

$$4.) \begin{cases} \textcircled{1} -6x - 2y + 2z = -8 \\ \textcircled{2} 3x - 2y - 4z = 8 \\ \textcircled{3} 6x - 2y - 6z = -18 \end{cases} \rightarrow \begin{array}{r} -6x - 2y + 2z = -8 \\ -3x + 2y + 4z = -8 \\ \hline -9x + 6z = -16 \end{array}$$

$$\begin{array}{r} -3x + 2y + 4z = -8 \\ + 6x - 2y - 6z = -18 \\ \hline 3x - 2z = -26 \end{array}$$

$$\begin{array}{r} -9x + 6z = -16 \\ 9x - 6z = -78 \\ \hline 0 = -94 \end{array}$$

$0 \neq -94$   
 No solution

$$5) \begin{cases} 3(x - y + 4z = 5) \\ 4x + 3y - 2z = 5 \end{cases} \rightarrow \begin{cases} 3x - 3y + 12z = 15 \\ 4x + 3y - 2z = 5 \end{cases}$$


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$$\begin{cases} 2x + z = 2 \\ 7x + 10z = 20 \end{cases}$$

$$-10 (2x + z = 2) \rightarrow \begin{cases} -20x - 10z = -20 \\ 7x + 10z = 20 \end{cases}$$

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$$\begin{cases} -13x = 0 \\ x = 0 \end{cases}$$

$$(0, 3, 2)$$

$$\begin{cases} z = 2 \\ y = 3 \end{cases}$$

①

x: par 3

y: par 4

z: par 5

$$y = 2z$$

$$3x + 4y + 5z = 70$$

$$x + y + z = 18$$

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$$\textcircled{4} \textcircled{0} (4B + 3L + 8R = \$3.25$$

$$\textcircled{2} (10B + 8L + 4R = \$5.90$$

$$\textcircled{3} (3B + 2L + 15R = \$3.70) - 4$$

$$32B + 24L + 64R = 26$$

$$-30B - 24L - 12R = -17.7$$

$$\boxed{2B + 52R = 8.30}$$

$$10B + 8L + 4R = 5.90$$

$$-12B - 8L - 60R = -14.8$$

$$\boxed{-2B - 56R = -8.9}$$

$$2.) \quad x = -4z - 19$$

$$y = 5x + z - 4$$

$$-5y - z = 25$$

$$y = 5(-4z - 19) + z - 4$$

$$y + 19z = -99$$

$$\begin{array}{l} -5y - z = 25 \\ 5(y + 19z = -99) \end{array}$$

$$-5y - z = 25$$

$$5y + 95z = -495$$

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$$94z = -470$$

$$z = -5$$

$$\textcircled{2} \quad x + y + z = 189$$

$$x = y - 28$$

$$y = x + z - 21$$

$$y + 21 = x + z$$

$$x + y + z = 189$$

$$-x + y - z = -21$$

$$x - y = -28$$

$$2y = 168$$

$$y =$$

3

$$\begin{array}{l} 2C + 3M + 1B = 85 \text{ flour} \\ 2C + 2M + 3B = 70 \text{ eggs} \\ 1C + 2M + 2B = 60 \text{ sugar} \end{array}$$

## 8.7: Solving Non-Linear systems of equations and inequalities

### Steps for equations

- 1) Decide whether to use elimination or substitution
- 2) Solve



$$1) \quad x^2 + (y) - 3 = 0$$

$$x + y = 1$$

$$y = 1 - x$$

$$x^2 + 1 - x - 3 = 0$$

$$x^2 - x - 2 = 0$$

$$(x - 2)(x + 1) = 0$$

$$x = 2, -1$$

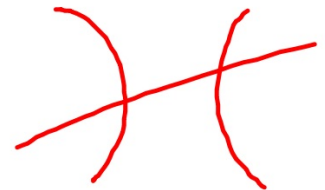
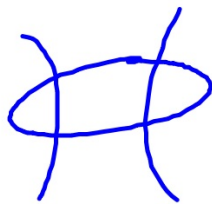
$$\begin{array}{l} (2, -1) \\ (-1, 2) \end{array}$$



$$2) \quad 2x^2 - x - y^2 + 55 = 0$$

$$-x + y = 5$$

$$y = (x + 5)$$



$$2x^2 - x - (x + 5)^2 + 55 = 0$$

$$x^2 - 11x + 30 = 0$$

$$(x - 6)(x - 5) = 0$$

$$x = 6, 5$$

$(5, 10)$
$(6, 11)$

$$3) \quad 9x^2 + y^2 - 90x + 216 = 0$$
$$x^2 - y^2 - 16 = 0$$

$$10x^2 - 90x + 200 = 0$$
$$10(x^2 - 9x + 20) = 0$$
$$10(x-4)(x-5) = 0$$
$$x = 4, 5$$

$x=4$	$x=5$
$x^2 - y^2 - 16 = 0$	$25 - y^2 - 16 = 0$
$16 - y^2 - 16 = 0$	$y^2 = 9$
$y^2 = 0$	$y = \pm 3$
$y = 0$	
$(4, 0)$	$(5, 3)$ $(5, -3)$

$$\textcircled{2} (y+1)^2 < 10(x+1)$$

$$(x-2)^2 + (y+1)^2 > 4$$

Focus:

$$4p = 10$$

$$p = 2.5$$

$(0,0)$

$1 < 10$  True

