Section 8.4 : Zero & Negative Exponents
In Class Notes

Name: _____

What would come next according to the pattern?

2^5 2^4 2^3 2^2 . . .

32 16 8 4 . . .

Key Ideas

Zero Exponents

Words For any nonzero number a, $a^0 = 1$. The power 0^0 is *undefined*.

Numbers $4^0 = 1$ **Algebra** $a^0 = 1$, where $a \neq 0$

Negative Exponents

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

Numbers $4^{-2} = \frac{1}{4^2}$ **Algebra** $a^{-n} = \frac{1}{a^n}$, where $a \neq 0$

Evaluating Expressions

Ex:) Evaluate. Express answers with positive exponents. Notes:

a. 3^{-4}

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

c. $\frac{2^6}{2^8}$

OYO:) Evaluate the expression. Express answers with positive exponents. Notes:

a. $\dfrac{(-3)^5}{(-3)^6}$

b. $\dfrac{4^5 \cdot 4^{-3}}{4^2}$

Simplifying Expressions

Ex:) Simplify the expression. Express answers with positive exponents. Notes:

a. $-5x^0$

b. $\dfrac{9y^{-3}}{y^5}$

c. $\dfrac{n^4 \cdot n^{-7}}{6}$

OYO:) Simplify the expression. Express answers with positive exponents. Notes:

a. $8x^{-2}$

b. $\frac{z^6}{15z^9}$

Modeling Real Life

Ex:) One drop of water leaks from a faucet every second. How many liters of water leak from the faucet in 1 hour? Notes:

Drop of water: 50^{-2} liter

OYO:) A garden is 12 yards long. Assuming the snail moves at a constant speed, how many minutes does it take the snail to travel the length of the garden? Justify your answer.

Notes:

Speed: 5^{-2} foot per second