

## SUMMER QUIZ 01

Form 5  
Inequalities

### Part A – MC (@2 marks)

1.	A	<p>I is true. II is true.</p> $\text{LHS} = \frac{1}{a} < 0$ $\text{RHS} = \frac{1}{b} > 0$ <p>LHS &lt; RHS III is false.</p>
2.	C	<p><math>\{x &gt; -2 \text{ or } x \geq 1\}</math> and <math>x \leq 4</math>  <math>x &gt; -2</math> and <math>x \leq 4</math>  <math>\therefore -2 &lt; x \leq 4</math></p>
3.	D	$6x^2 + 53x - 9 \geq 0$ $(6x - 1)(x + 9) \geq 0$ $x \leq -9 \text{ or } x \geq \frac{1}{6}$
4.	A	$4x^2 + 4x + 1 \leq 0$ $(2x + 1)^2 \leq 0$ $x = -\frac{1}{2}$
5.	D	<p>Note that <math>a &lt; 0</math>.</p> $\left\{ \begin{array}{l} -\frac{5}{a} = \frac{1}{3} + \frac{1}{2} \\ \frac{b}{a} = \left(\frac{1}{3}\right)\left(\frac{1}{2}\right) \end{array} \right.$ <p>Solving, we have <math>a = -6</math> and <math>b = -1</math>.</p>

6.	C	$x > -2$ $x - 1 > -3$ $(x - 1)^2 \geq 0$ $(x - 1)^2 - 1 \geq -1$ $y \geq -1$
7.	B	$-(x - 2)^2 - 2(x - 2) + 3 \geq 0$ $-3 \leq x - 2 \leq 1$ $-1 \leq x \leq 3$
8.	C	$2x^2 + kx + 2 = x$ $2x^2 + (k - 1)x + 2 = 0$ $\Delta > 0$ $(k - 1)^2 - 4(2)(2) > 0$ $(k - 1)^2 > 16$ $k - 1 < -4 \text{ or } k - 1 > 4$ $k < -3 \text{ or } k > 5$
9.	A	Put $x = 2$ $2^2 + 6(2) + k = 0$ $k = -16$
10.	C	Case 1: $x - 3 > 0$ $3x + 2 > 4(x - 3)$ $3x + 2 > 4x - 12$ $x < 14$ $\therefore 3 < x < 14$ Case 2: $x - 3 < 0$ $3x + 2 < 4(x - 3)$ $3x + 2 < 4x - 12$ $x > 14$ $\therefore \text{No solution.}$ Thus, $3 < x < 14$

1. A      2. C      3. D      4. A      5. D  
6. C      7. B      8. C      9. A      10. C

## Part B - Short Questions

- |   | Marks |
|---|-------|
| 1. (a) $\Delta < 0$   | 1M    |
| $k^2 - 4(-1)(-25) < 0$  | 1M    |
| $\therefore -10 < k < 10$   | 1A    |
|   | (3)   |
| (b) $-10 < k < 10$ and $k > 8$  |       |
| $\therefore 8 < k < 10$   | 1M    |
| $\therefore k = 9$  | 1A    |
|   | (2)   |
| 2. Let $u = x^2 - 3x - 5$   |       |
| $u^2 + 6u + 5 \leq 0$   |       |
| $\therefore -5 \leq u \leq -1$  | 1A    |
| $x^2 - 3x - 5 \geq -5$ and $x^2 - 3x - 5 \leq -1$                     | 1M    |
| $\therefore \{x \leq 0 \text{ or } x \geq 3\}$ and $-1 \leq x \leq 4$ | 1A+1A |
| $\therefore -1 \leq x \leq 0$ or $3 \leq x \leq 4$                    | 1A    |
|   | (5)   |
| 3. $2x - 3 < \frac{4x - 3}{3}$ or $x - k < 0$                         |       |
| $\therefore x < 3$ or $x < k$   | 1A    |
| $\therefore k \leq 3$   | 2A    |
|   | (3)   |