

10.4 Zero and Negative Exponents p. 430

RPS p. 215 - 216 Activity 1, 2, 3

① For any non-zero number a , $a^0 = 1$. $a \neq 0$
The power 0^0 is undefined.

a) $4^0 = 1$

b) $\frac{2^6}{2^6} = 2^0 = 1$

c) $(-5)^0 = 1$

* d) $-5^0 = -1$

② Negative Exponents:

$$\begin{array}{l} 2^3 = 8 \quad \downarrow \div 2 \\ 2^2 = 4 \quad \downarrow \div 2 \\ 2^1 = 2 \quad \downarrow \div 2 \\ 2^0 = 1 \quad \downarrow \div 2 \\ 2^{-1} = \frac{1}{2} \quad \downarrow \div 2 \end{array}$$

$$2^{-2} = \frac{1}{2^2} = \frac{1}{4}$$

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

$$2^{-4} = \frac{1}{2^4} = \frac{1}{16}$$

* For any integer n and any nonzero number a , a^{-n} is the reciprocal of a^n

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

b) $(-8.5)^{-4} \cdot (-8.5)^4 = 1$

c) $\frac{2^6}{2^8} = 2^{-2} = \frac{1}{2^2} = \frac{1}{4}$

② $\frac{1}{2^2} = \frac{1}{4}$ ~~$\frac{2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2}{2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2}$~~

d) $-5x^0 = -5(1) = -5$

e) $\frac{9y^{-3}}{y^5} = 9y^{-3-5} = 9y^{-8} = \frac{9}{y^8}$

Evaluate the expression using only positive exponents:

a) $8x^{-2} = \frac{8}{x^2}$ b) $b^0 \cdot b^{-10} = \frac{1}{b^{10}}$

c) $\frac{2^6}{15z^9} = \frac{1}{15z^3}$ d) $\frac{4b^{-4}}{b^7} = \frac{4}{b^{11}}$ e) $-2x^0 = -2$

Evaluate the expression:

a) $4^{-2} = \boxed{\frac{1}{16}}$ b) $(-2)^{-5} = \boxed{-\frac{1}{32}}$

c) $6^{-8} \cdot 6^8 = 6^0 = \boxed{1}$ d) $\frac{(-3)^5}{(-3)^6} = \boxed{-\frac{1}{3}}$

e) $\frac{1}{5^7} \cdot \frac{1}{5^{-4}} = \frac{1}{5^3} = \boxed{\frac{1}{125}}$ f) $\frac{4^5 \cdot 4^{-3}}{4^2} = \frac{4^2}{4^2} = \boxed{1}$