

Warm-Up:

$$1) \sqrt{x^2} = |x|$$

$$2) (x^2)^{1/2} = |x|$$

$$3) \sqrt{x^4} = x^2$$

$$4) (x^4)^{1/2} = x^2$$

$$5) \sqrt[3]{x^6} = x^2$$

$$6) (x^6)^{1/3} = x^2$$

Section 7-6: Rational Exponents

For any real number b and for any positive integer n , $b^{\frac{1}{n}} = \sqrt[n]{b}$.

Examples:

1) Write $a^{1/6}$ in radical form.

$$\sqrt[6]{a}$$

2) Write \sqrt{w} in exponential form.

$$w^{1/2}$$

For any real number b and for positive integers m and n , $b^{\frac{m}{n}} = \sqrt[n]{b^m}$.

Examples:

Evaluate each expression.

$$3) 49^{-1/2} = \frac{1}{49^{1/2}} = \frac{1}{\sqrt{49}} = \frac{1}{7}$$

$$4) 32^{2/5} = \sqrt[5]{32^2} = 2^2 = 4$$

$$= \sqrt[5]{1024} = 4$$

Examples:

4) The formula $M = 512 - 146,230B^{-8/5}$ can be used to estimate the maximum total mass that a weightlifter of mass B kilograms can lift using the snatch and the clean and jerk. Suppose a 168-kilogram weightlifter competed in a contest. According to the formula, what is the maximum he can lift?

$$M = 512 - 146,230B^{-8/5}$$

$$M = 512 - 146,230(168)^{-8/5}$$

$$168^{-8/5}$$

$$M = 471.7 \text{ kg}$$

Examples:

Simplify.

$$5) y^{1/7} \cdot y^{4/7} = y^{5/7}$$

$$6) x^{-2/3} = \frac{1}{x^{2/3}} \frac{x^{1/3}}{x^{1/3}} = \frac{x^{1/3}}{x}$$

Examples:

Simplify.

$$7) \frac{\sqrt[6]{16}}{\sqrt[3]{2}} = \frac{\sqrt[6]{2^4}}{2^{1/3}} = \frac{2^{4/6}}{2^{1/3}} = \frac{2^{2/3}}{2^{1/3}} = 2^{1/3}$$

$$8) \sqrt[6]{4x^4} = \sqrt[6]{2^2 x^4} = 2^{2/6} x^{4/6} = 2^{1/3} x^{2/3} = \sqrt[3]{2x^2}$$

Examples:

Simplify.

$$9) \frac{y^{1/2} + 1}{(y^{1/2} - 1)} \cdot \frac{(y^{1/2} + 1)}{(y^{1/2} + 1)} = \frac{y + y^{1/2} + y^{1/2} + 1}{y - 1}$$

$$\frac{y + 2y^{1/2} + 1}{y - 1}$$

Examples:

10) If x is a positive number, then $\frac{x^{1/3} \cdot x^{1/2}}{x^{1/6}}$

A) $\sqrt[2]{x^3}$

B) $\sqrt[3]{x^2}$

C) $\sqrt[6]{x^5}$

D) $x^{3/2}$

$$\frac{x^{2/6} \cdot x^{3/6}}{x^{1/6}} = \frac{x^{5/6}}{x^{1/6}} = x^{4/6} = x^{2/3}$$

Homework: pg. 420-421 #18-48 even, 52, 58

Quiz over 7-4, 7-5, 7-6 Next Class