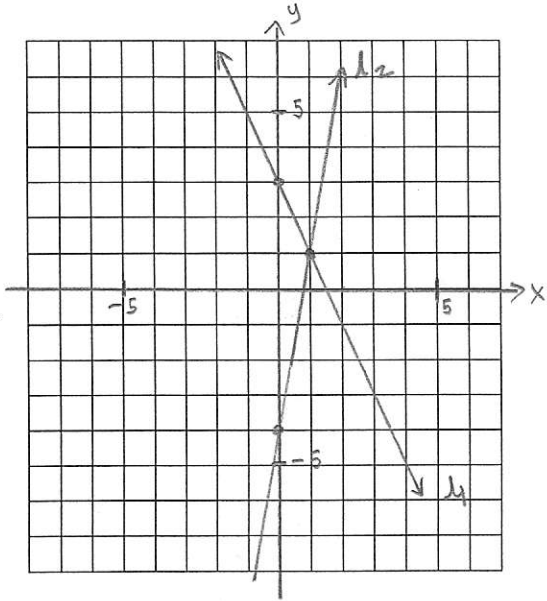


Key

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

1. Solve by graphing method: 
$$\begin{cases} 2x + y = 3 & \text{--- } l_1 \\ x - \frac{1}{5}y = \frac{4}{5} & \text{--- } l_2 \end{cases}$$

 $l_1$ 

$$2x + y = 3$$

$$y = -2x + 3$$

 $l_2$ 

$$x - \frac{1}{5}y = \frac{4}{5}$$

$$5x - y = 4$$

$$5x - 4 = y$$

 $(1, 1) //$ 

2. Solve and write the solution set in interval notation:  $-3|6 - 2t| + 1 > -5$

$$-3|6 - 2t| > -6$$

$$|6 - 2t| < 2$$

$$6 - 2t < 2$$

$$-2t < -4$$

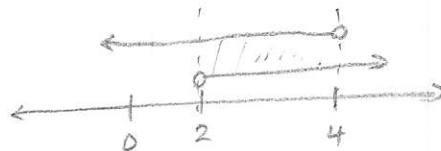
$$t > 2$$

and

$$6 - 2t > -2$$

$$-2t > -8$$

$$t < 4$$

 $(2, 4) //$ side

3. A bank loaned out \$12000, part of it at the rate of 8% per year and the rest at the rate of 18% per year. if the annual interest received totaled \$1000, how much was loaned at 8%?

①

	P	r	t	I
acc A	x	0.08	1	0.08x
acc B	12000-x	0.18	1	0.18(12000-x)

②

$$0.08x + 0.18(12000 - x) = 1000$$

$$0.08x + 2160 - 0.18x = 1000$$

$$2160 - 0.10x = 1000$$

$$-0.10x = -1160$$

$$x = \frac{-1160}{-0.10}$$

$$x = 11600$$

$$\begin{array}{r} y \\ 18 \\ \times 12 \\ \hline y 36 \\ + 180 \\ \hline 216 \end{array}$$

③ \$11600 was loaned at 8% //

4. Solve by substitution method:  $\begin{cases} 4x - 5y = 14 \\ 3y = x - 7 \end{cases}$

$$3y = x - 7$$

$$3y + 7 = x$$

$$4x - 5y = 14$$

$$4(3y + 7) - 5y = 14$$

$$12y + 28 - 5y = 14$$

$$7y + 28 = 14$$

$$7y = -14$$

$$y = -2$$

$$x = 3y + 7$$

$$x = 3(-2) + 7$$

$$x = 1$$

(1, -2) //

5. Solve and write the solution set in set-builder notation:  $7|2y+1|-3 \geq 18$

$$7|2y+1| \geq 21$$

$$|2y+1| \geq 3$$

$$2y+1 \geq 3 \quad \text{or} \quad 2y+1 \leq -3$$

$$2y \geq 2$$

$$y \geq 1$$

$$2y \leq -4$$

$$y \leq -2$$

$$\{y \mid y \leq -2 \text{ or } y \geq 1\} //$$



6. How many pounds of cashews cost \$9.00/lb. to mix with 60 pounds of almonds cost \$3.50/lb to make the mixture which cost \$7.50/lb?

