

Show all necessary steps clearly, neatly, systematically to receive full credit.

1. Solve by substitution method: $\begin{cases} c - 2d = 29 \\ 2(c - 5) = d - 21 \end{cases}$

$$c - 2d = 29$$

$$c = 2d + 29$$

$$2(c - 5) = d - 21$$

$$2(2d + 29 - 5) = d - 21$$

$$2(2d + 24) = d - 21$$

$$4d + 48 = d - 21$$

$$3d + 48 = -21$$

$$3d = -69$$

$$d = -23$$

$$c = 2d + 29$$

$$c = 2(-23) + 29$$

$$c = -46 + 29$$

$$c = -17$$

$$(-17, -23) //$$

2. Solve: $\frac{1}{2}|3 - 4x| - 5 > 6$. Write the solution set in interval notation and graph.

$$\frac{1}{2}|3 - 4x| > 11$$

$$|3 - 4x| > 22$$

$$3 - 4x > 22 \quad \text{or} \quad 3 - 4x < -22$$

$$-4x > 19$$

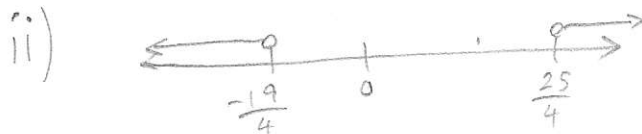
$$x < \frac{19}{-4}$$

$$-4x < -25$$

$$x > \frac{-25}{-4}$$

$$x > \frac{25}{4}$$

i) $(-\infty, -\frac{19}{4}) \cup (\frac{25}{4}, \infty)$



side



3. A total investment of \$5000 is made into 6% and 9.5% annual simple interest accounts. How much should be invested in the 9.5% annual simple interest account so that the total annual interest earned is \$370? (show in 3-steps format)

	P	r	t	I
acc A	x	0.06	1	0.06x
acc B	5000-x	0.095	1	0.095(5000-x)

side

$$\begin{array}{r} 0.035 \overline{) 105} \\ \underline{3000} \\ 35 \overline{) 105000} \\ \underline{105} \end{array}$$

②

$$\begin{aligned} 0.06x + 0.095(5000-x) &= 370 \\ 0.06x + 475 - 0.095x &= 370 \\ 475 - 0.035x &= 370 \\ -0.035x &= -105 \end{aligned}$$

$$x = \frac{-105}{-0.035}$$

$$x = 3000$$

- ③ need to invest \$2000 in 9.5% account.

4. Solve: $\frac{x-7}{2} - \frac{x-1}{5} \geq -\frac{x}{4}$. Write the solution set in set-builder notation and graph.

$$20 \left(\frac{x-7}{2} - \frac{x-1}{5} \right) \geq \left(-\frac{x}{4} \right) \cdot 20$$

$$10(x-7) - 4(x-1) \geq -5x$$

$$10x - 70 - 4x + 4 \geq -5x$$

$$6x - 66 \geq -5x$$

$$-66 \geq -11x$$

$$6 \leq x$$

i) $\{x \mid x \geq 6\}$



5. Solve: $3 \left| \frac{3}{4}x + 7 \right| - \frac{2}{3} = \frac{7}{3}$.

$$3 \left| \frac{3}{4}x + 7 \right| = \frac{9}{3}$$

$$3 \left| \frac{3}{4}x + 7 \right| = 3$$

$$\left| \frac{3}{4}x + 7 \right| = 1$$

$$\frac{3}{4}x + 7 = 1$$

$$\frac{3}{4}x = -6$$

$$x = -6 \cdot \frac{4}{3}$$

$$x = -8$$

or $\frac{3}{4}x + 7 = -1$

$$\frac{3}{4}x = -8$$

$$x = -8 \cdot \frac{4}{3}$$

$$x = -\frac{32}{3}$$

$$\left\{ -\frac{32}{3}, -8 \right\} //$$

6. How many pounds of candy that sells for \$7 per pound must be mixed with 6 pounds of candy that sells for \$12 per pound to create a mixture that sell for \$10 per pound? (show in 3-steps format)

①

	Quantity	Unit price	\$ total
candy A	x	7	7x
candy B	6	12	72
mix	x+6	10	10(x+6)

② $7x + 72 = 10(x + 6)$

$$7x + 72 = 10x + 60$$

$$-3x + 72 = 60$$

$$-3x = -12$$

$$x = 4$$

③ need 4 pounds of candy that sells for \$7 per pound.

