MATHEMATICS

Stage 4

Number and Algebra

Linear Relationships

Teacher: Chi Binh Le

Exam Equivalent Time: 171 minutes *(based on allocation ~1.25 min/mark)*

norWEST CHRISTIAN COLLEGE
STRENGTH OF PURPOSE

Questions

1. D Linear Relationships (250531) Core

The table below has a pattern. The top and bottom numbers are connected by a rule.

Top number	**1**	**2**	**3**	**4**	**...**	**?**
Bottom number	**3**	**6**	**9**	**12**	**...**	**27**

What is the top number when the bottom number is 27?

A. 5
B. 6
C. 9
D. 19

---

2. D Linear Relationships (250522) Core

The table below has a pattern. The top and bottom numbers are connected by a rule.

Top Number	**1**	**2**	**3**	**4**	**...**	**?**
Bottom Number	**4**	**8**	**12**	**16**	**...**	**28**

What is the top number when the bottom number is 28?

A. 5
B. 7
C. 12
D. 17

---

3. C Linear Relationships (250834) Core

Dress sizes					
Country A	6	8	10	12	14
Country B	36	38	40	42	44

What is the rule connecting dress sizes in Country A and Country B?

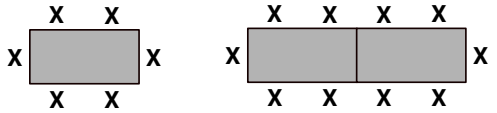
A. $\text{Country B} = \text{Country A} - 30$
B. $\text{Country B} = \text{Country A} + 30$
C. $\text{Country B} = (4 \times \text{Country A}) + 12$
D. $\text{Country B} = 6 \times \text{Country A}$

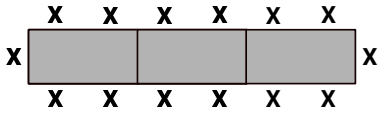
---

4. C Linear Relationships (250827) Core

Billy is setting up tables for a comedy night at his club.

An **X** is placed for every available seat at a table, as shown below.





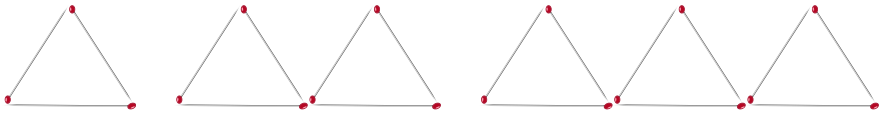
Which of these rules can be used to work out how many people can sit on any row of tables?

A. $\text{number of tables} \times 6$
B. $\text{number of tables} \div 2 - 2$
C. $\text{number of tables} \times 4 + 2$
D. $\text{number of tables} \times 4 - 2$

---

5. C Linear Relationships (252674) Core

Which rule correctly describes the pattern below?



A. $\textbf{The number of pins} = \textbf{The number of triangles} + 3$

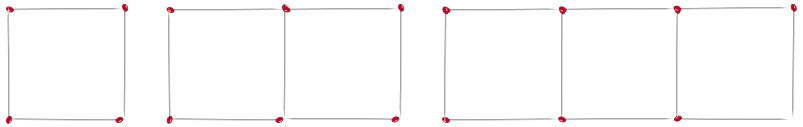
B. $\textbf{The number of pins} = \textbf{The number of triangles} + 5$

C. $\textbf{The number of pins} = \textbf{The number of triangles} \times 2$

D. $\textbf{The number of pins} = \textbf{The number of triangles} \times 3$

6. C Linear Relationships (252699) Core

Which rule correctly describes the pattern below?



A. $\textbf{The number of pins} = 2 \times \textbf{The number of squares} + 3$

B. $\textbf{The number of pins} = 3 \times \textbf{The number of squares} + 1$

C. $\textbf{The number of pins} = 1 \times \textbf{The number of squares} + 3$

D. $\textbf{The number of pins} = 4 \times \textbf{The number of squares}$

7. C Linear Relationships (250634) Core

This table shows the growth of a plant, in centimetres, over a 4 week period.

Week	1	2	3	4
Growth (cm)	3	4	5	6

The table also shows a pattern in the growth of the plant. The correct pattern connecting the week and the growth is:

A. $\textbf{Week} \times 3$

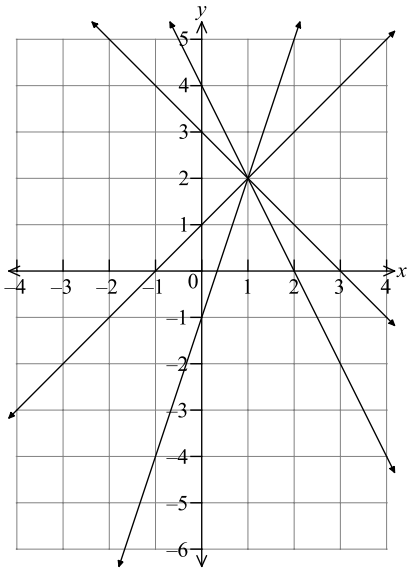
B. $\textbf{Week} \times 4 - 1$

C. $\textbf{Week} \times 2 + 1$

D. $\textbf{Week} + 2$

8. C Linear Relationships (253033) Core

What do all the lines on the following number plane have in common?



