

10.4

Zero and Negative Exponents

Today's Learning Goals:

- Evaluate expressions involving numbers with zero as an exponent.
- Evaluate expressions involving negative integer exponents.

Do Now:

Simplify. Write your answer as a power.

1) $\frac{5^4 \cdot 5^2}{5^3}$

2) $\frac{2^{11} \cdot 2^5}{2^{13}}$

3) $\frac{a^{13} \cdot a^{11}}{a^{12}}$

8-3 Define and Use Zero and Neg. Exponents

Use the pattern to find zero exponent and negative exponents results:

2^4	
2^3	
2^2	
2^1	
2^0	
2^{-1}	
2^{-2}	
2^{-3}	

RULES:

- ANY number to the zero power equals _____.
- a^{-n} is the _____ of a^n .

Evaluate

1) 4^{-2}

2) 8^0

3) $(-24)^0$

4) $\left(\frac{1}{4}\right)^{-3}$

5) $\frac{1}{2^{-4}}$

6) $(-5)^{-3}$

Practice**Evaluate**

7) $\frac{1}{3^{-4}}$

8) $(4^{-2})^{-2}$

9) $\frac{5^{-1}}{5^2}$

10) $(5^{-3})^{-1}$

Practice**Evaluate**

11) $2^4 \bullet 2^4 \bullet 2^4$

12) $(-3)^5 \bullet (-3)^{-5}$

Practice**Simplify**

13) $3f^{-4}$

14) $(3f)^{-4}$

15) $\frac{a^{-7}}{b^4}$

16) $\frac{m^6}{n^{-7}}$

Practice

Simplify

17) $\frac{c^{-2}}{d^{-3}}$

18) $6x^{-2}yz^{-4}$

Practice

Simplify

1) 10^{-3}

4) $\frac{1}{5^{-4}}$

2) $(-2)^{-6}$

5) $10^{-7} \bullet 10^5$

3) 7^0

Practice

Simplify

6) x^{-7}

9) $3x^{-2}y^{-5}$

7) $6y^{-4}$

10) $\frac{1}{3x^{-3}y^{-7}}$

8) a^2b^{-4}

Practice

Simplify.

1. 5^{-3}

2. $(-8)^0$

Practice

Simplify.

3. $\frac{6^{-3}}{6^{-5}}$

4. $\frac{15^{-4}}{15^{-4}}$

Practice

Simplify.

5. $10^{-1} \bullet 10^{-2}$

6. $\frac{1}{3^{-4}} \bullet \frac{1}{3^6}$

Practice

Simplify.

7. $27^{-18} \bullet 27^{18}$

8. $\frac{4^{-7}}{4^2 \bullet 4^{-5}}$

Practice

Simplify.

10. $\frac{14u^{-4}}{7u^8}$

11. $\frac{18w^{-8}}{w^{-5}}$

Practice

Simplify.

12. $y^5 \cdot z^{-3}$

13. $\frac{2^{-3} \cdot a^0 \cdot b^5}{b^{-4}}$