Solution of Recitation - 1.8 **Done by: A. Al-Shallali**

Q1) $\left|\dfrac{2x+5}{3}\right| < \dfrac{3}{4} + \dfrac{1}{2} = \dfrac{5}{4} \implies -\dfrac{5}{4} < \dfrac{2x+5}{3} < \dfrac{5}{4}$ (multiply by 12)

$-15 < 8x+20 < 15 \implies -35 < 8x < -5 \implies -\dfrac{35}{8} < x < -\dfrac{5}{8} \implies$ S.S. $= \left(-\dfrac{35}{8}, -\dfrac{5}{8}\right)$

Q2) $\dfrac{-7+5|3x-4|}{7|3x-4|-2} = -3 \implies -7+5|3x-4| = -21|3x-4|+6 \implies 26|3x-4| = 13$

$\implies |3x-4| = \dfrac{1}{2} \implies 3x-4 = -\dfrac{1}{2}$ or $3x-4 = \dfrac{1}{2} \implies 3x = \dfrac{7}{2}$ or $3x = \dfrac{9}{2}$

$\implies x = \dfrac{7}{6}$ or $x = \dfrac{3}{2} \implies$ S.S. $= \left\{\dfrac{7}{6}, \dfrac{3}{2}\right\}$

Q3) $|2x+8|^2 - |9x+36| \geq 9 \implies 4|x+4|^2 - 9|x+4| - 9 \geq 0.$

Let $y = |x+4|$, so the equation is $4y^2 - 9y - 9 \geq 0$

$\implies (4y+3)(y-3) \geq 0 \implies$ (from sign test) $y \leq -\frac{3}{4}$ or $y \geq 3$

$\implies |x+4| \leq -\frac{3}{4}$ (impossible) or $|x+4| \geq 3 \implies x+4 \leq -3$

or $x+4 \geq 3 \implies x \leq -7$ or $x \geq -1$

$\implies$ S.S. $= (-\infty, -7] \cup [-1, \infty)$

		-3/4		3	
(4y+3)	- -		+ +		+ +
(y-3)	- -		- -		+ +
L. S. is :	+		-		+

Q4) $|5x-1| = |2x+3| \implies 5x-1 = 2x+3$ or $5x-1 = -(2x+3) = -2x-3 \implies 3x = 4$

or $7x = -2 \implies x = \frac{4}{3}$ or $x = -\frac{2}{7}$.

Thus the solution set contains one positive and one negative rational number.

Q5) (Extra) : Solve the equation $4 \leq (x+3)^2 \leq 9$

$\implies 2 \leq |x+3| \leq 3 \implies |x+3| \geq 2$ and $|x+3| \leq 3 \implies (x+3 \leq -2$ or $x+3 \geq 2)$ and

$(-3 \leq x+3 \leq 3) \implies \mathrm{S}_1 : (x \leq -5$ or $x \geq -1)$ and $\mathrm{S}_2 : (-6 \leq x \leq 0)$.

S.S. $= \mathrm{S}_1 \cap \mathrm{S}_2 = \Big[(-\infty, -5] \cup [-1, \infty)\Big] \cap [-6, 0] = [-6, -5] \cup [-1, 0]$