A. They all intersect at the point $(2, 1)$.

B. They are all parallel to each other.

C. They all intersect at the point $(1, 2)$.

D. They are all perpendicular to each other.

9. C Linear Relationships (250533) Core

This chart shows the longest run, in kilometres, that Deek ran each week over 4 weeks.

Week	1	2	3	4
Longest Run (km)	8	11	14	17

The chart also shows a pattern in Deek's running. The correct pattern connecting the week and the longest run is:

A. $\textbf{Week} \times 8$

B. $\textbf{Week} \times 2 + 6$

C. $\textbf{Week} \times 3 + 5$

D. $\textbf{Week} + 7$

10. C Linear Relationships (253146) Core

Which of the following points lies on the line $y = 10 + x$?

A. $(3, 7)$
B. $(-2, 8)$
C. $(2, -8)$
D. $(-6, -4)$

---

11. B Linear Relationships (253157) Core

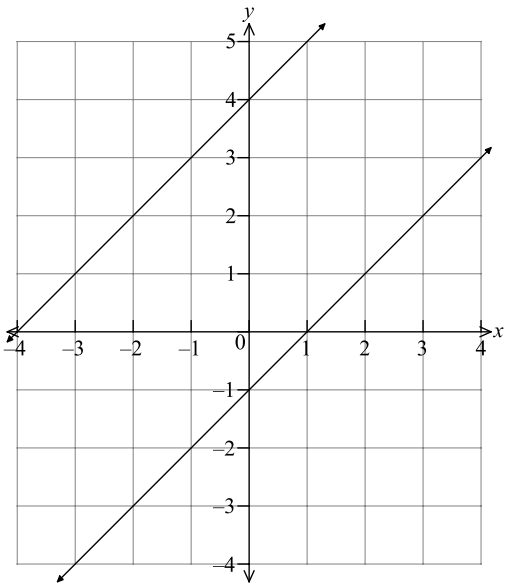
Which of the following points lies on the line $y = 2x - 4$?

A. $(0, 2)$
B. $(-2, 8)$
C. $(2, -1)$
D. $(-1, -6)$

---

12. B Linear Relationships (253044) Core

What do all the lines on the following number plane have in common?



A. They have the same y-intercept.
B. They are parallel to each other.
C. They both pass through the origin.
D. They are perpendicular to each other.

---

13. B Linear Relationships (253117) Core

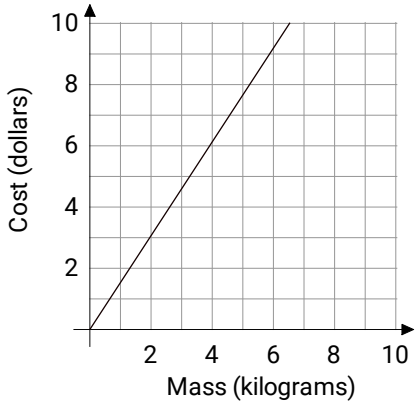
Paddy and Miffy each bought potatoes from the local farmers' market.

Paddy bought 2 kilograms for $2.50.

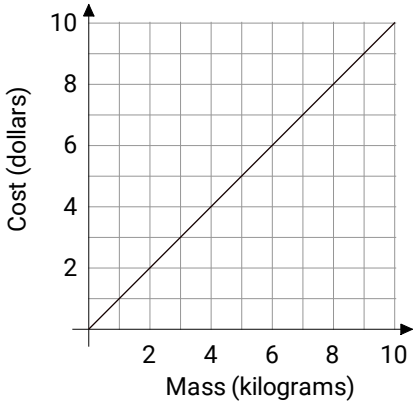
Miffy bought 6 kilograms for $7.50.

Which graph best represents the cost of potatoes at the farmers' market?

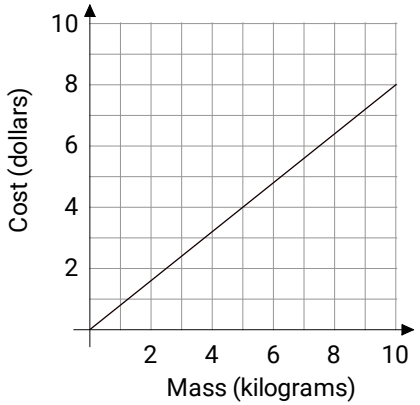
A.



