S3A TOPICAL INTENSIVE REVISION WEEK 1

Total Marks: 30

Topic: Equations and Inequalities

1 (i) Express $y = 3x^2 - 6x + 11$ in the form $y = a(x+h)^2 + k$, where a, h and k are constants. [2]

(ii) State the minimum value of y and the corresponding value of x. [2]

(iii) Sketch the graph $y = 3x^2 - 6x + 11$ showing clearly the coordinates of the minimum point of the curve and y-intercept. [3]

2 (i) Find the range of values of x for which $x(10 - x) \geq 24$. [2]

(ii) Find the value of k for which the line $2y + x = k$ is a tangent to the curve $y^2 + 4x = 20$. [3]

(iii) Show that the equation $x^2 + (2a - 2)x + (2a - 3) = 0$ has real roots for all real values of a. [3]

3 Find the range of values of c for which $3x^2 + cx + 7 > 4$. [4]

4 (i) Find the range of values of p for which the line $y = x - 2p$ does not intersect the curve $x^2 = 3y - 1$. [4]

(ii) Hence state the value of p for which the line $y = x - 2p$ is tangent to the curve $x^2 = 3y - 1$. [1]

5 (i) Solve the simultaneous equations. [5]

$x = 1 + 2y$

$x = 6xy - 2y - 3$

(ii) Explain the geometrical meaning of this solution. [1]

Answer Key

1(i)	$y = 3(x-1)^2 + 8$
1(ii)	Minimum value of $y = 8$ Corresponding $x = 1$
1(iii)	Sketch Graph
2(i)	$-2 \le x \le 12$
2(ii)	$k = 9$
2(iii)	The equations has real roots
3	$-6 < c < 6$
4(i)	$p > \frac{5}{24}$
4(ii)	$p = \frac{5}{24}$
5(i)	$x = -\frac{1}{3},\ y = -\frac{2}{3}$ $x = 2,\ y = \frac{1}{2}$
5(ii)	The line intersects the curve at the points $\left(2, \frac{1}{2}\right)$ and $\left(-\frac{1}{3}, -\frac{2}{3}\right)$