

Division of Polynomials

Trinomial \div Monomial

Method: Distribute the
Division over the
terms of the polynomial
on the numerator

Example 1: Divide

$$\begin{array}{r} 24x^8 - 12x^3 - 6x \\ \hline 2x \end{array}$$

< . . .

Solution:

$$\begin{aligned} & \frac{24x^8}{2x^1} - \frac{12x^3}{2x^1} - \frac{6x}{2x} \\ & \underbrace{\hspace{1.5cm}} \quad \underbrace{\hspace{1.5cm}} \quad \underbrace{\hspace{1.5cm}} \\ & = 12x^{8-1} - 6x^{3-1} - 3 \\ & = \boxed{12x^7 - 6x^2 - 3} \end{aligned}$$

Example 2:

Divide

$$(60x^9 + 30x^7 - 3x^2) \div (3x^2)$$

Solution:

$$\begin{array}{r} 60x^9 + 30x^7 - 3x^2 \\ \hline 3x^2 \end{array}$$

Blue arrows indicate the division process: one arrow from $60x^9$ to $3x^2$, one from $30x^7$ to $3x^2$, and one from $-3x^2$ to $3x^2$.

$$= \frac{60X^9}{3X^2} + \frac{30X^7}{3X^2} - \frac{\cancel{3X^2}}{\cancel{3X^2}}$$

$$= 20X^{9-2} + 10X^{7-2} - 1$$

$$= \boxed{20X^7 + 10X^5 - 1}$$