

Unit 4.1 Zero and negative exponents PRACTICE

Period: _____

Simplify each expression.

1. 13^0 1

2. 5^{-3} $\frac{1}{125}$

3. $\frac{3}{3^{-4}}$ 243

4. $\frac{2}{4^{-1}}$ 8

5. $-(7)^{-2}$ $-\frac{1}{49}$

6. 46^{-1} $\frac{1}{46}$

7. -6^0 -1

8. $-(12x)^{-2}$ $-\frac{1}{144x^2}$

9. $\frac{1}{8^0}$ 1

10. $6bc^0$ 6b

11. $-(11x)^0$ -1

12. $\left(\frac{2}{9}\right)^{-2}$ $\frac{81}{4}$

13. $3m^{-8}p^0$ $\frac{3}{m^8}$

14. $\frac{5a^{-4}}{2c}$ $\frac{5}{2a^4c}$

15. $\frac{-3k^{-3}(mn)^3}{p^{-8}}$ $\frac{-3p^8m^3n^3}{k^3}$

16. $\left(\frac{2m}{3n}\right)^{-3}$ $\frac{27n^3}{8m^3}$

17. $8^{-2}q^3r^{-5}$ $\frac{q^3}{64r^5}$

18. $-(10a)^{-4}b^0$ $\frac{-1}{10,000a^4}$

19. $\frac{11xy^{-1}z^0}{v^{-3}}$ $\frac{11xv^3}{y}$

20. $\frac{5m^{-1}}{9(ab)^{-4}c^7}$ $\frac{5a^4b^4}{9mc^7}$

Evaluate each expression for $a = -4$, $b = 3$, and $c = 2$.

21. $3a^{-1} = -\frac{3}{4}$

22. $b^{-3} = \frac{1}{27}$

23. $4a^2b^{-2}c^3 = \frac{512}{9}$

24. $9a^0c^4 = 144$

25. $-a^{-2} = -\frac{1}{16}$

26. $(-c)^{-2} = \frac{1}{4}$

Write each number as a power of 10 using negative exponents.

27. $\frac{1}{1000} = 10^{-3}$

28. $\frac{1}{10} = 10^{-1}$

Write each expression as a decimal.

29. $10^{-3} = 0.001$

30. $8 \cdot 10^{-4} = 0.0008$

31. The number of people who vote early doubles every week leading up to an election. This week 1200 people voted early. The expression $1200 \cdot 2^w$ models the number of people who will vote early w weeks after this week. Evaluate the expression for $w = -3$. Describe what the value of the expression represents in the situation.

$1200 \cdot 2^{-3} = 150$ The 150 represents the number of early voters 3 weeks ago.

32. A pizza shop makes large pizzas with a target diameter of 16 inches. A pizza is acceptable if its diameter is within $3 \cdot 2^{-2}$ in. of the target diameter. Let d represent the diameter of a pizza. Write an inequality for the range of acceptable large pizza diameters in inches.

$15.25 < d < 16.75$

33. **Open-ended** Choose a fraction to use as a value for the variable c . Find the values of c^{-1} , c^{-3} , and c^3 .

Answers may vary.

Sample answer if $c = \frac{2}{7}$, then $c^{-1} = \frac{7}{2}$, $c^{-3} = \frac{343}{8}$, and $c^3 = \frac{8}{343}$