

Simultaneous Linear Equations

Name: _____

Class: _____ ()

1. Solve the following simultaneous linear equations using the method of elimination.

(a) $\begin{cases} x - y = 0 \\ 3x + 2y = 10 \end{cases}$

(b) $\begin{cases} x + 1 = y \\ 3x + y = 5 \end{cases}$

(c) $\begin{cases} x = -y \\ x + 2y = 1 \end{cases}$

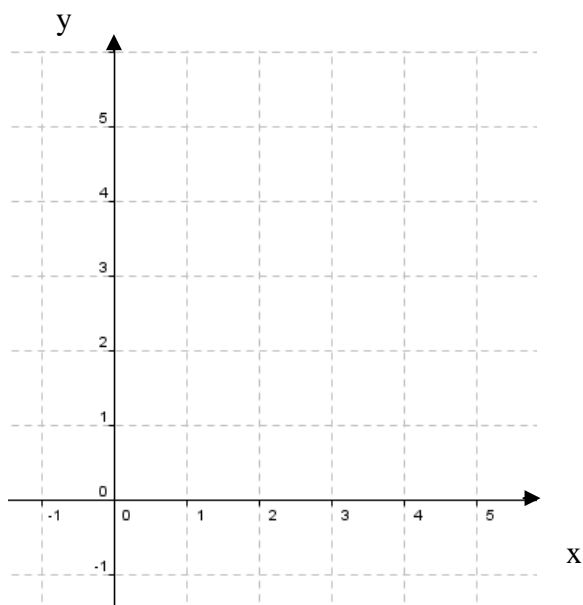
2. Plot the graphs and locate the point of intersection.

(a) $x - y = 0$

| | | | |
|---|---|---|---|
| x | 0 | 1 | 2 |
| y | | | |

$3x + 2y = 10$

| | | | |
|---|---|---|---|
| x | 0 | 2 | 4 |
| y | | | |



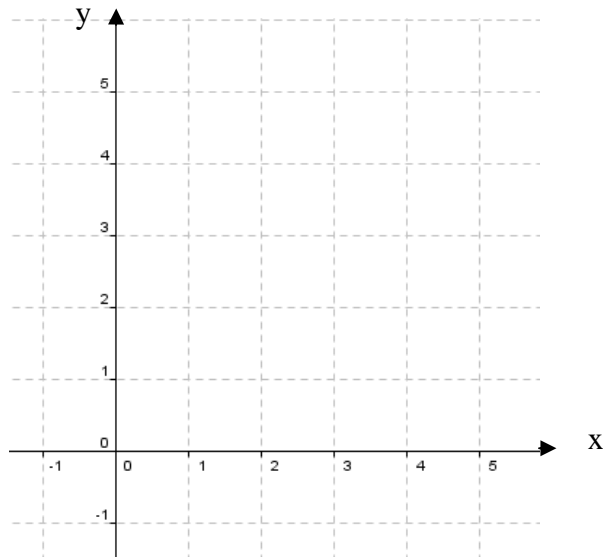
The point of intersection is (_____ , _____).

(b) $x + 1 = y$

| | | | |
|---|---|---|---|
| x | 0 | 1 | 2 |
| y | | | |

$3x + y = 5$

| | | | |
|---|---|---|---|
| x | 0 | 1 | 2 |
| y | | | |



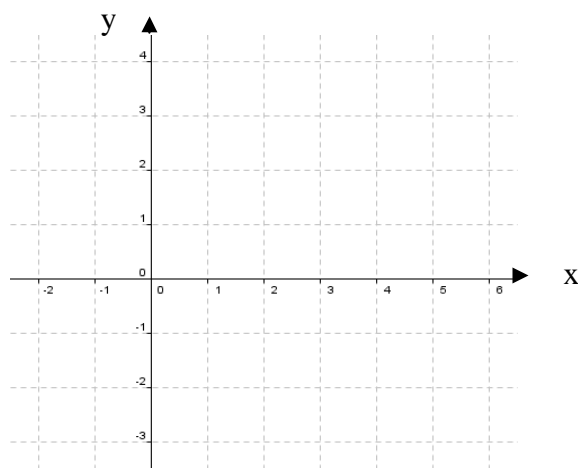
The point of intersection is (_____ , _____).

(c) $x = -y$

| | | | |
|---|---|---|---|
| x | 0 | 1 | 2 |
| y | | | |

$x + 2y = 1$

| | | | |
|---|---|---|---|
| x | 1 | 3 | 5 |
| y | | | |



The _____.

