



ANDERSON SECONDARY SCHOOL
Weighted Assessment 1 2024
Secondary Three Express



CANDIDATE NAME:

CLASS:

INDEX NUMBER:

ADDITIONAL MATHEMATICS

4049

29 February 2024

45 minutes

Candidates answer on the Question Paper.
No Additional Materials are required.

READ THESE INSTRUCTIONS FIRST

Write your name, class and index number in the spaces at the top of this page.
Write in dark blue or black pen.
You may use an HB pencil for any diagrams or graphs.
Do not use paper clips, highlighters, glue or correction fluid/tape.

Answer **all** the questions.
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.
The use of an approved scientific calculator is expected, where appropriate.
You are reminded of the need for clear presentation in your answers.

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

The total number of marks for this paper is 30.

1 (i) Express $\frac{x^2}{3} - 2x - 1$ in the form $a(x-h)^2 + k$, where a , h and k are constants. [3]

(ii) Hence find the minimum value of $\frac{x^2}{3} - 2x - 1$ and the value of x at which the minimum occurs. [2]

(iii) Sketch the curve $y = \frac{x^2}{3} - 2x - 1$. [2]

- 2 Find the values of k for which the equation $(k+1)x^2 - 2kx = 2 - k$ has real roots. [4]

- 3 The equation of a curve is $y = 2x^2 + (4 - k)x - 2k$, where k is a constant.
- (a) Show that the line $y = 7x - 18$ is a tangent to the curve when $k = 5$ and find the coordinates of the point of intersection. [3]
- (b) Explain why there is only one value of k for which y cannot be negative and state this value. [4]

- 4 Find the set of values of the constant a , for which $(a-3)x^2 + 5x - 3 = 0$ is always negative for all real values of x . [3]

- 5 Show that the equation $y = \frac{m}{4}x^2 + 4x + 6 - m$ has real and distinct roots for all values of m . [3]

- 6** The height, y metres, of a ball x seconds after it has been thrown from a cliff can be modelled by the equation $y = \frac{3}{2}(4 - x)(2x + 3)$.

(a) Find the height of the ball just before it was thrown. [2]

(b) Determine the maximum height reached by the ball. [3]

(c) Explain the significance of the x -intercept of the curve. [1]

End of Paper