



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

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

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

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

2 SERIES

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

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

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

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

$$2x + y = 3,$$

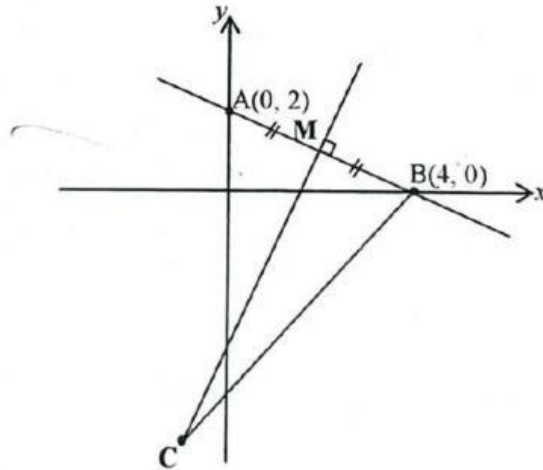
$$xy + 3y = 7.$$

[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

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

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

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

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. [4]
Hence, find the coordinates of the turning point.
