



# JOHN EDMONDSON HIGH SCHOOL

Mathematics Department

Year 11 Mathematics Extension 1

Assessment Task 1

Term 1 2023

Weighting 20%

## Polynomials Assignment

**Due Date:** Thursday 1<sup>st</sup> March 2023

This assignment must be submitted using A4 paper with your full name clearly written on all pages.

1.	Given $P(x) = x^3 + 8x^2 - 5x$ and $G(x) = -x^3 - x^2 + 3x - 2$ . Fully simplify the following expressions.  (a) $P(x) + G(x)$  (b) $P(x) - G(x)$  (c) $P(x) \times G(x)$	3 marks
2.	Solve for all real values of $x$ .  $2x^4 - 9x^2 + 4 = 0$	4 marks
3.	Use the Remainder Theorem to find the remainder when $P(x) = 2x^4 - 5x^3 + 6x^2 - 7$ is divided by $x + 2$ .	2 marks
4.	For the polynomial $P(x) = 7x^4 - 3x^2 + x - 10$ , determine the  a) Leading co-efficient.  b) Leading term.  c) Degree of the polynomial.  d) Constant term.	4 marks
5.	$P(x)$ is a monic polynomial of degree 3. Dividing by the term $x^2 - 4$ gives a remainder of $-5$ . Given $P(5) = 2$ , find the polynomial $P(x)$ .	3 marks

6.	<p>For the polynomial <math>P(x) = 2x^3 - 3x^2 - 11x + 6</math>;</p> <p>a) Find a factor of the Polynomial, <math>P(x)</math>.</p> <p>b) Fully factorise <math>P(x)</math> by first dividing the polynomial by your factor in part a).</p> <p>c) Graph the polynomial clearing showing all x and y intercepts.</p> <p>d) Use a graphing software (eg. DESMOS) to graph the above polynomial and include a print out of it as a comparison to your own graph.</p>	4 marks
7.	<p>Consider the polynomial <math>P(x) = x^4 + 4x^3 - 7x^2 - 10x</math>.</p> <p>a) Fully factorise.</p> <p>b) Graph the polynomial on a number plane, by using you factorised expression or otherwise.</p> <p>c) With the aid of your graph, solve the in-equation <math>x^4 + 4x^3 - 7x^2 - 10x \geq 0</math>.</p>	4 marks
8.	<p>Sketch a polynomial which has a double root at <math>x = 2</math> and a leading term <math>x^4</math></p>	2 marks
9.	<p>The polynomial <math>P(x) = 3x^3 + ax^2 + x + b</math> has <math>(x - 1)</math> as a factor and leaves a remainder of <math>-60</math> when divided by <math>(x + 2)</math>. Find the values of <math>a</math> and <math>b</math>.</p>	4 marks
10.	<p>Let <math>\alpha</math>, <math>\beta</math> and <math>\gamma</math> be roots of the equation <math>x^3 - 3x^2 + 4x + 2 = 0</math>. Find the value of;</p> <p>a) <math>\alpha + \beta + \gamma</math></p> <p>b) <math>\alpha\beta\gamma</math></p> <p>c) <math>\frac{1}{\alpha} + \frac{1}{\beta} + \frac{1}{\gamma}</math></p> <p>d) <math>\alpha^2 + \beta^2 + \gamma^2</math></p>	4 marks
11.	<p><math>\alpha, \beta</math> and <math>\gamma</math> are the zeroes of the monic polynomial <math>P(x)</math>. Given;</p> $\alpha + \beta + \gamma = 1$ $\alpha\beta + \beta\gamma + \alpha\gamma = 3$ $\alpha\beta\gamma = -4$ <p>Find <math>P(x)</math>.</p>	2 marks
12.	<p>Find <math>a, b</math> and <math>c</math>, given that the two polynomials are identically equal.</p> $ax(x + 1)(x + 2) + bx(x + 1) + cx + d = 4x^3 - x^2 + 3.$	4 marks

**END OF ASSIGNMENT**