

## Simplifying Radicals Notes

Check to see if the square root can be taken on the calculator. If a decimal is given, follow these steps to simplify square roots.

1. Find all of the prime factors of the number.
2. If there are pairs of twos of the same prime factor then those numbers go outside of the radical.
  - For more than one pair, all numbers that go outside the radical are multiplied.
3. The remaining numbers that do not have a pair are multiplied together and remain inside the radical.

A)  $\sqrt{18}$

To find prime factors, determine what prime number will go into the number and continue this until all the numbers on the left hand side are prime.

$$\begin{array}{r} 2 \overline{)18} \\ \underline{3 \phantom{0}} \\ 9 \\ \underline{3 \phantom{0}} \\ 0 \end{array}$$

2 divides into 18 - 9 times

3 divides into 9 - 3 times

Answer:  $3\sqrt{2}$

B)  $\sqrt{24}$

$$\begin{array}{c} \wedge \\ 2 \phantom{0} \phantom{0} \\ \wedge \phantom{0} \\ 2 \phantom{0} \phantom{0} \phantom{0} \\ \wedge \phantom{0} \phantom{0} \\ 2 \phantom{0} \phantom{0} \phantom{0} \phantom{0} \\ \wedge \phantom{0} \phantom{0} \\ 2 \phantom{0} \phantom{0} \phantom{0} \phantom{0} \phantom{0} \\ \wedge \phantom{0} \phantom{0} \\ 2 \phantom{0} \phantom{0} \phantom{0} \phantom{0} \phantom{0} \phantom{0} \end{array}$$

$2\sqrt{6}$

C)  $\sqrt{196}$

$$\begin{array}{c} \wedge \\ 2 \phantom{0} \phantom{0} \phantom{0} \\ \wedge \phantom{0} \phantom{0} \\ 2 \phantom{0} \phantom{0} \phantom{0} \phantom{0} \\ \wedge \phantom{0} \phantom{0} \\ 2 \phantom{0} \phantom{0} \phantom{0} \phantom{0} \phantom{0} \\ \wedge \phantom{0} \phantom{0} \\ 7 \phantom{0} \phantom{0} \phantom{0} \phantom{0} \phantom{0} \end{array}$$

perfect square  
 $14$

D)  $\sqrt{240}$

$$\begin{array}{c} \wedge \\ 2 \phantom{0} \phantom{0} \phantom{0} \\ \wedge \phantom{0} \phantom{0} \\ 2 \phantom{0} \phantom{0} \phantom{0} \phantom{0} \\ \wedge \phantom{0} \phantom{0} \\ 2 \phantom{0} \phantom{0} \phantom{0} \phantom{0} \phantom{0} \\ \wedge \phantom{0} \phantom{0} \\ 2 \phantom{0} \phantom{0} \phantom{0} \phantom{0} \phantom{0} \phantom{0} \\ \wedge \phantom{0} \phantom{0} \\ 3 \phantom{0} \phantom{0} \phantom{0} \phantom{0} \phantom{0} \end{array}$$

$4\sqrt{15}$

E)  $\sqrt{72}$

$$\begin{array}{c} \wedge \\ 2 \phantom{0} \phantom{0} \phantom{0} \\ \wedge \phantom{0} \phantom{0} \\ 2 \phantom{0} \phantom{0} \phantom{0} \phantom{0} \\ \wedge \phantom{0} \phantom{0} \\ 2 \phantom{0} \phantom{0} \phantom{0} \phantom{0} \phantom{0} \\ \wedge \phantom{0} \phantom{0} \\ 3 \phantom{0} \phantom{0} \phantom{0} \phantom{0} \phantom{0} \phantom{0} \\ \wedge \phantom{0} \phantom{0} \\ 2 \phantom{0} \phantom{0} \phantom{0} \phantom{0} \phantom{0} \phantom{0} \end{array}$$

$6\sqrt{2}$

F)  $\sqrt{1440}$

$$\begin{array}{c} \wedge \\ 2 \phantom{0} \phantom{0} \phantom{0} \phantom{0} \\ \wedge \phantom{0} \phantom{0} \phantom{0} \\ 2 \phantom{0} \phantom{0} \phantom{0} \phantom{0} \phantom{0} \\ \wedge \phantom{0} \phantom{0} \\ 2 \phantom{0} \phantom{0} \phantom{0} \phantom{0} \phantom{0} \phantom{0} \\ \wedge \phantom{0} \phantom{0} \\ 2 \phantom{0} \phantom{0} \phantom{0} \phantom{0} \phantom{0} \phantom{0} \phantom{0} \\ \wedge \phantom{0} \phantom{0} \\ 3 \phantom{0} \phantom{0} \phantom{0} \phantom{0} \phantom{0} \phantom{0} \end{array}$$

$12\sqrt{10}$

G)  $\sqrt{50x^4y^7}$

$$\begin{array}{c} \wedge \\ 2 \phantom{0} \phantom{0} \phantom{0} \\ \wedge \phantom{0} \phantom{0} \\ 2 \phantom{0} \phantom{0} \phantom{0} \phantom{0} \\ \wedge \phantom{0} \phantom{0} \\ 5 \phantom{0} \phantom{0} \phantom{0} \phantom{0} \phantom{0} \\ \wedge \phantom{0} \phantom{0} \\ 5 \phantom{0} \phantom{0} \phantom{0} \phantom{0} \phantom{0} \phantom{0} \end{array}$$

$x^{4/2} = x^2$   
 $y^6 \cdot y \Rightarrow y^3 \text{ out}$

$5x^2y^3\sqrt{5y}$

H)  $\sqrt{24x^6y^7z^9}$

$$\begin{array}{c} \wedge \\ 2 \phantom{0} \phantom{0} \phantom{0} \\ \wedge \phantom{0} \phantom{0} \\ 2 \phantom{0} \phantom{0} \phantom{0} \phantom{0} \\ \wedge \phantom{0} \phantom{0} \\ 2 \phantom{0} \phantom{0} \phantom{0} \phantom{0} \phantom{0} \\ \wedge \phantom{0} \phantom{0} \\ 3 \phantom{0} \phantom{0} \phantom{0} \phantom{0} \phantom{0} \end{array}$$

$x^{6/2} = x^3$   
 $y^6 \cdot y = y^7$   
 $z^8 \cdot z = z^9$

$2x^3y^3z^4\sqrt{6yz}$