

# SEKOLAH BUKIT SION – HIGH SCHOOL AY 2020-2021

## ADDITIONAL MATHEMATICS 0606 CHAPTER 4 TEST: POLYNOMIALS

NAME: \_\_\_\_\_ CLASS: \_\_\_\_\_ DATE: \_\_\_\_\_

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### INSTRUCTIONS:

**1. CHOOSE AND ANSWER ONLY 8 QUESTIONS.**

**Question 1 must be answered. Select 7 more questions from Question 2 – 10.**

2. Use a file paper to answer the questions in an orderly and neat manner.  
Show necessary working. Marks may be deducted for incomplete working.

3. Use **black** or **blue** pen for working.  
**Do not use highlighter or correction tape.**

4. Once you are done, scan and upload your test **in pdf** as **pdf printout** on the assigned page for this Chapter Test **OR** by *“Add work”*.

**If you upload by add work, use the filename format indicated below.**

**Filename format:** *NameClass\_C4Test* Example: *Emman10.5\_C4Test*

5. Submit on-time. You only are given an extra 5 minutes after the specified time duration to scan and attach your files.

**After the closing time, your work may NO LONGER be accepted.  
You may be given a zero score.**

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**\*QUESTION 01 (Required)**

**[For #1, choose 3 items = total 9 marks]**

(a) Simplify:  $(4x^2 + 5x - 8) + (3x^2 - 5x + 2) - [3x(2x + 6) + 3]$  [3]

(b) Multiply:  $(2x^2 - x - 3)(2x^2 - 5x - 2)$  [3]

(c) Divide by **long division method**:

(i)  $(5x^2 + 3x + 4) \div (3x + 2)$  [3]

(ii)  $(x^4 - 2x^2 + 4x - 5) \div (x^2 + 5)$  [3]

(iii)  $(8x^4 - 5x + 2) \div (-2x + 1)$  [3]

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**QUESTION 02**

Solve the equation  $x^3 - 4x^2 - 11x + 2 = 0$ , expressing non-integer solutions in the form  $a \pm b\sqrt{2}$ , where  $a$  and  $b$  are integers. [6]

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**QUESTION 03**

Given that  $6x^3 + 5ax - 12a$  leaves a remainder of  $-4$  when divided by  $(x - a)$ , find the possible values of  $a$ . [7]

#### QUESTION 04

It is given that  $f(x) = (kx + 1)(x^2 - 3x + k)$ .

(a) Find the value(s) of  $k$  if  $3 - k$  is a factor of  $f(x)$ . [2]

(b) Find the smallest integer value of  $k$  such that there is only one real solution for  $(kx + 1)(x^2 - 3x + k) = 0$ . [3]

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#### QUESTION 05

The cubic polynomial  $f(x)$  is such that the coefficient of  $x^3$  is 1 and the roots of  $f(x) = 0$  are  $-2$ ,  $1 + \sqrt{3}$  and  $1 - \sqrt{3}$ .

(a) Express  $f(x)$  as a cubic polynomial in  $x$  with integer coefficients. [3]

(b) Find the remainder when  $f(x)$  is divided by  $(x - 3)$ . [2]

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#### QUESTION 06

The remainder when  $2x^3 + 2x^2 - 13x + 12$  is divided by  $(x + a)$  is three times the remainder when it is divided by  $(x - a)$ .

(a) Show that  $2a^3 + a^2 - 13a + 6 = 0$ . [3]

(b) Solve this equation completely. [5]

**QUESTION 07.**

The function  $f(x) = x^3 - 6x^2 + ax + b$ , where  $a$  and  $b$  are constants, is exactly divisible by  $(x - 3)$  and leaves a remainder of  $-55$  when divided by  $x + 2$ .

(a) Find the value of  $a$  and of  $b$ . [4]

(b) Solve the equation  $f(x) = 0$ . [4]

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**QUESTION 08**

Given that  $4x^4 - 12x^3 - b^2x^2 - 7bx - 2$  is exactly divisible by  $2x + b$ .

(a) Show that  $3b^3 + 7b^2 - 4 = 0$ . [2]

(b) Find the possible values of  $b$ . [5]

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**QUESTION 09**

Show that  $(x^2 + 2x - 3)$  is a factor of  $(x + 2)^3 - (x + 1)^3 - 3x - 16$ . [4]

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**QUESTION 10**

The expression  $3(x + 2)^5 + (x + k)^2$  leaves a remainder of 7 when divided by  $(x + 1)$ . Determine the values of  $k$ . [4]