Algebra 1

Section 10-2

Simplifying Radicals

Goal: to simplify radicals involving products and quotients

radical expression: an expression that contains a radical.

Examples: $\sqrt{15x}$ $3\sqrt{5}$ $\frac{\sqrt{2}}{4}$

*to be simplified

-radicand contains no perfect squares except 1 $\sqrt{4}$

-radicand contains no fractions $\sqrt{\frac{1}{3}}$

-No radicals appear in the denominator

$\frac{2}{\sqrt{5}}$

You can simplify radical expressions using multiplication and division properties of square roots.

Mult. Prop of Sq. Roots:

$\sqrt{ab} = \sqrt{a} \cdot \sqrt{b}$

-We will use this to remove perfect squares from the radicand.

Simplify:

$\sqrt{72}$ $\sqrt{9}\sqrt{8}$ $3\sqrt{8}$ $3\sqrt{4\cdot 2}$ $3\sqrt{4}\sqrt{2}$ $3(2)\sqrt{2}$ $6\sqrt{2}$

$\sqrt{36\cdot 2}$ $\sqrt{36}\sqrt{2}$ $6\sqrt{2}$

$\sqrt{125}$ $\sqrt{25\cdot 5}$ $\sqrt{25}\sqrt{5}$ $5\sqrt{5}$

Radical Expressions containing variables:

-a variable with an even exponent is a perfect square.

-a variable with an odd exponent is the product of a perfect square and the variable.

Ex: $\sqrt{x^4}$ $\sqrt{r^7}$ $\sqrt{s^2t^5}$

$\sqrt{x^{100}} = x^{50}$ x^2 $\sqrt{x^{40}} = x^{20}$ $\sqrt{r^6 r^1}$ $\sqrt{r^6}\cdot\sqrt{r}$ $r^3\sqrt{r}$ $\sqrt{s^2t^4t^1}$ $\sqrt{s^2}\sqrt{t^4}\sqrt{t}$ $st^2\sqrt{t}$

Simplify:

$-m\sqrt{80m^9}$ $-m\sqrt{16\cdot 5m^8 m}$ $-m\sqrt{16}\cdot\sqrt{5}\sqrt{m^8}\sqrt{m}$ $-m(4)\sqrt{5}(m^4)\sqrt{m}$ $-m(4)(m^4)\sqrt{5}\sqrt{m}$ $-4m^1\cdot m^4$ $-4m^5\sqrt{5m}$

$\sqrt{243x^5y^2}$ $\sqrt{81\cdot 3\cdot x^4\cdot x\cdot y^2}$ $9x^2y\sqrt{3x}$

Simplify the product:

$3\sqrt{16} \cdot \sqrt{18}$

$3(4)\sqrt{9 \cdot 2}$

$3(4)(3)\sqrt{2} = 36\sqrt{2}$

$\sqrt{2a} \cdot \sqrt{9a^3} = \sqrt{18a^4}$

$\sqrt{9 \cdot 2a^4}$

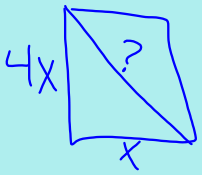
$3a^2\sqrt{2}$

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

$21\sqrt{100x^6}$

$21 \cdot 10 \cdot x^3 = 210x^3$

A door's height is four times its width. What is the maximum length of a painting that fits through the door?



$\sqrt{(4x)^2 + x^2} = \sqrt{?^2}$

$\sqrt{16x^2 + 1x^2}$

$x\sqrt{17}$

Hwk: pg. 623-624

#10-34 evens, 56, 70, 72, 76