

Section 4-6 – Applying Exponent Laws

Name: _____

key

1. Calculate: $(15^2)^6 \div 15^{11}$.

(A) 15^{-3}

(B) 15^1

(C) 15^{19}

(D) 15^{23}

$15^{12} \div 15^{11}$

$15^{12-11} = 15^1$

2. Simplify: $\frac{2a^{-3}b^5}{(2a^{-1}b)^3} = \frac{2a^{-3}b^5}{2^3 a^{-3} b^3} = \frac{2a^{-3}b^5}{8a^{-3}b^3}$

(A) $\frac{b^2}{4}$

(B) $\frac{b^2}{3}$

(C) b^2

(D) $\frac{b^2}{4a^5}$

$= \frac{2b^2}{8}$

$= \frac{b^2}{4}$

3. Calculate: $(9^4)^3 \div (9^7) = 9^{12} \div 9^7$

(A) 9^0

(B) 9^5

(C) 9^{14}

(D) 9^{19}

9^5

4. Simplify: $\left(\frac{x^8}{x^{-2}}\right)x^0 = (x^{10})(1)$

(A) x^{-4}

(B) x^0

(C) x^6

(D) x^{10}

5. Calculate: $(7^3)^2 \times (7^4) = 7^6 \times 7^4$

(A) 7^2

(B) 7^9

(C) 7^{10}

(D) 7^{13}

7^{6+4}

7^{10}

6. Simplify: $x^4 \cdot x^6 = x^{4+6}$

(A) x^{10}

(B) x^{24}

(C) $2x^{10}$

(D) $2x^{24}$

$= x^{10}$

7. Simplify: $(2x^6y^3)(3xy^2)$

(A) $3xy^2$

(B) $6x^7y^5$

(C) $6x^7y^6$

(D) $5x^7y^5$

$6x^7y^5$

8. Simplify: $\frac{(t^2)^3}{t^{-3}} = \frac{t^6}{t^{-3}} = t^{6-(-3)} = t^9$

(A) t^2

(B) t^3

(C) t^6

(D) t^9

9. Which statement is true?

(A) $(7^3)^2 = 7^5$

(B) $7^3 \cdot 7^4 = 7^{12}$

(C) $7^4 \cdot 7^5 = 7^9$

(D) $\frac{7^8}{7^4} = 7^2$

10. What is the simplest form of $\frac{(y^4)(y^3)}{y^2}$?

- (A) y^5
- (B) y^6
- (C) y^9
- (D) y^{10}

$$\frac{y^7}{y^2} = y^5$$

11. What is the simplest form of $(2x^3)^2 \cdot x^3$?

- (A) $2x^8$
- (B) $2x^9$
- (C) $4x^8$
- (D) $4x^9$

$$(2^2 x^6) \cdot x^3 = 4x^9$$

12. Simplify: $n^5 \times n^{-6} \div n^2$.

- (A) n^{-15}
- (B) n^{-3}
- (C) n^1
- (D) n^9

$$n^{5+(-6)} \div n^2 = n^{-1} \div n^2 = n^{-1-2} = n^{-3}$$

13. Simplify: $y^5 \cdot y^4 \cdot y$

- (A) y^3
- (B) y^9
- (C) y^{10}
- (D) y^{20}

$$= y^{5+4+1} = y^{10}$$

14. Simplify: $\frac{m^4 \cdot m^{-2}}{m^{-4}}$

- (A) $\frac{1}{m^4}$
- (B) $\frac{1}{m^2}$
- (C) m^2
- (D) m^6

$$= \frac{m^{4+(-2)}}{m^{-4}} = \frac{m^2}{m^{-4}} = m^{2-(-4)} = m^6$$

15. Simplify: $(-2x^2)^3 = (-2)^3 x^6$

(A) $-2x^5$

(B) $-8x^5$

(C) $-6x^6$

(D) $-8x^6$

$-8x^6$

16. What is the simplest form of: $(2x^4)^2 \cdot x$

(A) $2x^8$

(B) $4x^8$

(C) $2x^9$

(D) $4x^9$

$2^2 x^8 \cdot x$

$4x^9$

17. Which statement is true?

(A) $27^8 \cdot 27^{-9} = \frac{1}{27}$

(B) $(27^3)^0 = 27^3$

(C) $27^2 + 27^3 = 27^5$

(D) $\frac{27^7}{27^{-2}} = 27^5$

18. Simplify $\frac{2x(3xy)^2}{6xy^3}$

(A) $\frac{x^2}{y}$

(B) x^2y

(C) $\frac{3x^2}{y}$

(D) $3x^2y$

$\frac{2x(3^2 x^2 y^2)}{6xy^3} = \frac{2x(9x^2 y^2)}{6xy^3}$

$= \frac{18x^3 y^2}{6xy^3} = 3x^2 y^{-1}$

$= \frac{3x^2}{y}$

19. Determine the value of y in the equation $\frac{5^y \cdot 5^{-9}}{5^2} = 1$

- (A) 0
- (B) 7
- (C) 10

(D) 11

20. Write $\frac{x^7 y^5 z^2}{x^3 y^6 z}$ in simplest form without any exponents. *negative*

(A) $x^4 y z$

(B) $\frac{x^4 z^2}{y}$

(C) $x^{10} y^{11} z^3$

(D) $\frac{x^4 z}{y}$

$x^{7-3} y^{5-6} z^{2-1}$

$x^4 y^{-1} z^1$

$\frac{x^4 z}{y}$

21. Simplify: $(x^4 y^3)^{-2} (3x^3 y^5)^3$

$27 x y^9$

22. Simplify: $\frac{(x^2 y^8)^5 (3x^2 y^{12})^0}{(x^5 y^4)^3}$ 23. Evaluate: $\left(\frac{2}{5}\right)^{-4} \times \left(\frac{2}{5}\right)^6 \div \left(\frac{2}{5}\right)^3$

$\frac{y^{28}}{x^5}$

$\frac{5}{2}$

24. Simplify the following. Make sure your answers do not have negative exponents.

(A) $(2y^5) (-3y^6)^2$

(B) $\frac{-6x^4 y^3}{3x^{-2} y^2}$

$-2x^6 y$

$18 y^{17}$

$$21. (x^4 y^3)^{-2} (3x^3 y^5)^3$$

$$(x^{-8} y^{-6}) (3^3 x^9 y^{15})$$

$$\boxed{27xy^9}$$

$$22. \frac{(x^2 y^8)^5 (3x^2 y^{12})^0}{(x^5 y^4)^3} = \frac{(x^2 y^8)^5}{(x^5 y^4)^3}$$

$$= \frac{x^{10} y^{40}}{x^{15} y^{12}} = x^{-5} y^{28} = \boxed{\frac{y^{28}}{x^5}}$$

$$23. \left(\frac{2}{5}\right)^{-4+6-3} = \left(\frac{2}{5}\right)^{-1} = \boxed{\frac{5}{2}}$$

$$24. a) (2y^5)(-3y^6)^2$$

$$2y^5(-3)^2 y^{12}$$

$$\boxed{-18y^{17}}$$

$$b) \frac{-6x^4 y^3}{3x^{-2} y^2} = \boxed{-2x^6 y}$$

$$= -2x^{4-(-2)} y^{3-1}$$