Section 8.2 Zero and Negative Exponents

Assignment:

Definition of Zero and Exponents

Let a be a non-zero number and let n be a positive integer.

*** A non-zero number to the zero power is 1.

$a^0 = 1, \ a \neq 0$

*** a^{-n} is the reciprocal of a^n

$a^{-n} = \frac{1}{a^n}, \ a \neq 0$

$\frac{a^{-n}}{1}$

$(x^3 y^4 z^7)^0 = 1$

Examples

1. a. 3^{-4} $\frac{1}{3^4} = \frac{1}{81}$

   b. $(-5.2)^0 = 1$

   c. 4^{-y} $\frac{1}{4^y}$

   d. $(\frac{3}{5})^{-1}$ $\frac{5}{3}$

   e. 0^{-1} $\frac{1}{0}$ = und.

2. Rewrite with positive exponents. Assume *k* is positive.

   a. $(3x^{-2})^3$ $3^3 x^{-6}$ $\frac{27}{x^6}$.

   b. $5g^{-3}h^{-4}$ $\frac{5}{g^3 h^4}$

3. Evaluate the expression.

a. $4^{-3}4^{3}$ $4^0 = 1$

b. $(5^{-2})^{-3}$ $5^6 = 15625$

c. 2^{-3} $\frac{1}{2^3} = \frac{1}{8}$

4. Rewrite with positive exponents. Assume n is positive.

a. $(4y^4)^{-3}$ $4^{-3}\, y^{-12} = \frac{1}{64y^{12}}$

$\frac{1}{(4y^4)^3}$

b. $\frac{1}{a^{-2n}}$ a^{2n}

$$P = 5325(1.02)^t$$

5. Census figures showed that a town's population can be modeled by $P = 5325(1.02)^t$, where t=0 represents the year 2010.

a. Estimate the population in the year 1999.

$t = -11$ $P = 5325(1.02)^{-11}$

$P = \frac{5325}{(1.02)^{11}}$ $P \approx 4282.7$

b. Estimate the population in the year 2010.

$t = 0$ $P = 5325(1.02)^0$

$P = 5325$