Name: _____ Date: _____

Learning Goal 5.1	Express an entire radical as a simplified mixed radical and vice versa. Identify and order irrational numbers.

Order these numbers least to greatest.

$$5,\ 3\sqrt{3},\ 2\sqrt{6},\ \sqrt{23}$$

$5 = \sqrt{25}$

$$3\sqrt{3} = \sqrt{3^2 \times 3} = \sqrt{3^3} = \sqrt{27}$$

$$2\sqrt{6} = \sqrt{2^2 \times 6} = \sqrt{4 \times 6} = \sqrt{24}$$

$$\sqrt{23} < \sqrt{24} < \sqrt{25} < \sqrt{27}$$

$$\sqrt{23} < 2\sqrt{6} < 5 < 3\sqrt{3}$$

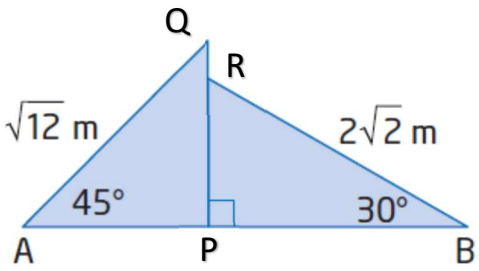
Simplify radicals and combine like terms.

a. $2\sqrt{7} + 13\sqrt{7} = 15\sqrt{7}$

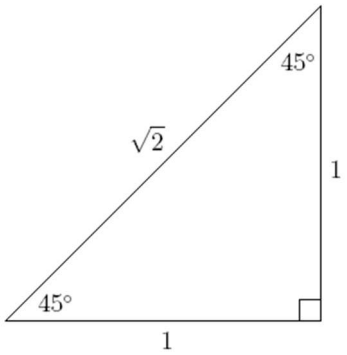
b. $\sqrt{24} - \sqrt{6}$
$= \sqrt{2^2 \times 6} - \sqrt{6}$
$= 2\sqrt{6} - \sqrt{6}$
$= \sqrt{6}$

c. $\sqrt{20x} - 3\sqrt{45x},\ x \geq 0$
$= \sqrt{2^2 \times 5 \times x} - 3\sqrt{3^2 \times 5 \times x}$
$= 2\sqrt{5 \times x} - (3 \times 3)\sqrt{5 \times x}$
$= 2\sqrt{5x} - 9\sqrt{5x}$
$= -7\sqrt{5x}$

What is the exact length of AB?



Because ΔAPR is a right isosceles triangle, it is similar to this triangle, so



$$\frac{AP}{\sqrt{12}} = \frac{1}{\sqrt{2}}$$

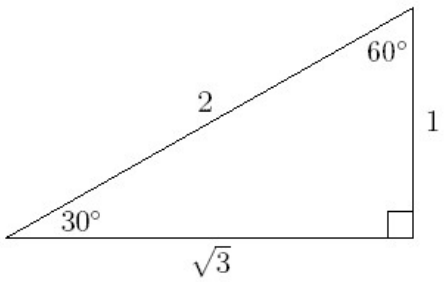
$$\frac{AP}{\sqrt{2^2 \times 3}} = \frac{1}{\sqrt{2}}$$

$$\frac{AP}{\sqrt{6 \times 2}} = \frac{1}{\sqrt{2}}$$

$$\frac{AP}{\sqrt{6 \times 2}} = \frac{\sqrt{6}}{\sqrt{6 \times 2}}$$

$$AP = \sqrt{6}$$

Because ΔBPR is a $30 - 60 - 90$ triangle, it is similar to this triangle, so



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

$$\frac{BP}{2\sqrt{2}} = \frac{\sqrt{2 \times 3}}{2\sqrt{2}}$$

$$\frac{BP}{2\sqrt{2}} = \frac{\sqrt{6}}{2\sqrt{2}}$$

$$BP = \sqrt{6}$$

$$AB = \sqrt{6} + \sqrt{6}$$

$$= 2\sqrt{6}$$