FACULTY OF INDUSTRIAL SCIENCES & TECHNOLOGY	**SUBJECT:** MATHEMATICS FOR MANAGEMENT		**MARKS**: /10
	CODE: BUM1123	**TOPIC:** INEQUALITIES	
	ASSESSMENT: QUIZ	**NO:** 3	**DUE/DURATION:** 10 MINUTES
NAME:		**STUDENT ID:**	**SECTION:**

Choose two from the questions below and solve for x :

1) $\frac{3x+1}{x+4} \geq 1$

2) $\frac{x^2-16}{(x-1)^2} < 0$

3) $\frac{3x-5}{x} \leq 5-x$

4) $\frac{x^2-3x-4}{x^2-8x+16} < 0$

5) $\frac{2x+10}{x+3} \geq 1$

6) $1-\frac{3x}{2x-3} \leq 5$

7) $\frac{2x}{x-4} \leq 1$

8) $\frac{x+1}{x-6} \geq \frac{x+2}{x-4}$

9) $\frac{1}{x+2} > \frac{3}{x+1}$

10) $\frac{3}{2-x} > \frac{x}{2+x}$

	Answer	Marks
1	$\frac{3x+1}{x+4} \geq 1$ $\frac{3x+1}{x+4} - 1 \geq 0$ $\frac{3x+1-(x+4)}{x+4} \geq 0$ $\frac{2x-3}{x+4} \geq 0$ $(2x-3)$ - - + $(x+4)$ - + + +ve -4 -ve 3/2 +ve $-\infty < x < -4$ and $\frac{3}{2} \leq x < \infty$ $(-\infty, -4)$ and $\left[\frac{3}{2}, \infty\right)$	M1 A1 M1 A1A1
		5 Marks

	Answer	Marks
2	$\frac{x^2-16}{(x-1)^2} < 0$ $\frac{(x-4)(x+4)}{(x-1)^2} < 0$ $(x-4)$ - - - + $(x+4)$ - + + + $(x-1)$ - - + + $(x-1)$ - - + + +ve -4 -ve 1 -ve 4 +ve $-4 < x < 1$ and $1 < x < 4$ $(-4,1)$ and $(1,4)$	M1 A1 M1 A1A1
		5 Marks

3	$\frac{3x-15}{x} \le 5-x$ $\frac{3x-15}{x}-5+x \le 0$ $\frac{3x-15-5x+x^2}{x} \le 0$ $\frac{x^2-2x-15}{x} \le 0$ $\frac{(x-5)(x+3)}{x} \le 0$	**M1** **A1**
	$(x-5)$: - - - + $(x+3)$: - + + + x: - - + + -ve -3 +ve 0 -ve 5 +ve	**M1**
	$(-\infty,-3]$ and $(0,5]$	**A1A1**
		5 Marks

4	$\frac{x^2-3x-4}{x^2-8x+16} < 0$ $\frac{(x+1)(x-4)}{(x-4)(x-4)} < 0$ $\frac{(x+1)}{(x-4)} < 0$	**M1**
	$(x+1)$: - + + $(x-4)$: - - + +ve -1 -ve 4 +ve	**A1**
	$(-1,4]$	**M1** **A1A1**
		5 Marks

5	$\frac{2x+10}{x+3} \geq 1$ $\frac{2x+10}{x+3} - 1 \geq 0$ $\frac{2x+10-x-3}{x+3} \geq 0$ $\frac{x+7}{x+3} \geq 0$ $(x+7)$ | - | + | + $(x+3)$ | - | - | + +ve -7 -ve -3 +ve $(-\infty, -7]$ and $(-3, \infty)$	**M1** **A1** **M1** **A1A1**
		5 Marks

6	$1 - \frac{3x}{2x-3} \leq 5$ $1 - 5 - \frac{3x}{2x-3} \leq 0$ $-4 - \frac{3x}{2x-3} \leq 0$ $\frac{-8x-3x+12}{2x-3} \leq 0$ $\frac{-11x+12}{2x-3} \leq 0$ $(-11x+12)$ | + | - | - $(2x-3)$ | - | - | + -ve 1.09 +ve 1.5 -ve $(-\infty, 1.09]$ and $(1.5, \infty)$	**M1** **A1** **M1** **A1A1**
		5 Marks

7	$\frac{1}{x+2} > \frac{3}{x+1}$ $\frac{1}{x+2} - \frac{3}{x+1} > 0$ $\frac{(x+1)-3(x+2)}{(x+1)(x+2)} > 0$ $\frac{-2x-5}{(x+1)(x+2)} > 0$	**M1** **A1**
	$(-2x-5)$: + | - | - | - $(x+1)$: - | - | - | + $(x+2)$: - | - | + | + +ve, -2.5, -ve, -2, +ve, -1, -ve $(-\infty, -2.5]$ and $(-2, -1)$	**M1** **A1A1**
		5 Marks

8	$\frac{x+1}{x-6} \geq \frac{x+2}{x-4}$ $\frac{x+1}{x-6} - \frac{x+2}{x-4} \geq 0$ $\frac{(x+1)(x-4)-(x+2)(x-6)}{(x-6)(x-4)} \geq 0$ $\frac{x+8}{(x+1)(x+2)} \geq 0$	**M1** **A1**
	$(x+8)$: - | + | + | + $(x-6)$: - | - | - | + $(x-4)$: - | - | + | + -ve, -8, +ve, 4, -ve, 6, +ve $(-8, 4)$ and $(6, \infty)$	**M1** **A1A1**
		5 Marks

9	$\frac{2x}{x-4} \le 1$ $\frac{2x}{x-4} - 1 \le 0$ $\frac{2x}{x-4} - \frac{x-4}{x-4} \le 0$ $\frac{2x-x+4}{x-4} \le 0$ $\frac{x+4}{x-4} \le 0$	**M1** **A1**
	$(x+4)$: - | + | + $(x-4)$: - | - | + +ve -4 -ve 4 +ve	**M1M1**
	$(-4, 4]$	**A1**
		5 Marks

10	$\frac{3}{2-x} > \frac{x}{2+x}$ $\frac{3}{2-x} - \frac{x}{2+x} > 0$ $\frac{3(2+x) - x(2-x)}{(2-x)(2+x)} > 0$ $\frac{x^2+x+6}{(2-x)(2+x)} > 0$	**M1** **A1**
	(x^2+x+6): + | + | + $(2-x)$: + | + | - $(2+x)$: - | + | + -ve -2 +ve 2 -ve	**M1M1**
	$(-2, 2)$	**A1**
		5 Marks