

Dividing a Polynomial by (x±p)

You divide polynomials in the same way as you perform long division.

Example 1: Divide $6x^3 + 28x^2 - 7x + 15$ by $(x + 5)$

$$\begin{array}{r} 6x^2 - 2x + 3 \\ (x + 5) \overline{) 6x^3 + 28x^2 - 7x + 15} \\ \underline{- 6x^3 + 30x^2} \\ - 2x^2 - 7x \\ \underline{- - 2x^2 - 10x} \\ 3x + 15 \\ \underline{- 3x + 15} \\ 0 \end{array}$$
$$\therefore \frac{6x^3 + 28x^2 - 7x + 15}{x + 5} = 6x^2 - 2x + 3$$

Example 2: Divide $-5x^3 - 27x^2 + 23x + 30$ by $(x + 6)$

$$\begin{array}{r} -5x^2 + 3x + 5 \\ (x + 6) \overline{) -5x^3 - 27x^2 + 23x + 30} \\ \underline{- - 5x^3 - 30x^2} \\ 3x^2 + 23x \\ \underline{- 3x^2 + 18x} \\ 5x + 30 \\ \underline{- 5x + 30} \\ 0 \end{array}$$
$$\therefore \frac{-5x^3 - 27x^2 + 23x + 30}{x + 6} = -5x^2 + 3x + 5$$