



Name: _____ () Class: _____ Date: _____

Duration: 1 hour

Marks: 40

- 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.

1 The equation of a curve is $y = mx^2 + (c - m)x - (c + 3)$. Given that $m > 0$, show that the curve cuts the x -axis at two distinct points. [3]

2 (a) Find the **exact** value of x if $8^{-2x+1} = \sqrt{32}$. [3]

(b) Simplify $\frac{1}{5+\sqrt{3}} + \frac{1}{5-\sqrt{3}}$. [2]

(c) Find the area of a right angled triangle ABC , given that angle ABC is a right angle,

$$AB = (5 + 3\sqrt{2}) \text{ cm and } BC = \left(4 - \frac{5}{\sqrt{2}}\right) \text{ cm.}$$

Leave your answer in the form $a + b\sqrt{2}$. [3]

3 (a) Find the range of values of x for which $\frac{x}{2}(2x+1) \geq 25 + \frac{x}{2}$. [3]

$$x \leq -5 \text{ or } x \geq 5$$

(b) Given that the curve whose equation is $y = p - (x - q)^2$ crosses the x -axis at the points $(1, 0)$ and $(3, 0)$,

(i) find the value of p and of q , $p=1, q=2$ [4]

(ii) the maximum value of y . 1 [1]

4 Find the values of q for which the line $y = qx - 8$ is a tangent to the curve $x^2 = 4y$.

Leave your answer in **exact** values. $q = \pm 2\sqrt{2}$ [4]

- 5 Solve the simultaneous equations:

$$27^x \div 3^y = 9,$$

$$2^{2x} \times 4^{1-y} = 64. \quad [4]$$

- 6 Sketch the graph of $y = 3x^2 - 8x + 9$, showing clearly the coordinates of the turning point and the y-intercept y -intercept (0,9) turning point(1.333, 3.667) [5]

- 7 Using a suitable substitution, solve the equation $2^{x+1} + 2^{-x} = 3$. [4]

- 8 Solve the equation : $x - 3\sqrt{x} - 4 = 0$. [4]



Please finish in 1 hour!!