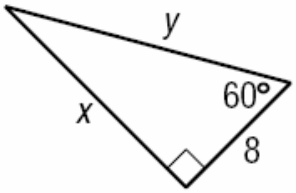
$H = 2s$ **where s = shorter leg**

$L = \sqrt{3}s$ **H = hypotenuse**

L = longer leg

<u>Ex 2</u> Find x and y.

a.



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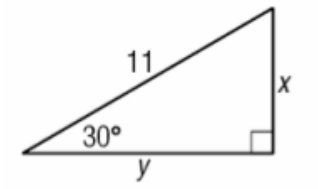

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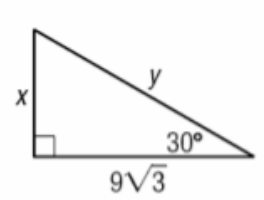

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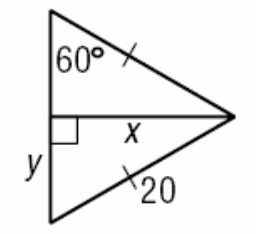

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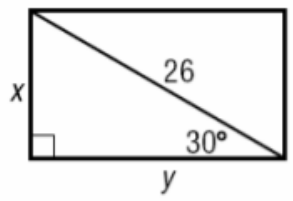

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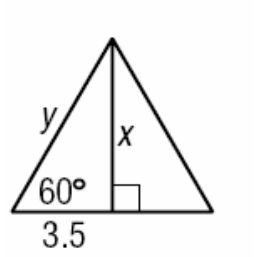
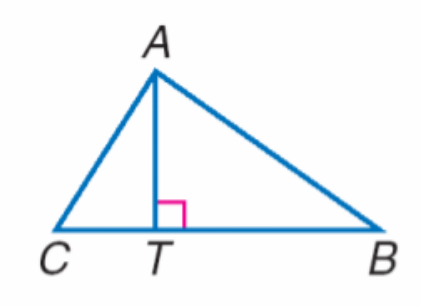


Ex 3 Find the perimeter of a square with diagonal 12 centimeters.

Ex 4 Find the diagonal of a square with perimeter 28 meters.

- An altitude of a triangle is a segment from a vertex of a triangle that is perpendicular to the line containing the opposite side.

Ex:



$\overline{AT}$ is an altitude of $\triangle ABC$.

Ex 5 An altitude of an equilateral triangle is 8.3 meters. Find the perimeter of the triangle to the nearest tenth of a meter.

Ex 6 The perimeter of an equilateral triangle is 32 centimeters. Find the length of an altitude of the triangle to the nearest tenth of a centimeter.

Assign Pgs. 360 - 363 # 11 - 23, 25, 26,
36 - 38, 40, 43 - 46

Pg. 363 Practice Quiz 1 # 3 - 5