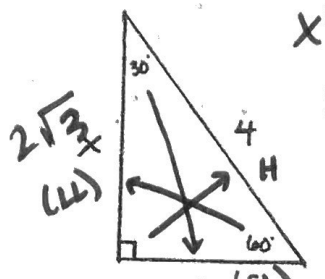
6.3 30-60-90 Right Triangles

Name: Key

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



$2\sqrt{3}$ (LL)

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

$x^2+4=16$

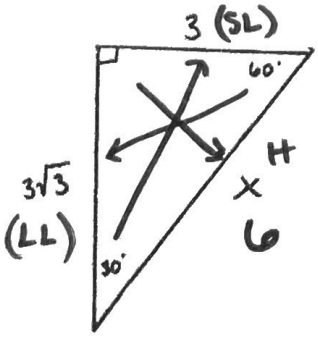
$-4\quad -4$

$\sqrt{x^2}=\sqrt{12}$

$4\cdot 3$

(22)

$x=2\sqrt{3}$



$3\sqrt{3}$ (LL)

x

6

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

$27+9=x^2$

$\sqrt{36}=\sqrt{x^2}$

$x=6$

30° 60° 90° Right Triangle

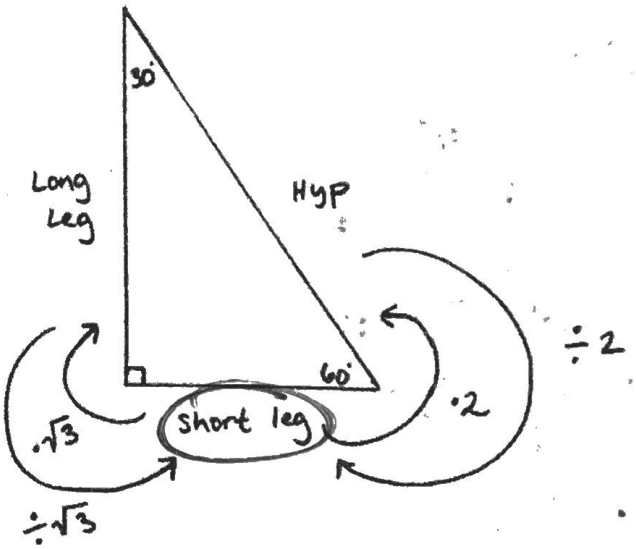
We have a shortcut for this special right triangle too!

FIRST YOU MUST KNOW...

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

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

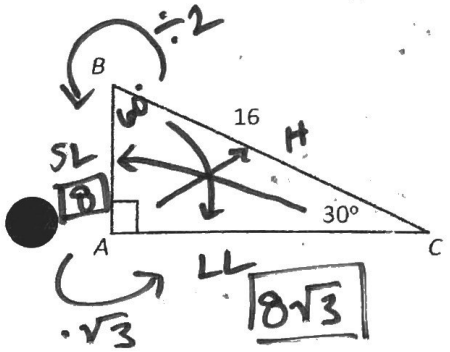
Hypotenuse: side **opposite 90°**.

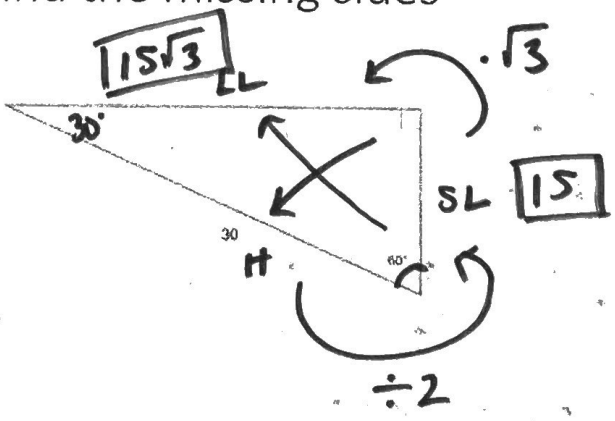


- **Short leg** to **Hypotenuse**: mult by 2.
- **Short leg** to **long leg**: mult. by $\sqrt{3}$

