



SEKOLAH BUKIT SION (HIGH SCHOOL)

CENTRE NUMBER: ID 138

CANDIDATE NUMBER:

CANDIDATE NAME:

**ADDITIONAL MATHEMATICS
PAPER 1**

**0606/12
May/June 2022**

E-PORTFOLIO (SPECIMEN 1)

**29 MARCH 2022
80 minutes**

INSTRUCTIONS:

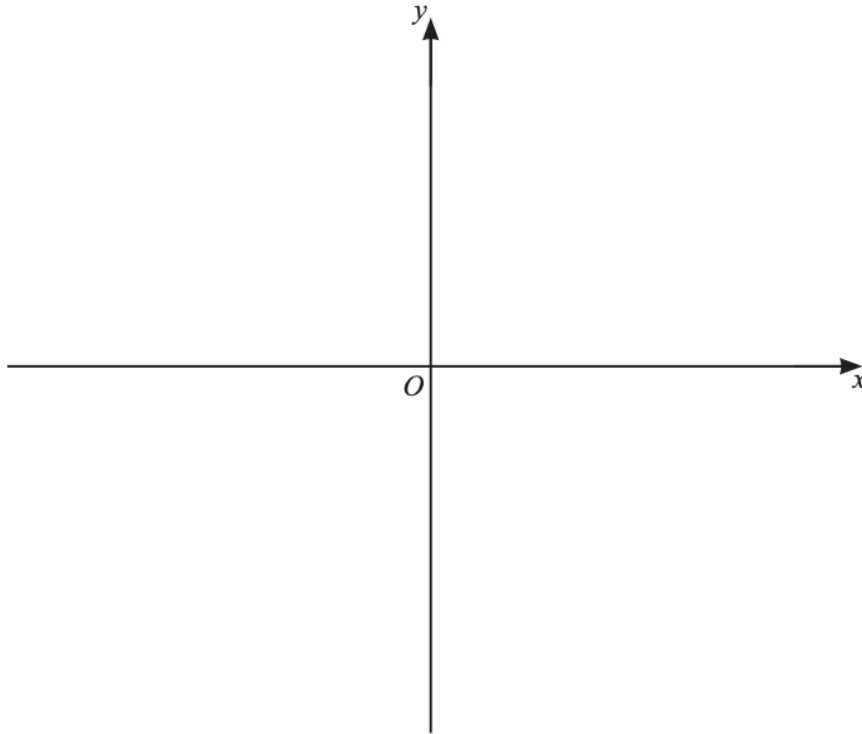
- Answer all questions.
- Use a black or dark blue pen.
- Use HB pencil for any diagrams or graphs.
- Write your name, centre number and candidate number in the boxes provided in each page.
- Write your answer to each question in the space provided.
- Do not use an erasable pen or correction fluid or tape.
- You may use a scientific calculator where appropriate.
- You must show all necessary working clearly.
- Give non-exact numerical answers correct to 3 significant figures, or 1 decimal place for angles in degrees, unless a different level of accuracy is specified in the question.
- Use the calculator value of π or 3.142.

INFORMATION:

- The total number of marks in this paper is 50.
- The number of marks for each question or part question is shown in brackets [].

Question 01

- (a) On the axes, sketch the graph of $y = |5 - 2x|$, stating the intercepts with the coordinate axes. [2]



- (b) Solve $|5 - 2x| = 3$. [2]

- (c) Solve the inequality $|5 - 2x| \geq 3$. [1]

Question 02

Write $\frac{(pqr)^{-2}r^3}{(p^2r)^{-2}q^3}$ in the form $p^a q^b r^c$, where a , b and c are constants.

[3]

Question 03

A curve is such that $y = (3x + 2)^{\frac{-1}{3}}$.
Find the equation of the line tangent to the curve at $x = 2$.