3. Study the answers to questions 1 and 2. What can you observe?

4. Discuss your observation with your partner. Explain your observation.

Conclusion:

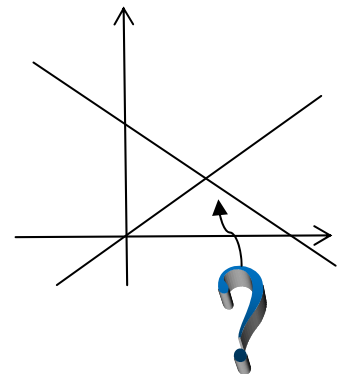
5. Exercise

a) Without drawing the graph, find the point of intersection of the following two straight lines.

$$y - x = 0$$

and

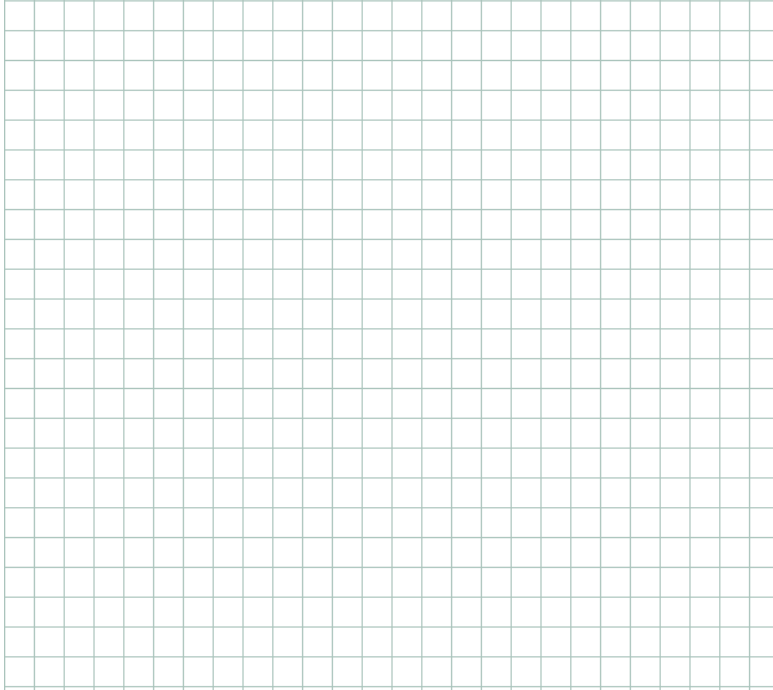
$$2x + y = 9$$



The _____.

b i) Solve the following equations graphically.

$$\begin{cases} 3x + y = 1 \\ x + 5y = 26 \end{cases}$$



The _____.

ii) Solve the equations in part (i) using the method of elimination or substitution.

iii) Compare the answers to parts (i) and (ii), which one is more accurate?

iv) What is/are the disadvantage(s) of solving simultaneous linear equations by the graphical method?



Suggested Answers

1a) $x - y = 0$ ----- (i)
 $3x + 2y = 10$ ---- (ii)
(i) $\times 2$ + (ii),
 $2x - 2y + 3x + 2y = 10$
 $5x = 10$
 $x = 2$
 $y = 2$
The solution is $x=2, y=2$

b) $x+1=y$ --- (i)
 $3x+y=5$ ---(ii)
(i) + (ii),
 $x+1+3x+y = y+5$
 $4x+1 = 5$
 $x=1$
 $y=2$
The solution is $x=1, y=2$

c) $x=-y$ ---(i)
 $x+2y=1$ ---(ii)
(ii)-(i),
 $x+2y-x = 1+y$
 $2y=1+y$
 $y=1$
 $x=-1$
The solution is $x = -1, y = 1$

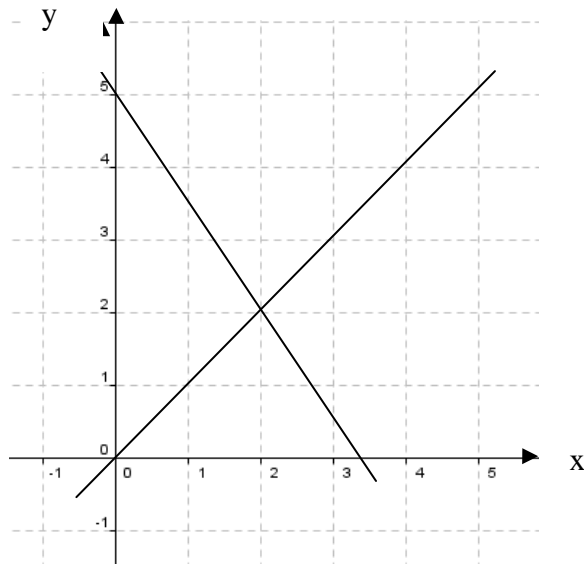
2. Plot the graphs and locate the point of intersection.

