

Simplifying Radical Expressions

Review: Simplify the following

a) $\sqrt{32}$

b) $\sqrt{12}$

c) $\sqrt{27}$

Simplifying Radicals with Variables and/or Exponents

Simplify the following:

d) $\sqrt{9x^3}$

1. Factor using perfect square factors
2. Take the square roots of the radicals you are able to take the square root of
3. Simplify

e) $\sqrt{25x^2}$

f) $\sqrt{36x^4}$

Multiplying Radicals

*When multiplying radicals, you can only multiply the like terms. Terms INSIDE of radicals can be multiplied by each other, and terms OUTSIDE of the radicals can be multiplied by each other.

Multiply and simplify the radicals:

g) $\sqrt{3x} \cdot 4\sqrt{x}$

1. Multiply like terms
2. Simplify

h) $\sqrt{12} \cdot \sqrt{3}$

i) $\sqrt{7xy^2} \cdot 3\sqrt{x}$

j) $\sqrt{2x^3} \cdot \sqrt{x}$

Diving Radicals – Using the Quotient Property

Quotient Property: $\sqrt{\frac{a}{b}} = \frac{\sqrt{a}}{\sqrt{b}}$ if $a \geq 0$ and $b > 0$

Use the quotient property to divide the radicals.

k) $\sqrt{\frac{16}{25}}$

l) $\sqrt{\frac{13}{100}}$

m) $\sqrt{\frac{7}{x^2}}$

Rationalizing the Denominator

****We can NEVER have a radical in the denominator! So, we must rationalize the denominator to get rid of it, if it exists.**

Rationalize the denominators.

n) $\frac{5}{\sqrt{7}}$

o) $\frac{1}{\sqrt{x}}$

p) $\frac{\sqrt{2}}{\sqrt{3b}}$

Adding and Subtracting Radicals

You can only add or subtract radicals that have the SAME NUMER INSIDE of the radical. The only numbers/variables to get added or subtracted are the numbers in front of the radicals. (The number inside of the radicals stays the same.)

Add or subtract the radicals.

q) $6\sqrt{10} - 4\sqrt{10}$

r) $7\sqrt{5} - 4\sqrt{2} + 2\sqrt{5}$

s) $5\sqrt{3} + \sqrt{48}$

Multiplying Radical Expressions

**Distribute just like you would do for regular polynomials.

Multiply the Radical Expressions

t) $\sqrt{5}(4 - \sqrt{10})$

u) $(\sqrt{7} + \sqrt{2})(\sqrt{7} - 3\sqrt{2})$

v) $(4 - \sqrt{5})(1 - \sqrt{5})$