[4]

Question 04

(a) Given that $\log_a p + \log_a 5 - \log_a 4 = \log_a 20$, find the value of p . [2]

(b) Solve the equation $3^{2x+1} + 8(3^x) - 3 = 0$. [3]

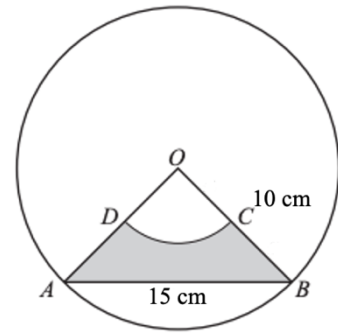
Question 05

(a) Solve $3\cos^2 \theta + 4\sin\theta = 4$ for $0^\circ \leq \theta \leq 180^\circ$. [4]

(b) Show that $\frac{\cos \theta}{1-\sin \theta} + \frac{1-\sin \theta}{\cos \theta} = 2 \sec \theta$. [4]

Question 06

The diagram on the right shows a circle, centre O , radius 10 cm.
The points A and B lie on the circumference of the circle.
The points C and D are the midpoints of the lines OB and OA .
The arc DC is a part of a circle centre O .
The chord AB is of length 15 cm.



- (a) Show that angle AOB is 1.70 radians, correct to 3 significant figures.

[3]

- (b) Find the perimeter of the shaded region $ABCD$.

[2]

- (c) Find the area of the shaded region $ABCD$.

[3]

Question 07

The polynomial $p(x) = ax^3 - 9x^2 + bx - 6$, where a and b are constants, has a factor of $x - 2$.
The polynomial has a remainder of 66 when divided by $x - 3$.

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

(b) Using your values of a and b , show that $p(x) = (x - 2)q(x)$,
where $q(x)$ is a quadratic factor to be found. [2]

(c) Hence, show that the equation $p(x) = 0$ has only one real solution. [2]

Question 08

Given the digits 1, 3, 5, 6, 8 and 9, using each digit only once,

(a) find how many different 5-digit numbers can be formed without any restriction. [1]

(b) How many of these 5-digit numbers are odd? [1]

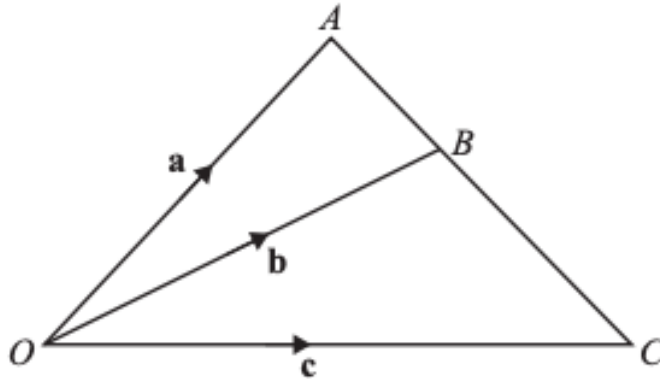
(c) How many of these 5-digit numbers are odd and greater than 60 000? [3]

Question 9

Find the set of values of k for which the line $y = 2x + k$ cuts the curve $y = x^2 + kx + 5$ at two distinct points. [6]

Question 10

- (a) The diagram shows triangle AOC , where $\overrightarrow{OA} = \mathbf{a}$, $\overrightarrow{OB} = \mathbf{b}$ and $\overrightarrow{OC} = \mathbf{c}$.
The point B lies on the line AC such that $AB : BC = 5 : 6$.



(i) Write down \overrightarrow{AB} in terms of \mathbf{a} and \mathbf{b} . [1]

(ii) Write down \overrightarrow{BC} in terms of \mathbf{b} and \mathbf{c} . [1]

(iii) Hence, show that $11\mathbf{b} = 5\mathbf{c} + 6\mathbf{a}$. [2]

(b) Given that

$$\lambda \begin{pmatrix} 2 \\ 1 \end{pmatrix} + (\mu - 1) \begin{pmatrix} -4 \\ 7 \end{pmatrix} = (\lambda + 1) \begin{pmatrix} 4 \\ -2 \end{pmatrix},$$

find the value of each of the constants λ and μ .

[4]

**** END OF EXAM ****