INTI INTERNATIONAL COLLEGE
PENANG

DIPLOMA IN BUSINESS ADMINISTRATION
MAT 1112: BASIC MATHEMATICS 2
FINAL EXAMINATION: JANUARY 2014 SESSION

This paper consists of **SIX (6)** questions. Answer any **FOUR (4)** questions in the answer booklet provided. All questions carry equal marks.

Question 1

(a) Simplify:

(i) $9\sqrt{96}-3\sqrt{150}$.

(3 marks)

(ii) $a^{\frac{1}{2}}\left(a^{\frac{1}{3}}\times a^{\frac{1}{6}}\right)$.

(3 marks)

(b) Expand $\left(2\sqrt{3}+\sqrt{2}\right)\left(3\sqrt{3}-\sqrt{2}\right)$.

(4 marks)

(c) Rationalize the denominator $\dfrac{3\sqrt{2}}{\sqrt{3}-1}$.

(3 marks)

(d) Simplify:

(i) $\dfrac{3x^2+6x}{x^2+4x+4}$.

(4 marks)

(ii) $\dfrac{1}{x}+\dfrac{2}{x+y}$.

(4 marks)

(iii) $\dfrac{a+b}{x-y}\times\dfrac{y-x}{b+a}$.

(4 marks)

Question 2

(a) Let $P(x) = x^3 + 4x^2 - 23x + 6$.

(i) Find the remainder when $P(x)$ is divided by $(x + 3)$.

(3 marks)

(ii) Prove that $(x - 3)$ is the factor of $P(x)$.

(3 marks)

(iii) Hence, use synthetic division to do the division $(x-3)\overline{)x^3 + 4x^2 - 23x + 6}$.

(4 marks)

(b) Assume that x varies directly with y and inversely with z. Find the constant of variation if $x = 5$ when $y = 4$ and $z = 8$.

(4 marks)

(c) Given $f(x) = x^2 - 4x - 5$.

(i) Write $f(x)$ in the form $y = a(x - h)^2 + k$.

(3 marks)

(ii) Find the vertex.

(2 marks)

(iii) Find the x-intercept and y-intercept (if any).

(3 marks)

(iv) Sketch the graph of $y = f(x)$.

(3 marks)

Question 3

(a) Solve the following equation:

(i) $\frac{1}{x} - \frac{1}{2x} + \frac{1}{3x} = 1$.

(4 marks)

(ii) $\sqrt{6x - 2} = 4$.

(4 marks)

(iii) $2x^2 + 3x = 5$.

(4 marks)

(b) Solve the following inequalities:

(i) $x^2 - x > 2$.

(4 marks)

(ii) $\frac{3x-2}{1-x} < 0$.

(4 marks)

(iii) $\frac{6}{x+3} < \frac{2}{x+5}$.

(5 marks)

Question 4

(a) Given the function $f(x) = \frac{1}{2}x - 3$ and $g(x) = \frac{4}{x+1}$, $x \neq -1$

(i) Find $4f(0) + g(3)$.

(2 marks)

(ii) Find $fg(2)$.

(3 marks)

(iii) $g^{-1}(2)$.

(4 marks)

(b) Expand $(1+6x)^3$.

(5 marks)

(c) Find the sixth term of the expansion of $(5a+2b)^{10}$.

(5 marks)

(d) Sketch the graph for the following functions:

(i) $y = -2^{x+1}$

(2 marks)

(ii) $y = 3^x + 2$

(2 marks)

(iii) $y = (\log_3 x) + 1$

(2 marks)

Question 5

(a) Find the next two terms.

1, 0.5, 0.25, __ , ___.

(2 marks)

(b) Let an arithmetic sequence with a common difference of 5 and whose 40^{th} term is 295.

(i) Find the first term.

(4 marks)

(ii) Find the sum of the first 20 term.

(5 marks)

(c) Given a geometric sequence with $T_4 = 24$ and $T_6 = 96$.

(i) Find the common ratio.

(6 marks)

(ii) Find the first term.

(4 marks)

(iii) Find the sum of the first 5 terms, S_5, (if $a > 0$ and $r > 0$).

(4 marks)

Question 6

(a) (i) Eleven boys are to be chosen from a group of 30 boys to form a football team. How many different ways can we choose the football team?

(3 marks)

(ii) Among the football team, if there are three brothers, not more than one of them can be selected, how many different ways can the team be form now?

(3 marks)

(b) How many different four – letter words can be formed using the letters in the word SOCIAL.

(4 marks)

(c) Find the value of x in each equation:

(i) $5^{2x+1} = 25^{3x-1}$.

(3 marks)

(ii) $\log_6 216 = x.$

(4 marks)

(iii) $\log_x 81 = 2.$

(4 marks)

(iv) $\log_2 (x+3) + \log_2 4 = 2$

(4 marks)

THE END

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