

For questions c & d, use any method. i.e., elimination or substitution.

c)

$$\frac{1}{3}x - \frac{4}{3}y = 2 \xrightarrow{\times 3} \textcircled{3} x - 4y = 6$$

$$\frac{5}{2}x - \frac{3}{2}y = -2 \xrightarrow{\times 2} \textcircled{4} 5x - 3y = -4$$

$\textcircled{3} \rightarrow \textcircled{5} x = 6 + 4y$; into $\textcircled{4}$

$$5(6 + 4y) - 3y = -4$$

$$30 + 17y = -4$$

$$17y = -34$$

$y = -2$; into $\textcircled{5}$

$\textcircled{5} x = 6 - 8$

$x = -2$

$\therefore (-2, -2)$

d)

$$3x + 10y = 10 \xrightarrow{\times (-3)} -9x - 30y = -30$$

$$9x - 5y = 2 \rightarrow \underline{-9x - 30y = -30}$$

$$-35y = -28$$

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

into $\textcircled{2}$

$9x - 5\left(\frac{4}{5}\right) = 2$

$9x = 6$

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

$\therefore \left(\frac{2}{3}, \frac{4}{5}\right)$

Part C: For each problem, provide appropriate "let" statements, equations, and solutions.

1. Find the two numbers that differ by 28 and add to 136.

$\textcircled{1} x - y = 28$

$\textcircled{2} x + y = 136$

$\therefore x = 82 \quad \& \quad y = 54$

2. The length of a rectangle is 4 less than 3 times its width. If the perimeter is 48 cm. What are the rectangle's dimensions? $x = \text{width}$ & $y = \text{length}$

$\textcircled{1} 2x + 2y = 48$ (perimeter)

$\textcircled{2} y = 3x - 4$ (length) $\rightarrow \textcircled{3} -3x + y = -4$

\therefore The width is 7cm & the length is 17cm.

3. A crew of four men and one boy charges \$760 per day. Another crew of three men and two boys charges \$645 per day. If all men earn the same amount per day, and all boys earn the same per day, how much do each earn per day? $x = \text{men}$ & $y = \text{boys}$

$\textcircled{1} 4x + y = 760$

$\textcircled{2} 3x + 2y = 645$

\therefore Men earn \$175/day & boys earn \$60/day

4. Lt. Commander Data needed 50 L of a 60% hypo-spray solution to revive the unconscious crew of the *Enterprise*. All he had was a 30% solution and an 80% solution. How much of each should he mix together?

$$\frac{\sqrt{x}}{30\%} + \frac{\sqrt{y}}{80\%} = \frac{\sqrt{50L}}{60\%}$$

$\textcircled{1} x + y = 50$ (Volume)

$\textcircled{2} 0.3x + 0.8y = 0.6(50)$

\therefore He needs

20L of 30% &

30L of 80%

5. Scrooge McDuck has \$2.25 in nickels and dimes only. If there are 28 coins altogether, how many of each coin are there?

$\textcircled{1} x + y = 28$ (coins)

$\textcircled{2} 0.05x + 0.10y = 2.25$ (value)

\therefore He has 11 nickels & 17 dimes

6. The sum of Itchy's and Scratchy's ages is 47. Itchy is 11 years more than twice as old as Scratchy. How old are Itchy and Scratchy? $x = \text{Itchy}$ & $y = \text{Scratchy}$

① $x + y = 47$

② $x = 11 + 2y \rightarrow$ ③ $x - 2y = 11$ \therefore Itchy is 35 & Scratchy is 12.

7. Veronica flew 4 hours for a total of 2200 km with a tail wind. The return trip, with a head wind, took 5 hours. Find the speed of the plane in still air and the wind speed. $x = \text{plane}$ & $y = \text{wind}$

	D	r	t	
There	2200	$x+y$	4	①
Back	2200	$x-y$	5	②

① $4(x+y) = 2200$

② $5(x-y) = 2200$

\therefore The plane's speed was 495 km/h & the wind's speed was 55 km/h

8. Lisa invested \$15 000 into savings bonds. Some at 5.5% and some 6.5%. She earned \$925 in interest in one year. How much did she invest into each bond?

$\frac{x}{5.5\%} + \frac{y}{6.5\%} = \frac{15000}{1} + \frac{925}{0.055}$

① $x + y = 15000$

② $0.055x + 0.065y = 925$

Part D: Solving 3 variables and 3 equations.

\therefore Invested \$5000 @ 5.5%
& \$10000 @ 6.5%

#1) ① $x + y + 2z = 1$

② $2x - y + z = -1$

③ $3x + y + z = 4$

① $x + y + 2z = 1$

② $2x - y + z = -1$

② $2x - y + z = -1$

③ $3x + y + z = 4$

④ $3x + 3z = 0$

⑤ $5x + 2z = 3$

④ $3x + 3z = 0$
⑤ $5x + 2z = 3$ } \rightarrow $x = 1$ & $z = -1$; into eq ①

$1 + y - 2 = -1$
 $y - 1 = -1$
 $y = 2$

\therefore Sol'n (1, 2, -1)

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

Part E: Number of solutions: Indicate whether the following systems have none, one, or many solutions.

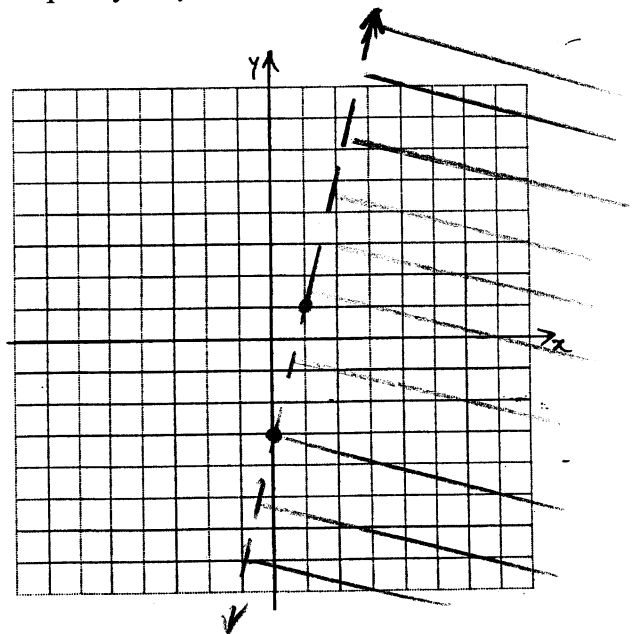
<p>#1) $4 + 12y = 16x \rightarrow y = \frac{4}{3}x - \frac{1}{3}$ $12x = 9y + 6 \rightarrow y = \frac{4}{3}x - \frac{2}{3}$</p> <p>$\therefore$ No Solution</p>	<p>#2) $1.2y + 0.8x = 4.8 \rightarrow 1.2y = -0.8x + 4.8$ $7.2 = 1.8y + 1.2x \rightarrow y = -\frac{2}{3}x + 4$</p> <p>$-1.2x + 7.2 = 1.8y$ $-\frac{2}{3}x + 4 = y \therefore$ Many Solutions</p>
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Part F: Linear Inequalities

#1. Answer the following for the following linear inequality: $-2y > -8x + 6$

$-2y > -8x + 6$
 $y < 4x - 3$
 ↳ the switch!

- Dashed
- Shade below



#2. Solve the system of inequalities by graphing. ① $y \geq -3x + 2$ & ② $y < 2x - 1$

- ①. shade above
 - Solid line
- ②. shade below
 - Dashed line

