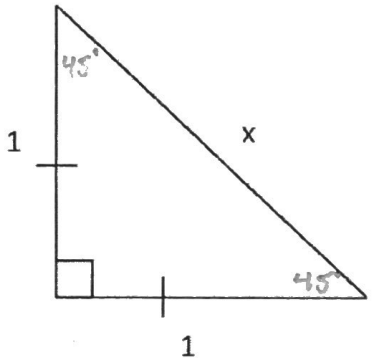
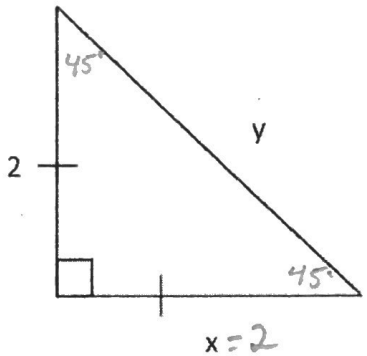
6.2 Special Right Triangles Guided Notes

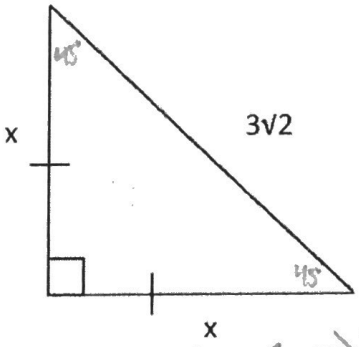
Name:_____

Period: _____ Date: 11/13/18

- Use the Pythagorean theorem to find the missing sides of these right triangles (put your answer in simplest radical form).







$1^2+1^2=x^2$

$1+1=x^2$

$2=x^2$

$\boxed{\sqrt{2}=x}$

$\sqrt{8}$

4 2

2 2

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

$4+4=y^2$

$8=y^2$

$\sqrt{8}$ $\boxed{y=2\sqrt{2}}$

$x^2+x^2=(3\sqrt{2})^2$

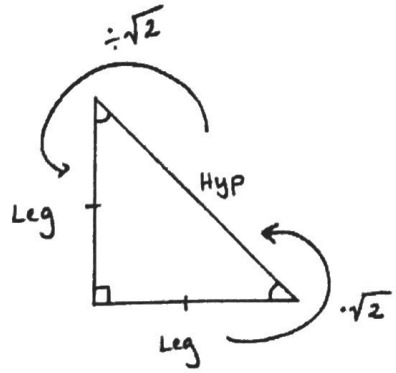
$2x^2=18$

$x^2=9$

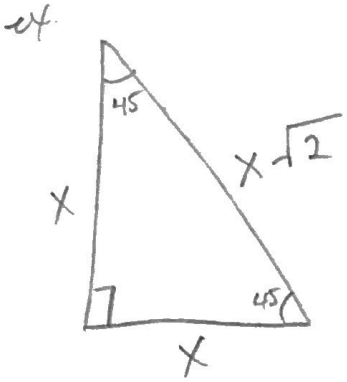
$\boxed{x=3}$

45°45° 90° (Isosceles Right Triangle)

- YES, we can use the Pythagorean theorem to find missing sides for all right triangles, but there is a SHORTCUT for a 45 45 90 right triangle.
- To go from LEG to HYPOTENUSE: multiply by $\sqrt{2}$ (smaller to larger side)
- To go from HYPOTENUSE to LEG: divide by $\sqrt{2}$ (larger to smaller side)



ex.



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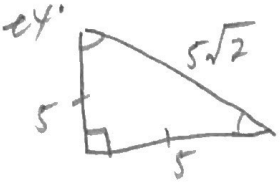

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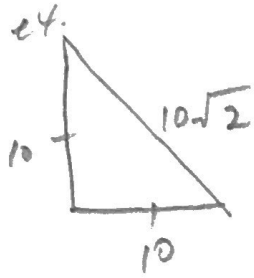

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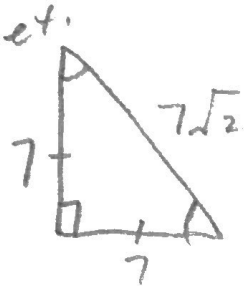
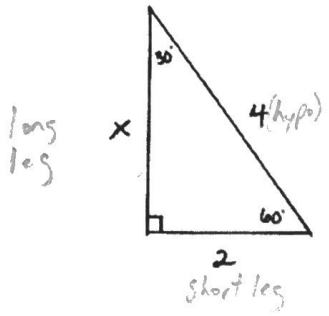


Use Pythagorean Theorem to find missing sides.
Put in **simplest radical form**. What do we notice?



