

Intermediate Algebra

5-1

Laws of Exponents

Laws of Exponents

$$1) \frac{x^9}{x^5} = \underline{\underline{x^4}}$$

$$2) x^1 = \underline{\underline{x}}$$

$$3) (x^3)^5 = \underline{\underline{x^{15}}}$$

$$4) \frac{x^2}{x^7} = \underline{\underline{\frac{1}{x^5} (x^{-5})}}$$

$$5) x^5 \cdot x^2 = \underline{\underline{x^7}}$$

6) $x^0 = \underline{\underline{1}}$ Anything to the zero power = 1 except $0^0 = \emptyset$

$$7) x^{-1} = \underline{\underline{\frac{1}{x}}}$$

$$8) 3^{-2} = \underline{\underline{\frac{1}{9}}}$$

- 1) When multiplying, add the powers.
- 2) When dividing, subtract the powers.
- 3) When the power is outside the parentheses, multiply the powers.
- 4) A negative power means reciprocal.
(one over)

Simplify.

$$2) (-2ab^4)(-3a^2b^4)$$

$$\underline{6a^3b^8}$$

$$8) (2^2a^2b^3)^3$$

$$\begin{aligned} & (4a^2b^3)^3 \\ & \underline{4^3a^6b^9} \\ & = \underline{\underline{64a^6b^9}} \end{aligned}$$

$$10) (xy)(x^2y^4)$$

$$\begin{aligned} & (x^1y^1)(x^2y^4) \\ & \underline{\underline{x^3y^5}} \end{aligned}$$

Simplify.

$$18) [(3x^2y^3)^2]^2$$
$$\begin{array}{l} \text{Red circle on } (3x^2y^3) \\ \boxed{[9x^4y^6]^2} \\ = 81x^8y^{12} \end{array}$$

$$22) y^{2n} \cdot y^{4n+1}$$
$$\begin{array}{l} \text{Red circle on } y \\ \boxed{y^{2n+4n+1}} \\ = y^{6n+1} \end{array}$$

$$36) (4ab)^3(-2ab^2c^3)^3$$
$$\begin{array}{l} \text{Red circle on } (4ab)^3 \\ \boxed{(16a^3b^3)(-8a^3b^6c^9)} \\ = -128a^6b^9c^9 \end{array}$$

Simplify.

$$42) \frac{2x^{-2}}{y^4} = \frac{2}{x^2y^4}$$

$$54) \frac{x^2y^{11}}{xy^2} = \frac{\cancel{x^2}\cancel{y^2}\cancel{y^9}}{\cancel{x}\cancel{x}\cancel{y^2}}$$
$$= \frac{y^2}{x^3y^9}$$
$$= \frac{1}{x^3y^9}$$

Assignment:
pg 249
1-65 odd