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

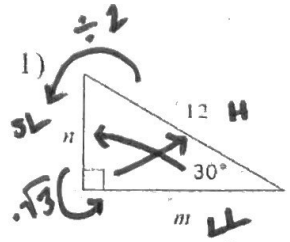
Practice with short cut: find the missing sides





Practice Problems

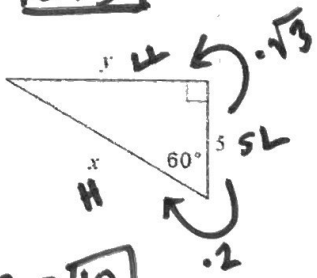
1)



$n = \frac{12}{2} = \boxed{6}$

$m = \boxed{6\sqrt{3}}$

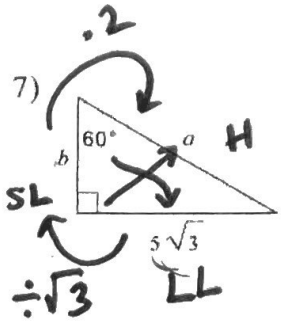
3)



$x = 5 \cdot 2 = \boxed{10}$

$y = \boxed{5\sqrt{3}}$

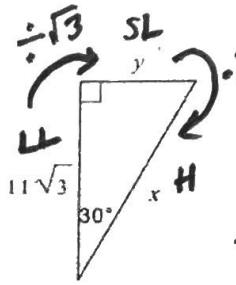
7)



$b = \frac{5\sqrt{3}}{\sqrt{3}} = \boxed{5}$

$a = 5 \cdot 2 = \boxed{10}$

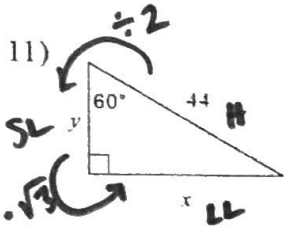
9)



$y = \frac{11\sqrt{3}}{\sqrt{3}} = \boxed{11}$

$x = 11 \cdot 2 = \boxed{22}$

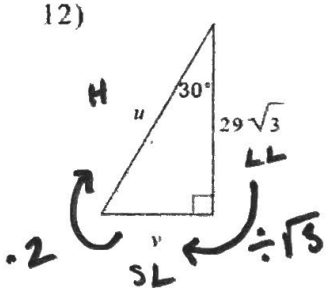
11)



$y = \frac{44}{2} = \boxed{22}$

$x = \boxed{22\sqrt{3}}$

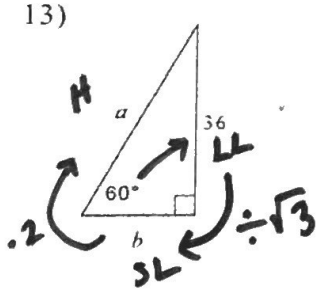
12)



$v = \frac{29\sqrt{3}}{\sqrt{3}} = \boxed{29}$

$u = 29 \cdot 2 = \boxed{58}$

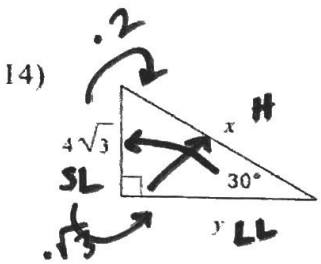
13)



$b = \frac{36}{\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}} = \frac{36\sqrt{3}}{3} = \boxed{12\sqrt{3}}$

$a = 12\sqrt{3} \cdot 2 = \boxed{24\sqrt{3}}$

14)



$x = 4\sqrt{3} \cdot 2 = \boxed{8\sqrt{3}}$

$y = 4\sqrt{3} \cdot \sqrt{3} = 4 \cdot 3 = \boxed{12}$