a) $x - y = 0$

$3x + 2y = 10$

| | | | |
|---|---|---|---|
| x | 0 | 1 | 2 |
| y | 0 | 1 | 2 |

| | | | |
|---|---|---|----|
| x | 0 | 2 | 4 |
| y | 5 | 2 | -1 |



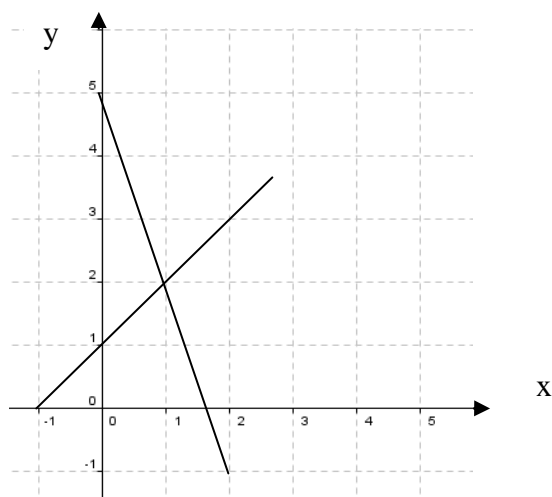
The point of intersection is (2 , 2).

b) $x + 1 = y$

$3x + y = 5$

| | | | |
|---|---|---|---|
| x | 0 | 1 | 2 |
| y | 1 | 2 | 3 |

| | | | |
|---|---|---|----|
| x | 0 | 1 | 2 |
| y | 5 | 2 | -1 |



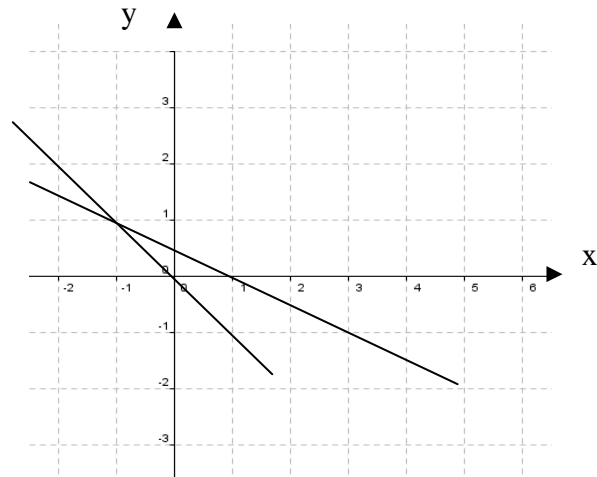
The point of intersection is (1 , 2).

c) $x = -y$

| | | | |
|---|---|----|----|
| x | 0 | 1 | 2 |
| y | 0 | -1 | -2 |

$x + 2y = 1$

| | | | |
|---|---|----|----|
| x | 0 | 1 | 2 |
| y | 0 | -1 | -2 |



The point of intersection is $(-1, 1)$.

Conclusion: The intersection point of the graph of the two linear equations is the solution of the simultaneous linear equations.

5 a) $y - x = 0$

$2x + y = 9$

$x = y$

$2x + y = 9$

$2x + x = 9$

$3x = 9$

$x = 3$

$y = 3$

The solution is $x=3, y=3$

As the coordinates of the intersection point are the same as the solution, the point of intersection is $(3,3)$.

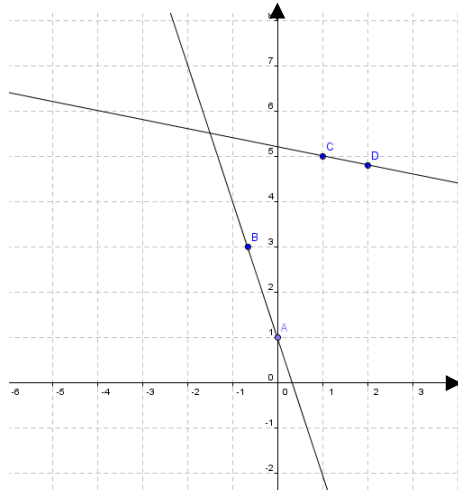
b i)

$$3x + y = 1$$

| | | | |
|---|----|---|----|
| x | -1 | 0 | 1 |
| y | 4 | 1 | -2 |

$$x + 5y = 26$$

| | | | |
|---|----|---|---|
| x | -4 | 1 | 6 |
| y | 6 | 5 | 4 |



The solution is $x=-1.5, y=5.5$

ii) Put $y=1-3x$ into $x+5y=26$

$$x+5(1-3x)=26$$

$$x+5-15x=26$$

$$x=-1.5$$

$$y=1-3(-1.5)=5.5$$

The solution is $x=-1.5, y=5.5$

iii) The answer in part (ii) is more accurate.

iv) e.g. It is time consuming to draw the graph

Reading the solution from the graph may not be accurate