Homework – Chapter 9 Part I

1. Write the following as a set of values and an interval.

a) $x > -5$ $\{x \in \mathbb{R}, x > -5\}$ $(-5, +\infty)$

b) $x \leq -10$ $\{x \in \mathbb{R}, x \leq -10\}$ $(-\infty, -10]$

c) $-2 \leq x < 3$ $\{x \in \mathbb{R}, -2 \leq x < 3\}$ $[-2, 3)$

d) $x < -1$ or $x \geq 4$ $\{x \in \mathbb{R}, x < -1 \text{ or } x \geq 4\}$ $(-\infty, -1) \cup [4, +\infty)$

2. Solve:

a) $2(x+5) - 4 \geq 5(3x-2)$

$2x + 10 - 4 \geq 15x - 10$

$-13x \geq -16$

$x \leq \frac{16}{13}$

$(-\infty, \frac{16}{13}]$

b) $\frac{2}{3}(9x-12) < 1 - 3(2x-5)$

$6x - 8 < 1 - 6x + 15$

$12x < 24$

$x < 2$

$(-\infty, 2)$

c) $\frac{x+3}{4} \leq -\frac{2x-3}{5}$

$\times 4 \times 5$

$5(x+3) \leq -4(2x-3)$

$5x + 15 \leq -8x + 12$

$13x \leq -3$

$x \leq -\frac{3}{13}$

$(-\infty, -\frac{3}{13}]$

d) $(2x+1)(3x-5) \leq 6(x+1)(x-1)$

$6x^2 - 10x + 3x - 5 \leq 6(x^2 - 1)$

$6x^2 - 7x - 5 \leq 6x^2 - 6$

$-7x \leq -1$

$x \geq \frac{1}{7}$

$[\frac{1}{7}, +\infty)$

e) $4(x+3)(x-1) > (2x-3)^2$

$4(x^2-x+3x-3) > 4x^2-12x+9$

$4x^2+8x-12 > 4x^2-12x+9$

$20x > 21$

$x > \frac{21}{20}$

$\left(\frac{21}{20}, +\infty\right)$

3. Are the following numbers part of the solution?

a) $x = 5$ for $3x-5 \leq 2x+1$

$3(5)-5$	$2(5)+1$
$15-5$	$10+1$
10	11

yes!

b) $x = -\frac{1}{3}$ for $2(x-4) > 3x+2$

$2\left(-\frac{1}{3}-4\right)$	$3\left(-\frac{1}{3}\right)+2$
$2\left(-\frac{13}{3}\right)$	$-1+2$
$-\frac{26}{3}$	1

no!

c) $x = -3$ for $x^2-5x+2 \geq 0$

$(-3)^2-5(-3)+2$	0
$9+15+2$	
26	

yes!

d) $x = -\frac{2}{3}$ for $3x^2-4x+5 \leq 0$

$3\left(-\frac{2}{3}\right)^2-4\left(-\frac{2}{3}\right)+5$	0
$3\left(\frac{4}{9}\right)+\frac{8}{3}+5$	
$\frac{4}{3}+\frac{8}{3}+\frac{15}{3}$	
$\frac{27}{3}$	
9	

no!