Simplifying Radicals

Perfect Squares

$2^2 = 4$
$3^2 = 9$
$4^2 = 16$
$5^2 = 25$
$6^2 = 36$
$7^2 = 49$
$8^2 = 64$
$9^2 = 81$
$10^2 = 100$

Ex:

$\sqrt{45} = \sqrt{9}\sqrt{5}$

$= 3\sqrt{5}$

$\sqrt{48} = \sqrt{16}\sqrt{3}$

$= 4\sqrt{3}$

$\sqrt[3]{54} = \sqrt[3]{27}\sqrt[3]{2}$

$= 3\sqrt[3]{2}$

Divide by the largest perfect # that is a factor (*)

Perfect cubes

$2^3 = 8$
$3^3 = 27$
$4^3 = 64$
$5^3 = 125$

$\frac{5}{2} = 2\frac{1}{2}$

Variables in Radicals

Variable expressions with exponents

Ex: $\sqrt[2]{18x^5}$

- Divide the exponent by the index (root)
- The whole # becomes the exponent for the variable outside the radical
- The remainder is the exponent inside the radical

$\sqrt{18}\ \sqrt{x^5}$

$\sqrt{9}\sqrt{2}\ x^2\sqrt{x}$

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

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

4
9
16.
25.
36

Ex: $\sqrt[2]{32x^8y^3} = \sqrt{32}\,\sqrt{x^8}\,\sqrt{y^3}$

$\sqrt{16}\,\sqrt{2}$

$= 4\sqrt{2}\,x^4\,y\sqrt{y}$

$= \boxed{4x^4y\sqrt{2y}}$

$\frac{8}{2} = 4$ (no remainder)

$\frac{3}{2} = 1$ r 1