

Simplifying Radicals

ERI

Steps:

- 1) Either look for factors that are perfect squares or prime factor the number.
- 2) Take the square root of the perfect square and place it outside the radical.
- 3) Factor the variables into perfect squares.
- 4) Take the square root of the perfect square of the variables and place it outside the radical.
- 5) Check that the radical is simplified.

A Radical is Simplified When:

- 1) the numbers under the radical sign have NO perfect square factors
- 2) the variables under the radical sign are raised to the lowest possible power
- 3) you have the fewest radical signs possible

Examples: 1, 4, 9, 16, 25, 36, 49, 64, 81, 100, 121, 144, 169, 196, 225

$$1) \sqrt{12} \quad \sqrt{2 \cdot 2 \cdot 3}$$

$$\sqrt{4 \cdot 3} \quad \sqrt{2^2 \cdot 3}$$

$$2\sqrt{3} \quad 2\sqrt{3}$$

$$2) \sqrt{75} \quad \sqrt{25 \cdot 3}$$

$$\sqrt{25 \cdot 3} \quad \sqrt{5 \cdot 5 \cdot 3}$$

$$5\sqrt{3} \quad 5\sqrt{3}$$

$$3) \sqrt{27} \quad \sqrt{9 \cdot 3}$$

$$3\sqrt{3}$$

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

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

$$3\sqrt{3}$$

$$4) \sqrt{12x^2}$$

$$\sqrt{4 \cdot 3 \cdot x^2}$$

$$2x\sqrt{3}$$

$$5) \sqrt{75x^3}$$

$$\sqrt{25 \cdot 3 \cdot x^2 \cdot x}$$

$$5x\sqrt{3x}$$

$$6) \sqrt{27x^4y^7}$$

$$\sqrt{9 \cdot 3 \cdot x^4 \cdot y^6 \cdot y}$$

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

$$7) 3\sqrt{20x^5}$$

$$3\sqrt{4 \cdot 5 \cdot x^4 \cdot x}$$

$$6x^2\sqrt{5x}$$

$$8) 2\sqrt[3]{8x^3y^5}$$

$$2\sqrt[3]{8 \cdot x^3 \cdot y^3 \cdot y^2}$$

$$4xy\sqrt[3]{y^2}$$

$$9) -\sqrt[3]{54x^6y^4}$$

$$-\sqrt[3]{27 \cdot 2 \cdot x^6 \cdot y^3 \cdot y}$$

$$-3x^2y\sqrt[3]{2y}$$

$$3x + 2x = 5x$$
$$3\sqrt{x} + 2\sqrt{x} = 5\sqrt{x}$$

$$3x(2x) = 6x^2$$
$$3\sqrt{x}(\sqrt{x})$$
$$6\sqrt{x}$$
$$6 \cdot 2 = 12$$