



Name: _____ () Class: _____ Date: _____

Duration: 1 hour

Marks: 40

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- Answer all questions.
 - Omission of essential working will result in loss of marks.
 - The number of marks for each question or part question is shown in [].
 - The use of calculators is allowed.
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- 1 Using appropriate substitution, solve the equation $5^x + \frac{1}{25^{-0.5}} = 30(5^{x-1})$. [4]
- 2 Find the range of values of x for which $(x+2)^2 - 8(x+2) + 15 \leq 0$ [4]
- 3 By expressing $-3x^2 + 21x - 18$ in the form $a(x-b)^2 + c$, where a , b and c are constants,
- (i) write down the minimum value of $-3x^2 + 21x - 18$, [2]
- (ii) hence, sketch the graph of $y = -3x^2 + 21x - 18$, indicating clearly all workings, intercepts and turning point. [3]
- 4 Express $\frac{\sqrt{3}-\sqrt{2}}{2\sqrt{3}+3\sqrt{2}} - \frac{2-2\sqrt{3}}{\sqrt{24}}$ in the form $p + q\sqrt{2} + r\sqrt{6}$, where p , q and r are rational numbers. [4]
- 5 The line $y = x + 1$ meets the curve $9x^2 + y^2 - 3x - 4 = 0$ at two distinct points. Find the coordinates of these two points. [5]
- 6 Find the range of values of m for which the straight line $y = 12x - 2m$ meets the curve $y = (m+3)x^2$. [4]

- 7 Show that for all real values of p and q , $y = -(1 + p^2)x^2 + 2pqx - (2q^2 + 1)$ is always negative for all real values of x . [3]
- 8 AMB is a right-angled triangle with angle $AMB = 90^\circ$. BM is produced to C such that $BM = MC = (\sqrt{2} + 4)$ cm. Given that the area of triangle $ABC = 14 \text{ cm}^2$, find, without using a calculator, the length of AM in the form $a + b\sqrt{2}$, where a and b are integers, [4]
- 9 Find the range of values of x that satisfy the inequality $2x - 1 \leq x^2 - 4 < 12$. [4]
- 10 Solve the equation $\sqrt{3x - 2} = 2 + \sqrt{x - 2}$. [3]

- End of Paper -



Manage your time well during the test!