ST IGNATIUS COLLEGE
Mathematics Department

END OF TERM 1 Examination
GRADE 10

Additional Mathematics   4030/1

Paper 1

APRIL 2025

Additional materials:
Answer booklet
Silent Electronic Calculator (non- programmable)

Time: 2 hours   **Marks: 60**

Instructions to candidates

1 Write full names and your class on **every page** of separate **Answer booklet** provided.

2 There are **eleven** questions in this paper. Answer **all** questions

3 Write your answers and working in the **Answer Booklet** provided.

4 If you use more than one Answer Booklet, fasten the Answer Booklets together.

5 Give non-exact numerical answers correct to 3 significant figures, or 1 decimal place in the case of angles in degrees, unless a different level of accuracy is specified in the question.

Information for Candidates

1 The number of marks is given in brackets [ ] at the end of each question or part question.

2 **The use of non-programmable electronic calculators is expected, where appropriate.**

3 You are reminded of the need for clear presentation in your answers

4 **Cell phones are not allowed in the Examination room.**

5 **Check the formulae overleaf**

THIS PAPER CONSISTS OF 4 PRINTED PAGES

MATHEMATICS FORMULAE

1   ALGEBRA

Quadratic Equation

For the equation $ax^2 + bx + c = 0$,

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

Binomial Theorem

$$(a+b)^n = a^n + \binom{n}{1}a^{n-1}b + \binom{n}{2}a^{n-2}b^2 + \ldots + \binom{n}{r}a^{n-r}b^r + \ldots + b^n,$$

where n is a positive integer and $\binom{n}{r} = \frac{n!}{(n-r)!r!}$

2   SERIES

Arithmetic $S_n = \frac{1}{2}n\left[2a + (n-1)d\right]$

Geometric $S_n = \frac{a(1-r^n)}{1-r}$ $(r \neq 1)$

$$S\infty = \frac{a}{1-r} \text{ for } |r| < 1$$

1.

Find the equation of a line perpendicular to the line $5x - 2y - 11 = 0$ passing through the point $(2, -3)$. [4]

_____

2.

Solve the simultaneous equations [5]

$2x + y = 7,$

$xy - x^2 = 4.$

_____

3.

Find the range of values of k, where $k > 0$, for which the line $y = kx - 2$ does not meet the curve $x^2 - 4y + 1 = 0$. [4]

_____

4.

The perpendicular bisector of the line joining the points $P(1, 4)$ and $Q(k, 3)$ meets the y-axis at -4. Find the possible values of k. [4]

_____

5.

Find the equation of the line parallel to the line $y - 3x - 2 = 0$ passing through the point of intersection of the lines $2x + y = 5$ and $x - 3y = -1$. [4]

_____

6.

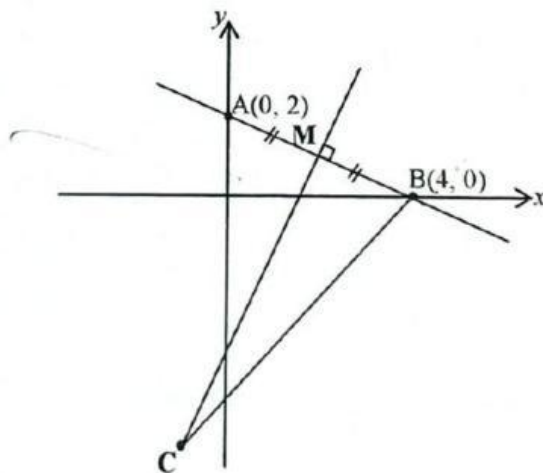Solve the simultaneous equations

$2x + y = 3,$

$xy + 3y = 7.$ [5]

_____

7.

Solutions to this question by scale drawing will not be accepted.

In the following diagram, CM is a perpendicular bisector of AB and BC is parallel to a line with equation $5y = 5x + 4$. The coordinates of A and of B are (0, 2) and (4, 0) respectively.

Find the

(a)   coordinates of C,   [7]

(b)   area of triangle ABC.   [3]

8.

Solve the following systems of equations

$2x + 3y - z = 2,$

$x - 2y - 4z = 8,$

$3x + 5y + 2z = -7.$ [6]

9.

The line $y = 3x + p$, where $p < 0$, is a tangent to the curve $x^2 + xy + 4 = 0$.
Find the value of p.   [4]

10.

(a)   Find the range of values of x for which $2x^2 \geq 7x - 3$.   [3]

(b)   Express $9 - 8x - x^2$ in the form $a(x + b)^2 + c$, where a, b and c are constants.
       Hence, find the coordinates of the turning point.   [4]

11.

(a) Find the range of values of m for which $2m^2 - 2m - 4 < 0$. [3]

(b) Express $x^2 + 5x + 6$ in the form $a(x + b)^2 + c$, where a, b and c are constants. Hence, find the coordinates of the turning point. [4]