

Mathematics Department – Langholm Academy

HIGHER HOMEWORK

UNIT 2

CHAPTER 1.1

Polynomials Homework 1

Higher - Unit 2
Polynomials 1

1. Evaluate the remainder when the polynomial is divided by the factor given
 - a. $x^3 + 5x^2 + 3x + 4$, $(x - 2)$
 - b. $3x^3 - 2x^2 + x - 3$, $(x - 1)$
 - c. $2x^3 + x^2 - 3x - 6$, $(x + 2)$
 - d. $4x^3 + 3x - 7$, $(x + 1)$

2. Determine which of the following are factors of the given expression
 - a. $x^3 - 6x^2 + 3x + 10$, $(x + 1)$
 - b. $x^3 + 5x^2 + 3x + 4$, $(x - 1)$
 - c. $4x^3 + 16x^2 - x - 4$, $(x + 4)$
 - d. $x^3 + x^2 + 4$, $(x - 2)$

3. Show that $(x - 1)$ is a factor of $x^3 - 9x^2 + 20x - 12$, and hence find all the remaining factors (fully factorise the polynomial)

4. Fully factorise
 - a. $x^3 + 2x^2 - 5x - 6$
 - b. $x^3 - 3x + 2$

5. Find k for which $x^3 - 3x^2 + kx + 6$ has a factor of $(x + 3)$

6. If $(x + 2)$ is a factor of $x^3 + kx^2 - x - 2$ find k and fully factorise

7. Solve the following equations
 - a. $x^3 + x^2 - 17x + 15 = 0$
 - b. $x^3 + 4x^2 + x - 6 = 0$
 - c. $x^4 - 1 = 0$

8. Given that $(x - 2)$ is a factor of $f(x) = 2x^3 + kx^2 + 7x + 6$, find k and hence solve the equation $f(x) = 0$

9. $f(x) = x^3 - x^2 - 5x - 3$
 - a. Show that $(x + 1)$ is a factor of $f(x)$
 - b. Hence factorise $f(x)$ fully
 - c. One of the turning points of the graph $y = f(x)$ lies on the x-axis. Write down the coordinates of this turning point.

10. For each of the following equations show that there is a root between the values stated and find the root to 1 decimal place.
 - a. $x^3 + x^2 + 2x - 1 = 0$, $x = 0$ and $x = 1$
 - b. $x^3 + 2x - 7 = 0$, $x = 1$ and $x = 2$
 - c. $2x^3 + x^2 - 7x + 1 = 0$, $x = -3$ and $x = -2$