7. Solve: $0.9 < 0.7 - 2x \leq 1.5$. Write the solution set in set-builder notation and graph.

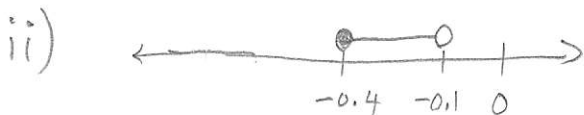
$$0.2 < -2x \leq 0.8$$

$$-0.1 > x \geq -0.4$$

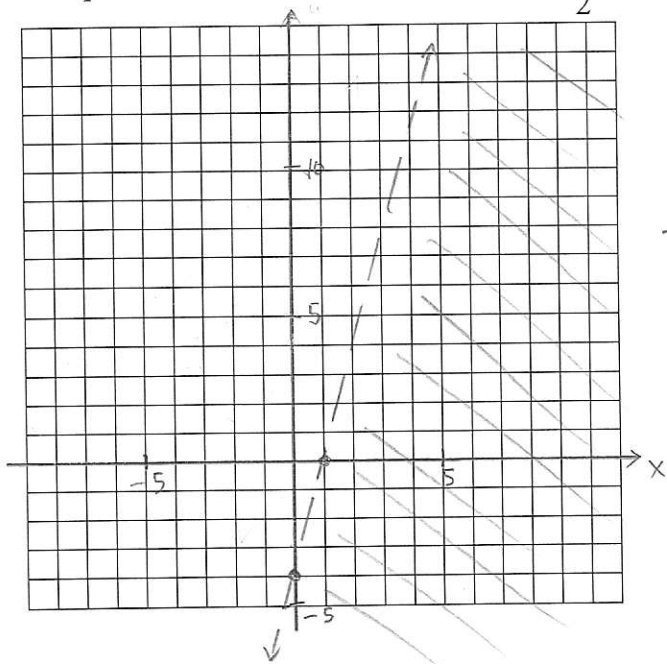
$$\text{or}$$

$$-0.4 \leq x < -0.1$$

$$i) \{x \mid -0.4 \leq x < -0.1\}$$



8. Graph the solution set of inequality: $2x - \frac{1}{2}y > 2$.



$$2x - \frac{1}{2}y > 2$$

$$-\frac{1}{2}y > -2x + 2$$

$$-2 \cdot \left(-\frac{1}{2}y\right) < (-2x + 2) \cdot (-2)$$

$$y < 4x - 4$$

Test, Pick (0, 0)

$$2(0) - \frac{1}{2}(0) > 2$$

$$0 > 2$$

↑
false.

