PERSIDANGAN KEBANGSAAN PENGETUA-PENGETUA
SEKOLAH MENENGAH MALAYSIA (PKPSM)
CAWANGAN KELANTAN

PEPERIKSAAN KENDALIAN BERASASKAN SEKOLAH (PKBS 3)
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SIJIL TINGGI PERSEKOLAHAN MALAYSIA
(MALAYSIA HIGHER SCHOOL CERTIFICATE)

MATHEMATICS T
PAPER 1
Three Hours

Instructions to candidates:

DO NOT OPEN THIS QUESTION PAPER UNTIL YOU ARE TO DO SO.

Answer **ALL** questions. Answers may be written in either English or Bahasa Malaysia

ALL necessary working should be shown clearly

Non-exact numerical answers may be given correct to three significant figures, or in one Decimal place in the case of angles in degree, unless a different level of accuracy is specified in the question.

This question paper consists of 4 printed pages

1. Using definition, show that ,for any sets A and B ,

   $(A - B) \cup (A \cap B) \subset A$ [5m]

2. Determine the value of p if $Z = \dfrac{\sqrt{3} - pi}{2 + 2\sqrt{3}\,i}$ is a real number and find this real number [5m]

3. If $3 - \sqrt{3}$ is a root of the equation $2x^2 + 3ax + 3b = 0$, where a and b are constant. Find the values of a and b. [5m]

4. Show that $2x + 1$ is a factor of $(x) = 6x^3 - 5x^2 + 2$. Hence, show that $-\dfrac{1}{2}$ is the only real root of $f(x)$ [6m]

5. Given that $y = \ln(\sin^2 3x)$, find $\dfrac{dy}{dx}$ and show that

   $2\dfrac{d^2y}{dx^2} + \left(\dfrac{dy}{dx}\right)^2 + 36 = 0$ [6m]

6. The function g and h are defined by

   $g : x \to \ln x\,,\ x \in \Re, x > 0$

   $h : x \to 1 + x\,, x \in \Re, x > -1$

   i. Find the function $g^{-1}(x)$ and $h^{-1}(x)$

   ii. Find the function $g^{-1}h^{-1}(x)$ [6m]

7. Express $\dfrac{1}{x(1-x)^2}$ as partial fraction [4m]

   Hence, find $\int \dfrac{1}{x(1-x)^2}\,dx$ [3m]

8. The circle C has the equation $3x^2 + 3y^2 + 6x + 12y - 60 = 0$. The equation of the straight line l is $3x - 2y - 4 = 0$,

   a) Find the coordinates of the centre of C and the radius of C [3m]

   b) Find the distance from the centre of the circle C to the straight line l [2m]

   c) Find the equation of the normal to the circle at the point $(1,-7)$ [4m]

9. Sketch the curve $y = x(x - 2)(x + 3)$. If A_1 is the area above the x-axis bounded by this curve and the x-axis. While A_2 is the area under the x-axis bounded by this curve and the x-axis, find $A_1 : A_2$ [10m]

10. Given that $A = \begin{pmatrix} 6 & -18 & -4 \\ 1 & 1 & 2 \\ 3 & -13 & -2 \end{pmatrix}$, $B = \begin{pmatrix} 3 & 2 & -4 \\ 1 & 0 & -2 \\ -2 & 3 & 3 \end{pmatrix}$

    Find AB and deduce A^{-1}.

    Hence, solve the following equations

    $12x - 36y - 8z = 124$

    $2x + 2y + 4z = 2$

    $6x - 26y - 4z = 86$ [12m]

11. The equation of a curve is given by $= \frac{x-3}{(x-2)(x+1)}$. Find the equations of the asymptotes of the curve. [2m]

    Find the points where the curves intersects the x-axis and the y-axis, Determine the turning points of this curve and state their nature. Sketch the curve. [9m]

    Find the range of values of k such that the equation $x - 3 = k(x - 2)(x + 1)$ has no real roots [3m]

12.

a) Find the expansion of $\sqrt[3]{\frac{1+2x}{(1-3x)^2}}$ in ascending powers of x up to and including the terms in x^3 [4m]

Find the sets of values of x so that the expansion is valid [3m]

b) If the expansion of $(1+mx)^n$ in ascending powers of x until the term x^2 is equal to $1-\frac{1}{12}x-\frac{1}{144}x^2$. Find the values of m and n [5m]

With the values of m and n , and taking $x=0.05$, find the value of $\sqrt[3]{7.9}$ correct to 3 decimal places [3m]

$(1+y)^\alpha = 1+\alpha y + \frac{\alpha(\alpha-1)}{2}y^2$

$\frac{(2)(3)(\alpha-1)}{3!}y^3$

$-\frac{1}{3}$ $-\frac{1}{2}$