

Exponent Properties Review Problems

I can recognize terminology such as power, exponent, and base

Level 2

1. Identify the base and the exponent

a.  $-2x^2$   
base X exponent 2

c.  $(\frac{2x}{y^2})^3$   
base  $\frac{2x}{y^2}$  exponent 3

b.  $(-y)^5$   
base -y exponent 5

d.  $2x^{\frac{1}{2}}$   
base X exponent  $\frac{1}{2}$

I can calculate with positive exponents, zero exponents, negative exponents, fractional exponents

Level 2

2. Evaluate the following expressions. Simplify without a calculator.

a)  $2(\frac{1}{2})^3$   
 $2(\frac{1^3}{2^3}) = \frac{2}{1}(\frac{1}{8}) = \frac{1}{4}$

b)  $(2 \cdot 4)^{-1}$   
 $(8)^{-1} = \frac{1}{8}$

c)  $-63^0 + 2^0$   
 $-(1) + 1 = 0$

d)  $81^{1/2}$   
 $\sqrt{81} = 9$

3. Simplify the expressions

a)  $\frac{8y^6}{y^3} = 8y^{6-3}$   
 $8y^3$

b)  $c^{10}(c^4)^{10+4}$   
 $c^{14}$

4. Simplify the expressions

a)  $-2(x^2y^4)^{2 \cdot 4}$   
 $-2x^8y^8$

b)  $\frac{10x^{-3}}{z}$   
 $\frac{10}{z^3}$

c)  $-(5x)^0$   
 $-(1) = -1$

5. Rewrite the expression as a radical

a)  $2x^{1/3}$   
 $2\sqrt[3]{x}$

b)  $(-4y)^{1/2}$   
 $\sqrt{-4y}$

6. Rewrite the expression with a fractional exponent

a)  $\sqrt{4xy}$   
 $(4xy)^{1/2}$

b)  $3x^5\sqrt[5]{y}$   
 $3x(y)^{1/5}$

I understand the difference between adding/subtracting terms and multiplying/dividing a term

Level 2

7. Simplify the expressions

a)  $3x - (6x + 3xy)$   
 $3x - 6x - 3xy$   
 $-3x - 3xy$

b)  $3n(4n^3)$   
 $12n^4$

c)  $\frac{6x^5}{x^3}$   
 $6x^2$

d)  $4x(x-7) + 3x^2 - 2x$   
 $4x^2 - 28x + 3x^2 - 2x$   
 $7x^2 - 30x$

I can apply the rules of exponents

Level 3

10. Simplify

$\left(\frac{3x^2y}{3xy^3}\right)^3 \rightarrow \frac{3^3 x^6 y^3}{3^3 x^3 y^9}$   
 Simplify inside or  $\frac{x^3}{y^6}$   
 $\left(\frac{x}{y^2}\right)^3 = \frac{x^3}{y^6}$

11. Simplify

$(2x^3)^2 * (-3x^2)$   
 $2^2 x^6 (-3) x^2$   
 $4 x^6 (-3) x^2$   
 $-12x^8$

12. Simplify

$yx^{-9}(3x^3)$   
 $\frac{y}{x^9} \cdot 3x^3 \rightarrow \frac{3y}{x^6}$

13. Simplify

$2m(mp)^0 p^2$   
 $2m(1)p^2$   
 $2mp^2$

14. Simplify

$\frac{4^2 x^{10}}{4x^4}$   
 $\frac{(4x^5)^2}{4x^4}$   
 $4x^6$

15. Simplify

$(3xy)^0 x^{-5}$   
 $(1) \frac{1}{x^5}$   
 $\frac{1}{x^5}$

I can calculate the value of a multistep exponential expression

Level 3

16. Evaluate using  $x = -1$  and  $y = 2$

a)  $4x^2 - 5xy$

$4(-1)^2 - 5(-1)(2)$   
 $4 + 10$   
 $14$

b)  $(x^2)^3 + 3y$

$x^6 + 3y$

c)  $(xy)^4$

$x^4 y^4$

I can generate equivalent expressions

Level 2

17. Write the expanded form of each expression

a)  $5z^3 y^4$

$5z z z y y y y$

b)  $x^{-3} z^2 \rightarrow \frac{z^2}{x^3}$

$\frac{z z}{x x x}$

c)  $(-3x^2)^3 \rightarrow (-3)^3 x^6$

$-3 \cdot -3 \cdot -3 \cdot x x x x x x$

18. Condense each expression

a)  $(5x) \cdot (5x) \cdot (5x)$

$(5x)^3$

b)  $\frac{4 \cdot 4 \cdot x^2 \cdot x^2 \cdot x^2}{3 \cdot c \cdot c \cdot c \cdot c} = \frac{4^3 (x^2)^3}{3c^4}$

c)  $4x \cdot x \cdot x \cdot y \cdot y$

$4x^3 y^2$

19. Choose the equivalent expression(s) for the expression:

Level 3

$\frac{2x^4 y}{3z^5}$

A.  $\frac{2x^7 (2y)^0 y^3}{3y^2 x^2 z^5}$

$\frac{2x^7 (1)y^3}{3y^2 x^2 z^5}$

$\frac{2x^5}{3z^5}$

B.  $\frac{2(xy)^3 z}{3z^6}$

$\frac{2x^3 y^3 z}{3z^6}$

$\frac{2x^3 y^3}{3z^5}$

C.  $\frac{4z^{-5} y}{6x^{-4}}$

$\frac{4yx^4}{6z^5}$

$\frac{2yx^5}{3z^5}$

D.  $\frac{3(2x^2 y)^2 z^{-3}}{18yz^2}$

$\frac{3 \cdot 4x^4 y^2}{18z^3 y z^2}$   
 $\frac{2x^4 y}{3z^5}$