Communicate Your Understanding

1. Describe how you would simplify $(-4x^2y^3)(3xy^4)$.
2. Describe how you would evaluate $\dfrac{3^{-2}}{3^{-1}+3^{-2}}$ using paper and pencil.
3. What is the value of 0^4? Explain.
4. Explain why $a \neq 0$ for the negative exponent property.

Practise

A

1. Express as a power of 2.

a) $2^4 \times 2^3$ b) $2^6 \div 2^2$ c) $(2^4)^3$
d) 2×2^7 e) $2^3 \times 2^m$ f) $2^7 \div 2^y$
g) $2^x \div 2^4$ h) $(2^x)^y$ i) $2^{-3} \times 2^4$
j) $2^{-2} \div 2^{-5}$ k) $(2^3)^{-1}$ l) $2^{-4} \times 2^0$

2. Evaluate.

a) 3^{-2} b) 5^0 c) $(-2)^{-4}$
d) $(2^{-1})^2$ e) $-(-3)^0$ f) $\dfrac{1}{5^{-2}}$
g) $\dfrac{1}{(-4)^{-1}}$ h) $-(2^3)^{-2}$

3. Simplify. Express each answer with positive exponents.

a) $a^4 \times a^3$ b) $(m^6)(m^2)$
c) $b^5 \times b^6 \times b$ d) $a \times b^2 \times a^4$
e) $(x^3)(y)(y^4)(x^5)$ f) $(x^3)(x^{-5})$
g) $m^{-4} \times m^{-5}$ h) $y^{-1} \times y^{-3} \times y^2$
i) $a^5 \times a^0$ j) $(a^{-3})(b^{-2})(a^2)$

4. Simplify. Express each answer with positive exponents.

a) $x^6 \div x^3$ b) $m^7 \div m$ c) $t^4 \div t^{-2}$
d) $y^{-5} \div y^{-3}$ e) $m^4 \div m^0$ f) $t^0 \div t^{-5}$

5. Simplify. Express each answer with positive exponents.

a) $(x^3)^2$ b) $(a^2b^3)^4$ c) $(x^2)^{-1}$
d) $(t^4)^0$ e) $(a^{-1}b^2)^{-2}$ f) $(x^2y^3)^{-3}$

6. Simplify. Express each answer with positive exponents.

a) $\left(\dfrac{x}{2}\right)^3$ b) $\left(\dfrac{a}{b}\right)^4$ c) $\left(\dfrac{x^2}{y^3}\right)^5$
d) $\left(\dfrac{x}{3}\right)^{-1}$ e) $\left(\dfrac{a^{-2}}{b^{-3}}\right)^{-2}$

7. Simplify. Express each answer with positive exponents.

a) $5m^4 \times 3m^2$ b) $(4ab^4)(-5a^3b^2)$
c) $5a(-2ab^2)(-3b^3)$ d) $(-6m^3n^2)(-4mn^5)$
e) $(7x^2)(6x^{-2})$ f) $(3x^{-2}y^2)(-2x^2y^{-3})$
g) $(-6a^{-1}b^2)(-a^{-3}b^{-4})$ h) $(-10x^4) \div (-2x)$
i) $\dfrac{45a^2b^4}{9ab^2}$ j) $\dfrac{(4m^2n^4)(7m^3n)}{14mn^5}$
k) $\dfrac{3ab^3 \times 10a^4b^2}{15a^2b^6}$ l) $\dfrac{4a^4b^3}{a^5b^6} \times \dfrac{-a^3}{-(b^2)}$
m) $(35x^5) \div (5x^{-3})$ n) $\dfrac{-54a^5b^{-7}}{-6a^{-2}b^{-3}}$
o) $(-6m^{-4}n^2) \div (2m^{-1}n^{-6})$
p) $\dfrac{(-2x^{-3}y)(-12x^{-4}y^{-2})}{6xy^{-3}}$

8. Simplify. Express each answer with positive exponents.

a) $(2m^3)^2$ b) $(-4x^2)^3$
c) $(-3m^3n^2)^2$ d) $(5c^{-3}d^3)^{-2}$
e) $(2a^{-3}b^{-2})^{-3}$ f) $(-3x^3y^{-2})^{-4}$