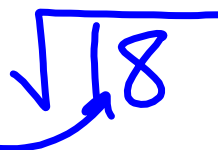


### Multiplying Radicals:

Step 1: Factor radicands.


$$\sqrt{18}$$

Step 2: Multiply coefficients and combine factors of radicands under one radical (assuming index is same).

Step 3: Simplify radical.

Example A.  $\sqrt{18} \cdot \sqrt{24} = 12\sqrt{3}$

$\sqrt{432}$

$\sqrt{144 \cdot 3}$

$12\sqrt{3}$

$3 \cdot 2 \cdot 2$

$\sqrt{18 \cdot 24}$

$\sqrt{\cancel{9} \cdot 2 \cdot \cancel{6} \cdot \cancel{4}}$

$\frac{12}{4 \cdot 3}$

$\sqrt{2 \cdot 6}$

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

Example B.  $\sqrt{32x^3y} \cdot \sqrt{72xy^2}$

$$\sqrt{32 \cdot 72 \cdot x^4 \cdot y^3}$$

$$\sqrt{2304}$$

$$\sqrt{\cancel{16} \cdot \cancel{2} \cdot \cancel{2} \cdot \cancel{36} \cdot \cancel{x} \cdot \cancel{y} \cdot y}$$

$$4 \cdot 6 \cdot 2 = 48x^2y\sqrt{y}$$

Example C.  $\underline{2x}\sqrt{15x^2} \cdot \underline{3}\sqrt{20x^3}$

$$6x \sqrt{15 \cdot 20 \cdot x^5}$$

$$6x \sqrt{\cancel{3} \cdot \cancel{5} \cdot \cancel{4} \cdot \cancel{5} \cdot x \cdot x}$$

$$5 \cdot 2 \cdot x^2$$

$$60x^3 \sqrt{3x}$$

Challenge:  $2x\sqrt{15x^4y^2} \cdot 3\sqrt{20xy} \cdot \sqrt{12xy^5}$

What have we learned about the products of rational and irrational numbers?

$$\begin{array}{l} R \cdot I = \text{Always Irrational} \\ 3 \cdot \sqrt{2} = 3\sqrt{2} \end{array}$$

How would you describe the following?  
Give 2 examples of each.

The product of a rational and a rational.

$$\begin{aligned} R \cdot R &= R \\ (3.2) \cdot (5) &= 16 \\ \left(\frac{1}{5}\right)(10) &= 2 \end{aligned}$$

How would you describe the following?  
Give 2 examples of each.

The product of an irrational and an irrational.

$$\begin{array}{l} \text{I} \cdot \text{I} = \text{usually I} \\ \sqrt{3} \cdot \sqrt{2} = \sqrt{6} \text{ Irrational} \\ \text{except } \sqrt{3} \cdot \sqrt{3} = \sqrt{9} = 3 \text{ Rational} \end{array}$$