Two monomials are called similar when they have the same literal part. For example:

$4x^4y$ and $\frac{1}{5}x^4y$

Other examples of similar monomials are:

$5x^2yh$ and $\frac{6}{7}x^2yh$

x^2 and $3x^2$

We have to remark that the order in which the variables appear is not relevant.

Sum of monomials

The first rule we have to remember is that we can only add similar monomials. In this case, the independent term remains equal, and the coefficients must be added.

$3x^5y + 2x^5y = (3+2)x^5y = 5x^5y$

$4x^3 + 6x^3 = (4+6)x^3 = 10x^3$

$3xyh + 11xyh = (3+11)xyh = 14xyh$

Subtraction of monomials

As we have seen in the case of the sums, we can only reduce similar monomials. In this case, the independent term remains equal, and the coefficients must be reduced.

$3x^5y - 2x^5y = (3-2)x^5y = 1x^5y = x^5y$

$4x^3 - 6x^3 = (4-6)x^3 = -2x^3$

$3xyh - 11xyh = (3-11)xyh = -8xyh$

Product of monomials

The independent terms of the product is the product of independent terms, and the coefficient of the product is the product of the coefficients.

If we multiply the monomials $3x^2y$, $\frac{3}{4}zy$

The product of the coefficients is

$$3 \cdot \frac{3}{4} = \frac{9}{4}$$

And that of the independent terms are

$$(x^2y) \cdot (zy) = x^2yzy = x^2y^2z$$

So, the final result is

$$\frac{9}{4}x^2y^2z$$

In the same way, if we multiply $\frac{3}{4}x^6z$, $\frac{16}{7}z^2y$

The product of the coefficients is

$$\frac{3}{4} \cdot \frac{16}{7} = \frac{12}{7}$$

And that of the independent terms are

$$(x^6z) \cdot (z^2y) = x^6zz^2y = x^6z^3y$$

So, the final result is

$$\frac{12}{7}x^6z^3y$$

Division of monominals

The independent term of the division is the quotient between the independent term of the numerator and the independent term of the denominator.

The coefficient of the division is the quotient between the coefficient of the numerator and the coefficient of the denominator.

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

$\frac{3x^2y}{2x^4y} = \frac{3}{2} \cdot \frac{x^2y}{x^4y} = \frac{3}{2}\frac{1}{x^2}$

$\frac{3x^2}{2xz} = \frac{3}{2} \cdot \frac{x^2}{xz} = \frac{3}{2}\frac{x}{z}$