①	unit price	x	Quantity	Total \$
Almonds	3.50		60	3.50(60)
Cashews	9.00		x	9x
Mix	7.50		60+x	7.50(60+x)

side

$$\begin{array}{r}
 1.5 \overline{) 240} \\
 \underline{160} \\
 80 \\
 \underline{90} \\
 -90 \\
 \hline
 0
 \end{array}$$

②  $3.50(60) + 9x = 7.50(60+x)$

$$210 + 9x = 450 + 7.50x$$

$$210 + 1.50x = 450$$

$$1.50x = 240$$

$$x = \frac{240}{1.50}$$

$$x = 160$$

③ need 160 lb of cashews. //

7. Solve by elimination method:

$$\begin{cases} \frac{1}{4}x = \frac{11}{4} - \frac{1}{2}y \\ \frac{1}{3}y = \frac{7}{3} - \frac{2}{3}x \end{cases}$$

$$4 \cdot \begin{cases} \frac{1}{4}x + \frac{1}{2}y = \frac{11}{4} \\ \frac{2}{3}x + \frac{1}{3}y = \frac{7}{3} \end{cases}$$

$$-2 \cdot \begin{cases} x + 2y = 11 \\ 2x + y = 7 \end{cases}$$

$$\begin{array}{r} -2x - 4y = -22 \\ + \quad 2x + y = 7 \\ \hline -3y = -15 \end{array}$$

$$y = 5$$

$$x + 2y = 11$$

$$x + 2(5) = 11$$

$$x + 10 = 11$$

$$x = 1$$

$$(1, 5) //$$

8. Let  $f(x) = \frac{2}{3}x + \frac{3}{4}$ .

a. Find  $f(-3)$ .

$$\begin{aligned} f(-3) &= \frac{2}{3}(-3) + \frac{3}{4} \\ &= -\frac{2}{1} + \frac{3}{4} \\ &= -\frac{8}{4} + \frac{3}{4} \\ &= -\frac{5}{4} // \end{aligned}$$

b. Find  $f(a+2)$

$$\begin{aligned} f(a+2) &= \frac{2}{3}(a+2) + \frac{3}{4} \\ &= \frac{2}{3}a + \frac{4}{3} + \frac{3}{4} \\ &= \frac{2}{3}a + \frac{16}{12} + \frac{9}{12} \\ &= \frac{2}{3}a + \frac{25}{12} // \end{aligned}$$

c. Find the value(s) of  $x$  such that  $f(x) = 1$ .

$$f(x) = \frac{2}{3}x + \frac{3}{4}$$

$$1 = \frac{2}{3}x + \frac{3}{4}$$

$$12(1) = \left(\frac{2}{3}x + \frac{3}{4}\right) \cdot 12$$

$$12 = 8x + 9$$

$$3 = 8x$$

$$\frac{3}{8} = x //$$

d. Find the zero(s) of  $f$ .

$$\langle f(x) = 0, x = ? \rangle$$

$$f(x) = \frac{2}{3}x + \frac{3}{4}$$

$$0 = \frac{2}{3}x + \frac{3}{4}$$

$$-\frac{3}{4} = \frac{2}{3}x$$

$$\frac{3}{2} \cdot -\frac{3}{4} = \frac{2}{2} \cdot \frac{2}{3}x$$

$$-\frac{9}{8} = x$$

$$\text{zero of } f \text{ is } -\frac{9}{8} //$$

9. A chemist wants to make 50 ml of a 6% acid solution by mixing a 13% acid solution and an 18% acid solution. How many milliliters of each solution should the chemist use?

①

	concentration	Quantity	Amount of substance
Type A	0.13	$x$	$0.13x$
Type B	0.18	$50-x$	$0.18(50-x)$
Mix	0.06	50	$0.06(50)$

②  $0.13x + 0.18(50-x) = 0.06(50)$

$$0.13x + 9 - 0.18x = 3$$

$$9 - 0.05x = 3$$

$$-0.05x = -6$$

$$x = \frac{-6}{-0.05}$$

$$x = \frac{600}{5}$$

$$x = 120$$

③ need 120 mL of 13% acid solution, } no solution, can't get this type of  
 need -70 mL of 18% acid solution. } mixture.

10. Find the domain of the given functions.

a.  $f(x) = 5x^2 + 2$

Domain:

$$(-\infty, \infty) //$$

b.  $g(x) = \sqrt{\frac{3}{4}x - 4}$

Domain:

$$\text{radicant} \geq 0$$

$$\frac{3}{4}x - 4 \geq 0$$

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

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

$$x \geq \frac{16}{3}$$

$$\left[ \frac{16}{3}, \infty \right) //$$

c.  $h(x) = \frac{\frac{2}{3}x + \frac{3}{9}}{4x - 5}$  ← denominator  $\neq 0$

$$4x - 5 = 0$$

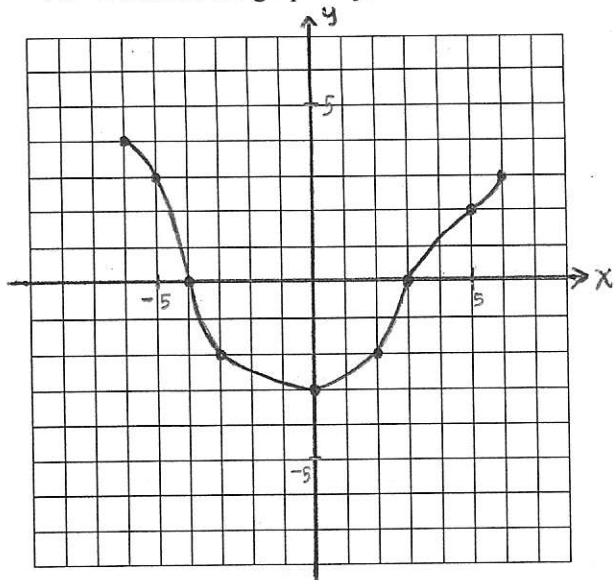
$$4x = 5$$

$$x = \frac{5}{4}$$

Domain:

$$\{x \mid x \in \mathbb{R}, x \neq \frac{5}{4}\} //$$

11. Consider the graph of  $f$ .



a. Find  $f(2)$ .

