Algebra 2

Ch. 7 Handout 7.2

Multiplying and Dividing Radical Expressions

1. Simplify each expression. Assume all variable are positive.

a) $\sqrt{50x^5}$

$\sqrt{25 \cdot 2\, x^4 x}$

$x^{\frac{4}{2}}$

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

b) $\sqrt[3]{54n^8}$

$\sqrt[3]{27 \cdot 2\, n^6 n^2}$

$n^{6/3}$

$3n^2\sqrt[3]{2n^2}$

c) $\sqrt{72x^6y^7}$

$\sqrt{36 \cdot 2\, x^6 y^6 y}$

$x^{\frac{6}{2}}\ y^{\frac{6}{2}}$

$6x^3y^3\sqrt{2y}$

d) $\sqrt{8x^5}$

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

$x^{\frac{4}{2}}$

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

e) $\sqrt[3]{-243x^3y^{10}}$

$\sqrt[3]{-27 \cdot 9\, x^3 y^9 y}$

$x^{3/3}\, y^{9/3}$

$-3xy^3\sqrt[3]{9y}$

Multiplying Radical Expressions

If $\sqrt[n]{a}$ and $\sqrt[n]{b}$ are real numbers, then $\sqrt[n]{a} \cdot \sqrt[n]{b} = \sqrt[n]{ab}$.

same

**In order to multiply radical expressions you must have the same index number!!!!

2. Multiply and simplify.

Index # the same

a) $\sqrt[3]{25xy^8} \cdot \sqrt[3]{5x^4y^3}$

$\sqrt[3]{25xy^8 \cdot 5x^4y^3}$

$\sqrt[3]{125\,x^5y^{11}}$

$\sqrt[3]{125\,x^3x^2y^9y^2}$

$x^{\frac{3}{3}}\ y^{\frac{9}{3}}$

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

b) $\sqrt{3} \cdot \sqrt{27}$

$\sqrt{81} = 9$

c) $3\sqrt{7x^3} \cdot 2\sqrt{21x^3y^2}$

$6\sqrt{7x^3 \cdot 21x^3y^2}$

$6\sqrt{147x^6y^2}$

$6\sqrt{49 \cdot 3 x^6 y^2}$

$x^{6/2}\ y^{2/2}$

$6 \cdot 7x^3y\sqrt{3}$

$42x^3y\sqrt{3}$

d) $\sqrt{5} \cdot \sqrt{45}$

$\sqrt{225} = 15$

2. Multiply and simplify.

e) $\sqrt[3]{4} \cdot \sqrt[3]{2000}$

$\sqrt[3]{8000}$

$\boxed{20}$

f) $\sqrt{18x^3} \cdot \sqrt{2x^2y^3}$

$\sqrt{18x^3 \cdot 2x^2y^3}$

$\sqrt{36x^5y^3}$

$\sqrt{36x^4 \times y^2 y}$

$x^{\frac{4}{2}} y^{\frac{2}{2}}$

$\boxed{6x^2y\sqrt{xy}}$

g) $\sqrt[3]{10x^2y^4} \cdot \sqrt[3]{4x^2y}$

$\sqrt[3]{10x^2y^4 \cdot 4x^2y}$

$\sqrt[3]{40x^4y^5}$

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

$x^{3/3}\, y^{3/3}$

$2xy\sqrt[3]{5xy^2}$

h) $\sqrt{7} \cdot \sqrt[3]{12}$

Already simplify.

Can't multiply radical expressions because index numbers are not the same.

Dividing Radical Expressions

If $\sqrt[n]{a}$ and $\sqrt[n]{b}$ are real numbers and $b \neq 0$, then $\dfrac{\sqrt[n]{a}}{\sqrt[n]{b}} = \sqrt[n]{\dfrac{a}{b}}$.

To rationalize the denominator of an expression, rewrite it so there are no radicals in any denominator and no denominators in any radical.

1. Divide and simplify. Assume all variables are positive.

a) $\dfrac{\sqrt[3]{-81}}{\sqrt[3]{3}}$

b) $\dfrac{\sqrt[3]{192x^8}}{\sqrt[3]{3}}$

1. Divide and simplify. Assume all variables are positive.

c) $\dfrac{\sqrt{243}}{\sqrt{27}}$

d) $\dfrac{\sqrt{12x^4}}{\sqrt{3x}}$

1. Divide and simplify. Assume all variables are positive.

e) $\dfrac{\sqrt{128x^3}}{\sqrt{2xy}}$

f) $\dfrac{\sqrt[3]{270x}}{\sqrt[3]{10xy^2}}$

2. Rationalize the denominator of each expression. Assume that the variable are positive.

a) $\frac{\sqrt{3}}{\sqrt{5}}$

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

c) $\dfrac{\sqrt[3]{4}}{\sqrt[3]{6x}}$

2. Rationalize the denominator of each expression. Assume that the variable are positive.

d) $\dfrac{\sqrt{7x}}{\sqrt{3}}$

e) $\dfrac{\sqrt[3]{x^2}}{\sqrt[3]{4}}$

3. The formula $a=\frac{d}{t^2}$ relates the acceleration a of a moving object to the distance d it moves in the time t. Solve the formula for t and rationalize the denominator.

Assignment:

Day 1: pgs 377-379 1-22,37-45,56-58