

Operations with Algebraic and Rational Expressions

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ADDING AND SUBTRACTING ALGEBRAIC EXPRESSIONS

Addition and subtraction of monomials:

Example 1:

$$m + 2 + 3m - 7 = 4m - 5$$

Example 2:

$$3a + 2b + (6a - 6b) = 3a + 2b + 6a - 6b = 9a - 4b$$

Example 3:

$$\begin{aligned} 2x^2 - 5x - 9 - (x^2 - 2x - 1) &= \\ 2x^2 - 5x - 9 - x^2 + 2x + 1 &= \\ x^2 - 3x - 8 \end{aligned}$$

Example 4:

$$\begin{aligned} a^2 - 3ax + x^2 - [4a^2 + 5ax - (3a^2 - 8ax)] &= \\ a^2 - 3ax + x^2 - [4a^2 + 5ax - 3a^2 + 8ax] &= \\ a^2 - 3ax + x^2 - 4a^2 - 5ax + 3a^2 - 8ax &= x^2 - 16ax \end{aligned}$$

Example 5:

$$\begin{aligned} - [4b^2 + 5a - 4 - (b^2 - 3a + 6)] &= \\ - [4b^2 + 5a - 4 - b^2 + 3a - 6] &= \\ - 4b^2 - 5a + 4 + b^2 - 3a + 6 &= \\ - 3b^2 - 8a + 10 \end{aligned}$$

DIVIDING ALGEBRAIC EXPRESSIONS

Dividing monomials by monomials

Examples 30:

$$18y^5 \div 60y^3 = \frac{18y^5}{60y^3} = \frac{3y^2}{10}$$

Examples 31:

$$6x^7 \div 3x^4 = \frac{6x^7}{3x^4} = 2x^3$$

Examples 32:

$$20m^5 \div 25m^3 = \frac{20m^7}{25m^2} = \frac{4m^5}{5}$$

Examples 33:

$$\frac{8x^5y^{12}}{-2x^3y^{10}} = -4x^2y^2$$

Examples 34:

$$\frac{8x^4y^4z}{4x^3y^4z^3} = 2xz^{-2}$$

Examples 35:

$$\frac{6x^2y^3}{12x^5y^2} = \frac{1}{2}x^{-3}y \qquad x^{-3} = \frac{1}{x^3}$$