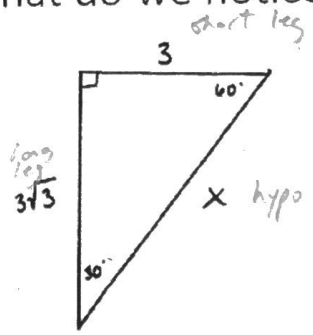
$x^2 + 2^2 = 4^2$

$x^2 + 4 = 16$

$x^2 = 12$

$x = \sqrt{4 \cdot 3}$

$\boxed{x = 2\sqrt{3}}$



$3^2 + (3\sqrt{3})^2 = x^2$

$9 + 27 = x^2$

$36 = x^2$

$\boxed{6 = x}$

30° 60° 90° Right Triangle

We have a shortcut for this special right triangle too!

FIRST YOU MUST KNOW...

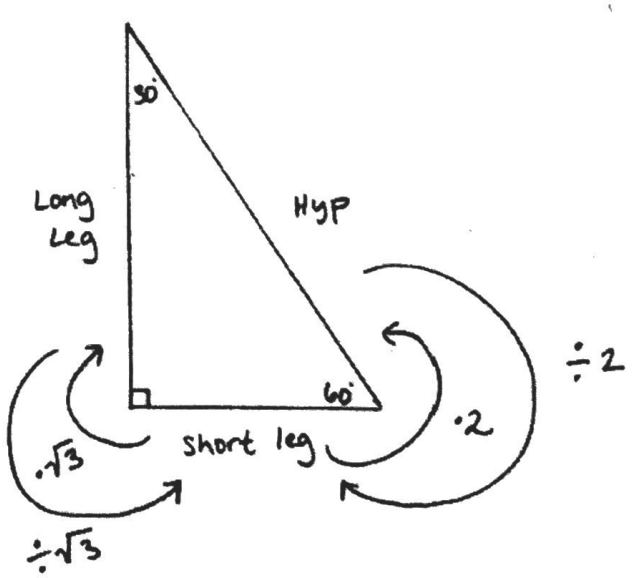
Short leg: leg **opposite** the **30°** angle.

Long leg: leg **opposite** the **60°** angle.

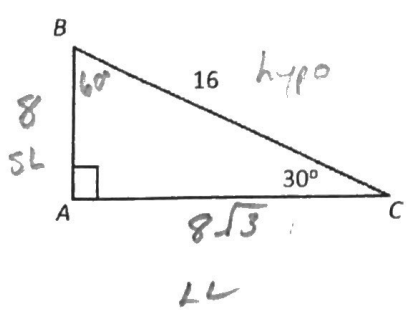
Hypotenuse: side **opposite 90°**.

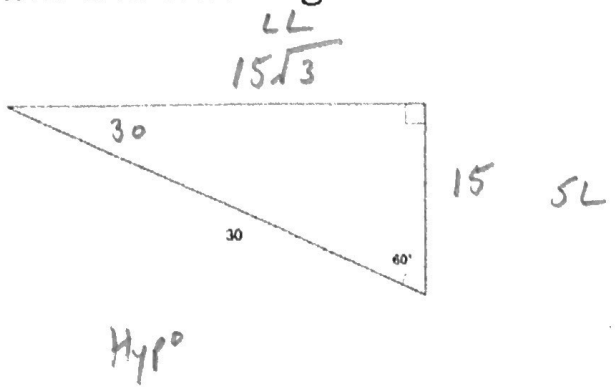
- **Short leg** to **Hypotenuse**: multiply by 2
- **Short leg** to **long leg**: multiply by $\sqrt{3}$

- **Hypotenuse** to **short leg**: divide by 2
- **Long leg** to **short leg**: divide by $\sqrt{3}$



Practice with short cut: find the missing sides





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Are these possible side lengths of a triangle?

① 1, 1, 2

*sum of 2 smaller sides has to be greater than largest side

1+1 is not greater than 2

Not possible

② 2, 3, 4

$2+3>4$ yes a triangle

<u>Practice</u> - put these in simplest radical form

① $\sqrt{40}/\sqrt{2}$ or $\dfrac{\sqrt{40}}{\sqrt{2}}$

$\dfrac{\sqrt{40}}{\sqrt{2}} \cdot \dfrac{\sqrt{2}}{\sqrt{2}}$

$= \dfrac{\sqrt{80}}{\sqrt{4}} = \dfrac{4\sqrt{5}}{2} = \boxed{2\sqrt{5}}$

② $\sqrt{36} = 6$

③ $\sqrt{120}$

$\sqrt{12 \quad 10}$

$\sqrt{4 \quad 3 \quad 2 \quad 5}$

$\sqrt{2 \quad 2 \cdot 3 \cdot 2 \cdot 5}$

$\boxed{= 2\sqrt{30}}$

④ $\sqrt{49} = 7$

⑤ $\dfrac{\sqrt{85}}{\sqrt{3}}$

$= \dfrac{\sqrt{85}}{\sqrt{3}} \cdot \dfrac{\sqrt{3}}{\sqrt{3}}$

$= \dfrac{\sqrt{255}}{\sqrt{9}}$

$\boxed{= \dfrac{\sqrt{255}}{3}}$

$\sqrt{255}$

$\sqrt{85 \quad 3}$

$\sqrt{5 \quad 17}$

⑥ $\sqrt{17}$ (in simplest form)