9. Solve: $-5|7x-9|+11 \geq 6$. Write the solution in interval notation and set-builder notation.

$$-5|7x-9| \geq -5$$

$$|7x-9| \leq 1$$

$$7x-9 \leq 1 \quad \text{and} \quad 7x-9 \geq -1$$

$$7x \leq 10$$

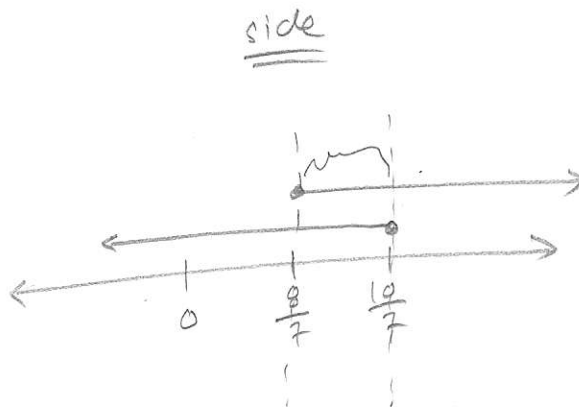
$$7x \geq 8$$

$$x \leq \frac{10}{7}$$

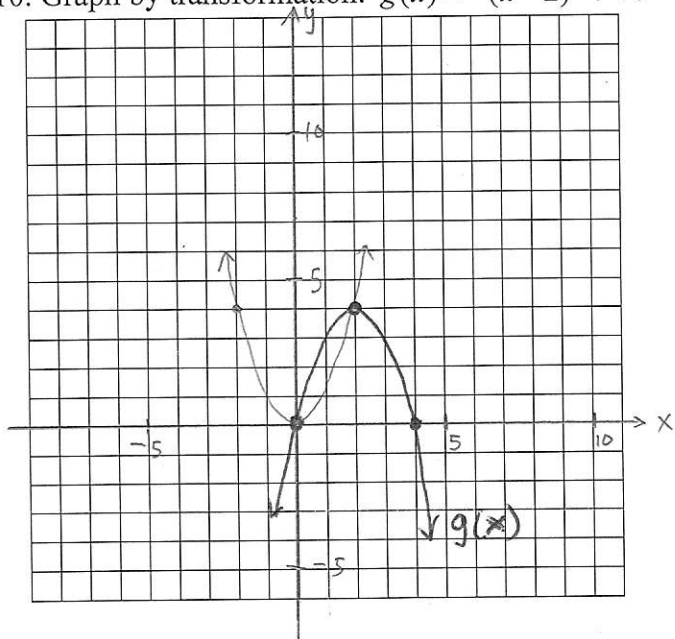
$$x \geq \frac{8}{7}$$

i) $\left[\frac{8}{7}, \frac{10}{7} \right]$

ii) $\left\{ x \mid \frac{8}{7} \leq x \leq \frac{10}{7} \right\}$



10. Graph by transformation: $g(x) = -(x-2)^2 + 4$.



$$y = x^2$$

$$y = -x^2$$

$$y = -(x-2)^2$$

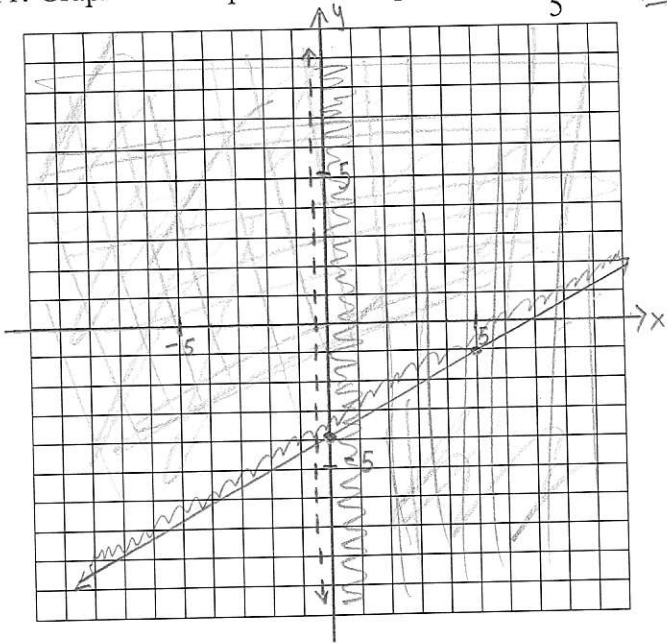
$$y = -(x-2)^2 + 4$$

reflect about x-axis

shift right 2 units.

shift up 4 units.

11. Graph the compounded inequality: $y \geq \frac{3}{5}x - 4$ or $5 - 6x < 7$.



$$y \geq \frac{3}{5}x - 4$$

Test, Pick (0,0)

$$0 \geq \frac{3}{5}(0) - 4$$

$$0 \geq -4$$

↑

True

or $5 - 6x < 7$

$$-6x < 2$$

$$x > \frac{2}{-6}$$

$$x > -\frac{1}{3}$$

12. Solve by elimination method: $\begin{cases} 3x - 2y = 13 \\ 4x - 3y = 6 \end{cases}$

$$\begin{array}{r} 3 \cdot \{ 3x - 2y = 13 \\ -2 \cdot \{ 4x - 3y = 6 \end{array}$$

$$9x - 6y = 39$$

$$+ \quad -8x + 6y = -12$$

$$x = 27$$

$$3x - 2y = 13$$

$$3(27) - 2y = 13$$

$$81 - 2y = 13$$

$$-2y = -68$$

$$y = 34$$

$$(27, 34)$$

13. Solve the system:
$$\begin{cases} 2x+2y=10-3z \\ 3x+y=z \\ x+2z=6-y \end{cases}$$

$$\begin{cases} 2x+2y+3z = 10 & \text{--- } \epsilon_1 \\ 3x+y-z = 0 & \text{--- } \epsilon_2 \\ x+y+2z = 6 & \text{--- } \epsilon_3 \end{cases}$$

$$3 \cdot \begin{cases} 2x+2y+3z = 10 \\ 3x+y-z = 0 \end{cases}$$

$$\begin{array}{r} 2x+2y+3z = 10 \\ + 9x+3y-3z = 0 \\ \hline 11x+5y = 10 \quad \text{--- } \epsilon_4 \end{array}$$

$$2 \cdot \begin{cases} 3x+y-z = 0 \\ x+y+2z = 6 \end{cases}$$

$$\begin{array}{r} 6x+2y-2z = 0 \\ + x+y+2z = 6 \\ \hline 7x+3y = 6 \quad \text{--- } \epsilon_5 \end{array}$$

$$\begin{array}{r} 3 \cdot 11x+5y = 10 \\ -5 \cdot 7x+3y = 6 \end{array}$$

$$\begin{array}{r} 33x+15y = 30 \\ + -35x-15y = -30 \\ \hline -2x = 0 \\ x = 0 \end{array}$$

$$11x+5y = 10$$

$$11(0)+5y = 10$$

$$5y = 10$$

$$y = 2$$

$$3x+y-z = 0$$

$$3(0)+2-z = 0$$

$$2-z = 0$$

$$z = 2$$

$$(0, 2, 2) //$$