Polynomials

1. Find the remainder when the polynomial $2x^3 - x^2 - 5x - 1$ is divided by $(x - 2)$.

2. (a) Show that $(x + 1)$ is a factor of $f(x) = x^3 - x^2 - x + 1$.
   (b) Hence factorise $f(x)$ fully.

3. (a) Show that $(x - 3)$ is a factor of $x^3 - 8x^2 + x + 42$.
   (b) Hence factorise $x^3 - 8x^2 + x + 42$ fully.

4. (a) Show that $(x + 4)$ is a factor of $g(x) = x^3 - 13x + 12$.
   (b) Hence factorise $g(x)$ fully.

5. (a) Show that $(x - 2)$ is a factor of $x^3 - 28x + 48$.
   (b) Hence factorise $x^3 - 28x + 48$ completely.

6. $f(x) = x^3 + 2x^2 - 5x - 6$. Factorise $f(x)$ fully.

7. $g(x) = x^3 + 2x^2 - 4x - 8$. Factorise $g(x)$ fully.

8. (a) Show that $(2x - 1)$ is a factor of $f(x) = 2x^3 + 3x^2 - 32x + 15$
   (b) Hence factorise $f(x)$ completely.

9. (a) Show that $(3x + 1)$ is a factor of $h(x) = 3x^3 + x^2 - 3x - 1$.
   (b) Hence factorise $h(x)$ fully.

10. $f(x) = x^3 - x^2 - 4x + 4$.
    (a) Show that $(x - 1)$ is a factor of $f(x)$.
    (b) Find the roots of $f(x) = 0$.

11. $g(x) = x^3 + 3x^2 - 18x - 40$.
    (a) Show that 4 is a root of $g(x) = 0$.
    (b) Find the other roots of $g(x) = 0$

12. (a) Show that $x = -3$ is a root of $x^3 - 19x - 30 = 0$.
    (b) Hence solve $x^3 - 19x - 30 = 0$ completely.

13. (a) $f(x) = 2x^3 + x^2 - 72x - 36$. Show that $x = 6$ is a root of $f(x) = 0$.
    (b) Hence solve $f(x) = 0$ fully.

14. (a) Show that -2 is a root of $x^3 + 2x^2 - 25x - 50 = 0$.
    (b) Hence find the other roots of $x^3 + 2x^2 - 25x - 50 = 0$.