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3.4

① a) $x + 4 \geq 12$

$x \geq 8$

b) $7 - 5x < 62$

$-5x < 62 - 7$

$(\div -5) -5x < 55 (\div -5)$

$x > -11$

c) $3(3 - 2x) \leq 2(3 + 2x)$

$9 - 6x \leq 6 + 4x$

$9 - 6 \leq 4x + 6x$

$3 \leq 10x$

$\frac{3}{10} \leq x$

$x \geq \frac{3}{10}$

② a) $7 \leq 5x - 3 \leq 17$

$(\div 5) 10 \leq 5x \leq 20 (\div 5)$

$2 \leq x \leq 4$

b) $\frac{x}{3} - \frac{2x}{9} < 3$

$\frac{9x}{3} - \frac{18x}{9} < 27$

$3x - 2x < 27$

$x < 27$

c) $3x(3+x) + x^2 \geq 1 + x(6+4x)$

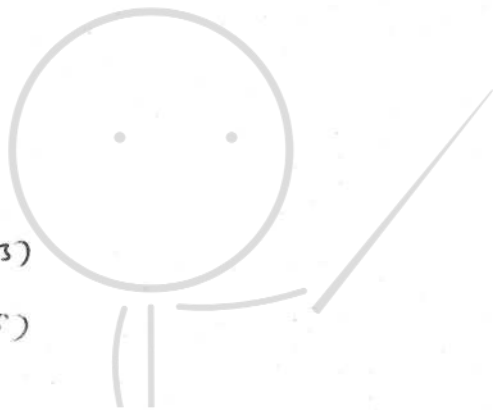
$9x + 3x^2 + x^2 \geq 1 + 6x + 4x^2$

$4x^2 + 9x \geq 4x^2 + 6x + 1$

$9x - 6x \geq 1$

$3x \geq 1$

$x \geq \frac{1}{3}$

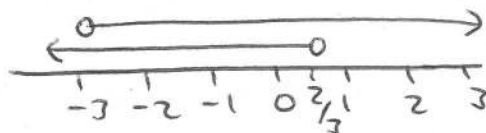


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$$\begin{aligned} \textcircled{3} \text{ a) } 2(1+x) &< 4-x \\ 2+2x &< 4-x \\ 2x+x &< 4-2 \\ 3x &< 2 \\ x &< \frac{2}{3} \end{aligned}$$

$$\begin{aligned} x-3 &< 4x+6 \\ -3-6 &< 4x-x \\ -9 &< 3x \\ -3 &< x \end{aligned}$$

$$\underline{\underline{\{x: -3 < x < \frac{2}{3}\}}}$$



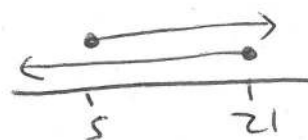
$$\text{b) } \frac{x}{4} + 3 \leq 6$$

$$\begin{aligned} x+3 &\leq 24 \\ x &\leq 24-3 \\ x &\leq 21 \end{aligned}$$

$$2(3x-5) \geq 20$$

$$\begin{aligned} 6x-10 &\geq 20 \\ 6x &\geq 20+10 \\ 6x &\geq 30 \\ x &\geq 5 \end{aligned}$$

$$\underline{\underline{\{x: 5 \leq x \leq 21\}}}$$



$$\text{c) } 0.5(4x+3) < 2.5$$

$$2x + \frac{3}{2} < 2.5$$

$$2x < 2.5 - \frac{3}{2}$$

$$2x < 1$$

$$x < \frac{1}{2}$$

$$\frac{x-3}{5} > 7$$

$$x-3 > 35$$

$$x > 38$$



$$\underline{\underline{\{x: x < \frac{1}{2}\} \cup \{x: x > 38\}}}$$

$$\textcircled{4} \text{ a) } 2x-6 > 3-x$$

$$2x+x > 3+6$$

$$3x > 9$$

$$x > 3$$

$$\text{b) } 4x-5 < 3+2x$$

$$4x-2x < 3+5$$

$$2x < 8$$

$$x < 4$$

$$\begin{aligned} \textcircled{5} \text{ a) } 20 - 2x &> 15 - 7x \\ 20 - 15 &> -7x + 2x \\ 5 &> -5x \\ -1 &< x \end{aligned}$$

$$\{x : x > -1\}$$

$$\begin{aligned} \text{b) } x - 5 &\leq 3 - 9x \\ x + 9x &\leq 3 + 5 \\ 10x &\leq 8 \\ x &\leq \frac{4}{5} \end{aligned}$$

$$\left\{x : x \leq \frac{4}{5}\right\}$$

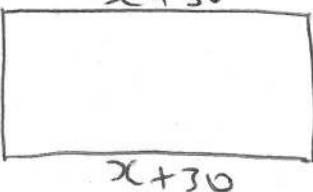
$$\begin{aligned} \textcircled{6} \text{ a) } 3(3x + 4) &\geq 2 - x \\ 9x + 12 &\geq 2 - x \\ 9x + x &\geq 2 - 12 \\ 10x &\geq -10 \\ x &\geq -1 \end{aligned}$$

$$\{x : x \geq -1\}$$

$$\begin{aligned} \text{b) } 7(x - 3) &< 3(x - 3) \\ 7x - 21 &< 3x - 9 \\ 7x - 3x &< -9 + 21 \\ 4x &< 12 \\ x &< 3 \end{aligned}$$

$$\{x : x < 3\}$$

$\textcircled{7} \text{ a)}$



(must be less than 400)

$$2(x + 30) + 2x < 400$$

$$\begin{aligned} \text{b) } 2(x + 30) + 2x &< 400 &\rightarrow 4x &< 340 \\ 2x + 60 + 2x &< 400 && x &< 85 \\ 4x + 60 &< 400 && \underline{\underline{x < 85}} \end{aligned}$$

$$\textcircled{8} \text{ a) } 3(2+x) \geq 2$$

$$6 + 3x \geq 2$$

$$3x \geq 2 - 6$$

$$3x \geq -4$$

$$x \geq -\frac{4}{3}$$

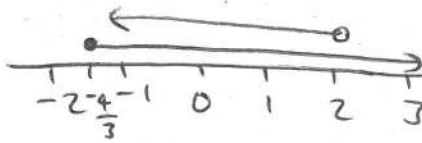
$$\{x: -\frac{4}{3} \leq x < 2\}$$

$$x + 7 > 5x - 1$$

$$7 + 1 > 5x - x$$

$$8 > 4x$$

$$2 > x$$



$$\text{b) } 0.25(8x + 4) \leq 5.5$$

$$2x + 1 \leq 5.5$$

$$2x \leq 5.5 - 1$$

$$2x \leq 4.5$$

$$x \leq \frac{9}{4} \text{ (or } 2.25)$$

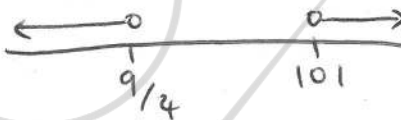
$$\frac{x-2}{9} > 11$$

$$x - 2 > 99$$

$$x > 101$$

$$\{x: x < 2.25\} \cup$$

$$\{x: x > 101\}$$



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