$$f(2) = -2 //$$

b. Find  $f(5)$ .

$$f(5) = 2 //$$

c. What is the domain of  $f$ ?

$$[-6, 6] //$$

d. What is the range of  $f$ ?

$$[-3, 4] //$$

e. What are the intercepts?

x-intercept(s)      y-intercept(s)

$$(-4, 0)$$

$$(0, -3) //$$

$$(3, 0) //$$

f. For what number(s)  $x$  is  $f(x) = -2$ ?

$$x = -3, x = 2 //$$

g. What are the zeros of  $f$ ?

$$x = -4, x = 3 //$$

12. The cost,  $C$ , of renting a 12-foot moving truck for a day is \$40 plus \$0.35 per miles driven.

a. Express the cost  $C$  as a function of driving the truck  $x$  miles.

$$\begin{aligned} \text{let } C(x) &= \text{cost} \\ x &= \# \text{ of miles} \end{aligned}$$

$$C(x) = 0.35x + 40 //$$

b. What is the implied domain of this linear function?

$$[0, \infty) //$$

c. What is the rental cost if the truck is driven 80 miles?

$$f(80) = 0.35(80) + 40$$

$$= 28 + 40$$

$$= 68$$

the rental cost is \$68 //

d. How many miles can you drive if you can spend up to \$127.50?

$$f(x) \leq 127.50$$

$$0.35x + 40 \leq 127.50$$

$$0.35x \leq 87.50$$

$$x \leq \frac{87.50}{0.35}$$

$$x \leq \frac{8750}{35}$$

$$x \leq 250$$

can drive up to 250 miles. //

$$\begin{array}{r} \text{side} \\ \hline 35 \overline{) 8750} \\ \underline{250} \\ 8750 \\ \underline{-70} \\ 175 \\ \underline{-175} \\ 0 \\ 0 \end{array}$$

13. Solve by elimination method:

$$\begin{cases} y = 2x + z + 1 \\ -3z - 1 = -2y + 2z \\ 5x + 3z = 16 - 3y \end{cases}$$

$$\boxed{\varepsilon_1 \quad \varepsilon_2 \quad \varepsilon_3}$$

$$\begin{cases} 5. & -2x + y - z = 1 \\ 2. & 5x + 3y + 3z = 16 \end{cases}$$

$$\begin{array}{r} -10x + 5y - 5z = 5 \\ + \quad 10x + 6y + 6z = 32 \\ \hline \end{array}$$

$$11y + z = 37 \quad \text{--- } \varepsilon_4$$

$$\boxed{\varepsilon_2 \quad \varepsilon_4}$$

$$\begin{cases} -2y + 5z = -1 \\ -5. & 11y + z = 37 \end{cases}$$

$$\begin{array}{r} -2y + 5z = -1 \\ + \quad -55y - 5z = -185 \\ \hline \end{array}$$

$$-57y = -186$$

$$y = \frac{186 \div 3}{57 \div 3}$$

$$y = \frac{62}{19}$$

$$11y + z = 37$$

$$11 \left( \frac{62}{19} \right) + z = 37$$

$$\frac{682}{19} + z = 37$$

$$z = \frac{703}{19} - \frac{682}{19}$$

$$z = \frac{21}{19}$$

$$\begin{cases} -2x + y - z = 1 & \text{--- } \varepsilon_1 \\ -2y + 5z = -1 & \text{--- } \varepsilon_2 \\ 5x + 3y + 3z = 16 & \text{--- } \varepsilon_3 \end{cases}$$

$$-2x + y - z = 1$$

$$-2x + \frac{62}{19} - \frac{21}{19} = 1$$

$$-2x + \frac{41}{19} = 1$$

$$-2x = \frac{19}{19} - \frac{41}{19}$$

$$-2x = -\frac{22}{19}$$

$$\frac{1}{-2} \cdot -2x = -\frac{22}{19} \cdot -\frac{1}{2}$$

$$x = \frac{11}{19}$$

$$\left( \frac{11}{19}, \frac{62}{19}, \frac{21}{19} \right) //$$

Side

$$\begin{array}{r} \cancel{y} 37 \\ \times 19 \\ \hline y 333 \\ + 370 \\ \hline 703 \end{array}$$