

POYNOMIAL – Long Division

Carry out the following long divisions and express your result as a transformation equation.

1. $x-3 \overline{)x^3 - 2x^2 - 9x + 18}$

2. $x-5 \overline{)x^4 - 3x^3 - 14x^2 + 12x + 40}$

3. $x^2 + x - 2 \overline{)x^4 + x^3 - 11x^2 - 9x + 18}$

4. $x^2 - 4 \overline{) x^4 - 3x^3 - 14x^2 + 12x + 40}$

5. Using your result in qu. 4, factorise completely the polynomial:

$$P(x) = x^4 - 3x^3 - 14x^2 + 12x + 40$$

6. Use the factor theorem to factorise the polynomial: $P(x) = x^4 - 2x^3 - 13x^2 + 14x + 24$

ANSWERS: 1. $x^2 + x - 6$ & $x^3 - 2x^2 - 9x + 18 = (x - 3)(x^2 + x - 6)$

2. $x^3 + 2x^2 - 4x - 8$ & $x^4 - 3x^3 - 14x^2 + 12x + 40 = (x - 5)(x^3 + 2x^2 - 4x - 8)$

3. $x^2 - 9$ & $x^4 + x^3 - 11x^2 - 9x + 18 = (x^2 + x - 2)(x^2 - 9)$

4. $x^2 - 3x - 10$ & $x^4 - 3x^3 - 14x^2 + 12x + 40 = (x^2 - 4)(x^2 - 3x - 10)$

5. $P(x) = (x - 2)(x + 2)^2(x - 5)$

6. $P(x) = (x + 1)(x - 2)(x + 3)(x - 4)$