

## Review Exercise Set 19

Exercise 1: Simplify.

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

Exercise 2: Simplify.

$$(3xy^3)(-x^4z^2)(-4x^2y^4z^3)$$

Exercise 3: Simplify.

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

Exercise 4: Simplify.

$$(-y^3z)(-2yz^2)^3$$

Exercise 5: Simplify.

$$\frac{9a^3b^7}{6a^6b^2}$$

Exercise 6: Simplify.

$$\left[ \frac{16x^2y^8z^3}{12x^6yz^7} \right]^2$$

## Review Exercise Set 19 Answer Key

Exercise 1: Simplify.

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

Group common terms

$$= (-3 * 2)(a * a^4)(b^3 * b^2)$$

Simplify

$$\begin{aligned} &= (-6)(a^{1+4})(b^{3+2}) \\ &= \mathbf{-6a^5b^5} \end{aligned}$$

When multiplying variables remember to add the exponents

Exercise 2: Simplify.

$$(3xy^3)(-x^4z^2)(-4x^2y^4z^3)$$

If a coefficient is not shown in front of a variable it is understood to be a 1

$$= (3xy^3)(-1x^4z^2)(-4x^2y^4z^3)$$

Group common terms

$$= (3 * -1 * -4)(x * x^4 * x^2)(y^3 * y^4)(z^2 * z^3)$$

Simplify

$$\begin{aligned} &= (-3 * -4)(x^{1+4+2})(y^{3+4})(z^{2+3}) \\ &= \mathbf{12x^7y^7z^5} \end{aligned}$$

Exercise 3: Simplify.

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

Distribute the exponent to each term

$$= (-2)^3 * (a^2)^3 * (b^4)^3$$

Simplify

$$\begin{aligned} &= (-2 * -2 * -2) * (a^{2*3}) * (b^{4*3}) \\ &= \mathbf{-8a^6b^{12}} \end{aligned}$$

When raising an exponent to another exponent you will multiply the exponents together.

Exercise 4: Simplify.

$$\begin{aligned} & (-y^3z)(-2yz^2)^3 \\ &= (-y^3z)(-2)^3(y)^3(z^2)^3 \\ &= (-y^3z)(-8)(y^{1*3})(z^{2*3}) \\ &= (-y^3z)(-8)(y^3)(z^6) \\ &= (-1 * -8)(y^3 * y^3)(z * z^6) \\ &= 8(y^{3+3})(z^{1+6}) \\ &= \mathbf{8y^6z^7} \end{aligned}$$

Exercise 5: Simplify.

$$\frac{9a^3b^7}{6a^6b^2}$$

Factor and reduce coefficients

$$\begin{aligned} &= \frac{3 \times 3a^3b^7}{3 \times 2a^6b^2} \\ &= \frac{\cancel{3} \times 3a^3b^7}{\cancel{3} \times 2a^6b^2} \\ &= \frac{3a^3b^7}{2a^6b^2} \end{aligned}$$

Reduce the variables by subtracting exponents

$$\begin{aligned} &= \frac{3b^{7-2}}{2a^{6-3}} \\ &= \frac{3b^5}{2a^3} \end{aligned}$$

When dividing variables with exponents you will subtract their exponents. In order to avoid having negative exponents always subtract the smaller exponent from the larger one. In this problem, we will subtract the  $a^3$  in the numerator from the  $a^6$  in the denominator and the  $b^2$  in the denominator from the  $b^7$  in the numerator.

Exercise 6: Simplify.

$$\left[ \frac{16x^2y^8z^3}{12x^6yz^7} \right]^2$$

We will work within the brackets to reduce the fraction before raising it to the second power. This will help to keep the numbers small. So our first step would be to factor and reduce the coefficients.

$$\begin{aligned} &= \left[ \frac{4 \times 4x^2y^8z^3}{4 \times 3x^6yz^7} \right]^2 \\ &= \left[ \frac{4 \times 4x^2y^8z^3}{4 \times 3x^6yz^7} \right]^2 \\ &= \left[ \frac{4x^2y^8z^3}{3x^6yz^7} \right]^2 \end{aligned}$$

Next, reduce the powers on the variables by subtracting the smaller degrees from the larger ones.

$$\begin{aligned} &= \left[ \frac{4y^{8-1}}{3x^{6-2}z^{7-3}} \right]^2 \\ &= \left[ \frac{4y^7}{3x^4z^4} \right]^2 \end{aligned}$$

Now, we will distribute the exponent outside of the brackets to the each term in the numerator and denominator.

$$\begin{aligned} &= \frac{(4y^7)^2}{(3x^4z^4)^2} \\ &= \frac{(4)^2(y^7)^2}{(3)^2(x^4)^2(z^4)^2} \end{aligned}$$

Exercise 6 (Continued):

Simplify

$$\begin{aligned} &= \frac{16(y^{7 \times 2})}{9(x^{4 \times 2})(z^{4 \times 2})} \\ &= \frac{16y^{14}}{9x^8z^8} \end{aligned}$$