Sec 3 A-Math WA1 Mock Exam Paper 2025

Time Allowed: 1 hour

Total marks: 35

Instructions:

- Answer all questions.
- Show your workings clearly.
- Marks are indicated for each question.
- Give your best shot!

Additional materials:

- Calculator

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1. Show that the equation $x^2 + px + 2p = 2x + 8$ has real roots for all real values of p. [3]

Answer: .....

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2. The curve $y = (k - 6)x^2 - 8x + k$ cuts the x-axis at two points and has a minimum point. Find the range of values of k.

Answer: .....

3. Prove that the roots of the equation $x^2 + (2a - 1)x + a^2 = 0$ are real if $a \leq \frac{1}{4}$. [2]

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4. Find the values of k for which the curve $y = 2x^2 + (3k + 1)x + 4$ lies entirely above the line $y = 2x - 3k^2 + 5$. [5]

Answer: .....

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5. Express $\frac{4x^2 + 5x - 32}{(x+2)(x^2 - 9x - 22)}$ in partial fractions. [5]

Answer: .....

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6. The functions $f(x) = 3x^3 + 5x + 6$ and $g(x) = 2x(2x + 11)$ leave the same remainder when divided by $(x - k)$.
   Show that $3k^3 - 4k^2 - 17k + 6 = 0$ and find the possible values of k. [6]

Answer: .....

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7. A ball is thrown vertically upwards. Its height, h m, above the ground at time t seconds after being thrown is given by the formula $h = 1.75 + 5t - 5t^2$.

(a) State the height above the ground from which the ball is thrown. [1]

Answer: .....

(b) Express h in the form $a + b(t + c)^2$ where a, b and c are constants to be determined. [3]

Answer: .....

(c) Hence, explain why the maximum height attained by the ball is 3 m when $t = 0.5$. [2]

Answer: .....

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(d) The ball hits the ground. Explain why the time taken for the ball to hit the ground is not twice the time in (c). [1]

Answer

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(e) Using (b), find the length of time for which the ball is at least 2 m above the ground. [3]

Answer: .....

End of Paper

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