

## Exercise 1.4

1. Use the elimination method to solve the following pairs of simultaneous linear equations:

$$\begin{aligned} \text{(a)} \quad & -2x + y = 2 \\ & 2x + y = -6 \end{aligned}$$

Add  
إلحاق

$$2y = -4$$

$$y = \frac{-4}{2} = -2$$

نعوض فأى معادله بقية y

$$-2x - 2 = 2$$

$$-2x = 2 + 2$$

$$-2x = 4$$

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

$$\begin{aligned} \text{(c)} \quad & 2x + y = 4 \quad \rightarrow \textcircled{1} \\ & 4x - 3y = 3 \quad \rightarrow \textcircled{2} \end{aligned}$$

Multiply ① by 3

$$6x + 3y = 12$$

$$4x - 3y = 3$$

إلحاق

$$10x = 15$$

$$x = \frac{15}{10} = \frac{3}{2}$$

$$2 \left( \frac{3}{2} \right) + y = 4$$

$$3 + y = 4$$

$$y = 4 - 3 = 1$$

5. If the following system of linear equations has infinitely many solutions, find the value of  $k$ .

$$\begin{aligned} & 6x - 4y = 2 \\ & -3x + 2y = k \end{aligned}$$

$$\frac{-3}{6} = \frac{k}{2}$$

$$\frac{-1}{2} = \frac{k}{2}$$

$$2x - \frac{1}{2} = k$$

$$k = -1$$

طريقة اخرى

$$\frac{2}{-4} = \frac{k}{2}$$

$$k = 2 * \frac{2}{-4} = \frac{4}{-4} = -1$$

$$k = -1$$

# Exercise 1.4\*

2. Write down a possible set of values of the numbers  $a$  and  $b$  for which the simultaneous equations:

(a)  $2x + 3y = 4$  have infinitely many solutions

$$ax + 6y = b$$

(b)  $4x - 6y = 1$  have no solutions

$$2x + ay = b$$

a)  $a = 2 * 2 = 4$

$$b = 4 * 2 = 8$$

b)  $a = -6 * \frac{1}{2} = -3$

$$b \neq 1 * \frac{1}{2}$$

$b \neq \frac{1}{2}$  [  $b$  takes any number except  $\frac{1}{2}$  ]

4. Solve the following systems of equations:

(a)  $x - 3y + 4z = 5$  (1)

$$2x + y + z = 3$$
 (2)

$$4x + 3y + 5z = 1$$
 (3)

① & ②

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

$$6x + 3y + 3z = 9$$

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$$7x + 7z = 14$$

$$x + z = 2 \rightarrow \textcircled{4}$$

① & ③

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

$$4x + 3y + 5z = 1$$

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$$5x + 9z = 6 \rightarrow \textcircled{5}$$

③

Solve ④ & ⑤

$$x + z = 2 \rightarrow \textcircled{4}$$

$$5x + 9z = 6 \rightarrow \textcircled{5}$$

Multiply ④ by 5

$$5x + 5z = 10$$

$$5x + 9z = 6$$

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$$-4z = 4$$

$$z = -1$$

$$x - 1 = 2$$

$$x = 3$$

④

بالعويض عن  $x$  بـ  $2 - z$  في (3)

$$\therefore 2(3) + y - 1 = 3$$

$$6 + y - 1 = 3$$

$$5 + y = 3$$

$$y = 3 - 5 = -2$$

$x = 3$ $y = -2$ $z = -1$
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