

NAME: _____

P.I. A2.N.1: Evaluate numerical expressions with negative exponents, without the aid of a calculator (when the answers are rational numbers)

P.I. A2.A.9: Rewrite algebraic expressions that contain negative exponents using only positive exponents

Simplify:

1. $(3.4)^0$

2. $x^{-5} \cdot x^{-3}$

3. $a^{-6}(a^4)(a^{-5})$

4. Write the expression so that it contains only positive exponents.

$$\frac{b^{-3}c^{-7}}{d^{-1}}$$

[A] b^3c^7d

[B] $\frac{d}{b^3c^7}$

[C] $-\frac{b^3c^7}{d}$

[D] $-\frac{d}{b^3c^7}$

Simplify:

5. $\frac{c^{-8}d^{-9}}{e^{-2}}$

6. $\frac{z^4}{z^{-4}}$

[A] 0

[B] z^{-8}

[C] z^{16}

[D] z^{-16}

[E] z^8

7. $\frac{x^{-7}}{x^{-8}}$

[A] x

[B] $\frac{1}{x}$

[C] x^{15}

[D] $\frac{1}{x^{15}}$

8. $\frac{x^{-7}}{x^{-9}}$

9. $\frac{36x^5}{12x^{-9}}$

[A] $3x^4$

[B] $\frac{3}{x^{14}}$

[C] $\frac{3}{x^4}$

[D] $3x^{14}$

10. $\frac{2x^3y^{-3}}{4x^7y^2}$

11. $(4x^3y^{-2})^3$

[A] $\frac{y^6}{64x^9}$

[B] $\frac{y^6}{12x^3}$

[C] $\frac{12x^3}{y^6}$

[D] $\frac{64x^9}{y^6}$

12. $\frac{4^{-1}a^2b^{-7}}{4^2(ab)^{-4}}$

13. Simplify. Write the answer with all exponents

positive. $\left(\frac{4x^{-5}p^5}{y^{-4}}\right)^{-2}\left(\frac{y^3p^4}{x^4}\right)^{-2}$

14. Which expression is equal to $\frac{1}{5}$?

[A] 5^{-2}

[B] $\frac{1}{5^{-1}}$

[C] -5^1

[D] -5^2

[E] 5^{-1}

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15. Choose a fraction to use as a value for the variable a . Find the values of a^{-3} and a^3 . What is true about $a^{-3} \cdot a^3$?

16. Compare the quantities in Column A and Column B.

<u>Column A</u>	<u>Column B</u>
the value of a^{-2}	the value of $-a^2$

- [A] The quantity in Column A is greater. [B] The quantity in Column B is greater.
[C] The quantities are equal.
[D] The relationship cannot be determined from the information given.

17. Compare the quantities in Column A and Column B.

<u>Column A</u>	<u>Column B</u>
the exponent of z when $3z^4 \cdot z^7 \cdot z^{-3}$ is simplified	the exponent of a when $5a^{-4} \cdot a^7 \cdot a^5$ is simplified

- [A] The quantity in Column A is greater. [B] The quantity in Column B is greater.
[C] The quantities are equal.
[D] The relationship cannot be determined from the information given.

18. Compare the quantities in Column A and Column B.

<u>Column A</u>	<u>Column B</u>
the exponent of x when $\frac{x^7}{x^2}$ is simplified	the exponent of m when $\frac{m^6}{m^{-3}}$ is simplified

- [A] The quantity in Column A is greater. [B] The quantity in Column B is greater.
[C] The quantities are equal.
[D] The relationship cannot be determined from the information given.

19. Compare the quantities in Column A and Column B.

<u>Column A</u>	<u>Column B</u>
the exponent of z when $(z^{-2})^{14}$ is simplified	the exponent of z when $(z^4)^{-7}$ is simplified

- [A] The quantity in Column A is greater. [B] The quantity in Column B is greater.
[C] The quantities are equal.
[D] The relationship cannot be determined from the information given.

[1] 1

[2] $\frac{1}{x^8}$

[3] $\frac{1}{a^7}$

[4] B

[5] $\frac{e^2}{c^8d^9}$

[6] E

[7] A

[8] x^2

[9] D

[10] $\frac{1}{2x^4y^5}$

[11] D

[12] $\frac{a^6}{64b^3}$

[13] $\frac{x^{18}}{16y^{14}p^{18}}$

[14] E

Answers may vary. Sample: Let $a = \frac{3}{4}$. Then

$$\left(\frac{3}{4}\right)^3 = \frac{27}{64} \text{ and } \left(\frac{3}{4}\right)^{-3} = \left(\frac{4}{3}\right)^3 = \frac{64}{27}. \text{ So}$$

[15] $a^{-3} \cdot a^3 = \frac{27}{64} \cdot \frac{64}{27} = 1.$

[16] D

[17] C

[18] B

[19] C