

1 Simplifying Exponential Expressions

Simplify the following expressions:

1. $(a^3b^6)^7$
2. $(a^2)(b^5)\sqrt{a^8b^4}$
3. $(a^{\frac{1}{4}}b^{\frac{3}{5}})^7$
4. $\sqrt{a^{-6}b^4c^2}$
5. $\frac{a^7b^8}{b^9}$

2 Rewriting Expressions

Rewrite each of the following expressions with rational exponents:

1. $\sqrt[4]{x^2y^6}$
2. $\sqrt[3]{27x^3y^6}$
3. $\sqrt[5]{125a^{10}b^{12}}$

Rewrite each of the following expressions with a radical sign:

1. $a^{\frac{1}{3}}b^{\frac{4}{3}}$
2. $16x^{\frac{3}{4}}y^{\frac{2}{5}}$

3 Exponential Growth and Decay

1. Consider a population, whose size is described by $p = 12(1.8)^x$.

(a) What is the initial value in this equation?

(b) Is this population increasing or decreasing?

(c) What is the rate?

(d) make up a word problem which uses this equation.

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2. A herd of buffalo had a starting population of 100,000. The average birth rate has been 25% per year, but the death rate has been 48% per year.
- (a) What is the difference between the birth and death rate?

 - (b) Is this population increasing or decreasing? How do you know that?

 - (c) Write an exponential equation that models this situation, letting P represent the population and t represent the time in years.

 - (d) Sketch a graph of the exponential equation that models this situation.

 - (e) Assuming that these rates stay the same and there are no other factors, how long (in years) will it take the population to fall below 5000?
3. A man has \$1000 available to invest. For each of the following plans, how much money would he have after 5 years?
- (a) 7.0%, compounded annually

 - (b) 6.9%, compounded continuously

 - (c) 6.8%, compounded monthly

 - (d) 6.95%, compounded daily