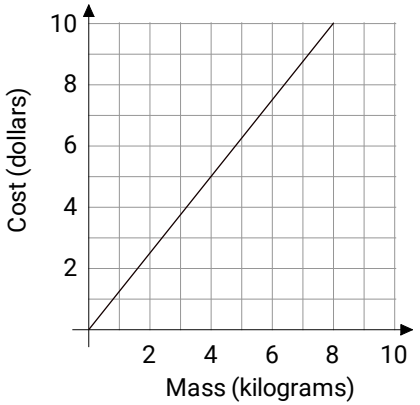
B.



C.

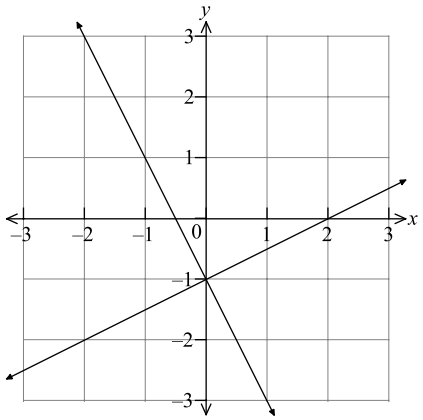


D.



14. B Linear Relationships (253051) Core

Which of the following is **not** true of the lines on the number plane below?



A. They have the same y-intercept.

B. They both pass through the point $(0, -1)$.

C. They constant value in the equations of both lines is -1.

D. They both pass through the point $(-1, 0)$.

---

15. B+ Linear Relationships (250655) Core

A plumber calculates the price of a job using a service fee and an amount per hour.

This table shows some of the job prices.

Hours	1	2	3	4
Job price	$90	$130	$170	$210

How are the jobs calculated?

A. $50 service fee + $40 per hour

B. $58 service fee + $32 per hour

C. $60 service fee + $30 per hour

D. $70 service fee + $20 per hour

---

16. B+ Linear Relationships (250670) Core

Jerry's wage is calculated using an amount per hour plus a travel allowance.

This table shows some of Jerry's wage amounts.

Hours	1	2	3	4
Wage	$85	$140	$195	$250

How are Jerry's wages calculated?

A. $40 per hour + $35 travel allowance

B. $60 per hour + $25 travel allowance

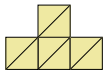
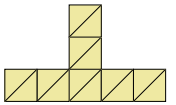
C. $55 per hour + $30 travel allowance

D. $45 per hour + $40 travel allowance

---

17. B+ Linear Relationships (252938) Core

Pepper uses matchsticks to make a pattern of shapes, as shown in the table below.

Shape number (N)	1 	2 	3 
Number of triangles (T)	2	8	14

The equation used to show the relationship between T and N is

A. $T = N + 1$

B. $T = 6N$

C. $T = 6N + 2$

D. $T = 6N - 4$

18. B+ Linear Relationships (250642) Core

Jennifer had 20 cupcakes for sale at the beginning of the day. The table shows the number of cupcakes at the beginning of each hour.

Hour	0	1	2	3
Cupcakes	20	16	12	8

The table also shows a pattern in the number of cupcakes sold. The correct pattern connecting the hour and the number of cupcakes is:

A. $20 - \text{Hour} \times 1$

B. $20 - \text{Hour} \times 4$

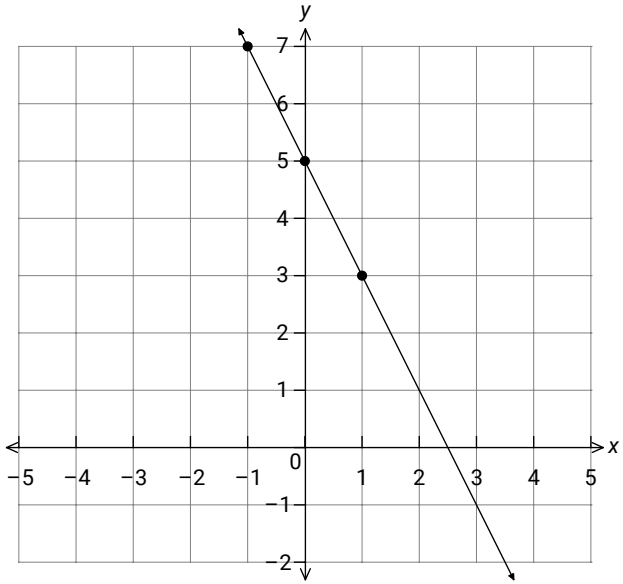
C. $20 + \text{Hour} \times 2$

D. $19 + \text{Hour}$

19. A Linear Relationships (253017) Core

Monique has correctly drawn the graph of $y = -2x + 5$ on the number plane below.

She used the points $(-1, 7)$, $(0, 5)$ and $(1, 3)$ to draw the line.



How many more different points could she have used to plot the line $y = -2x + 5$?

A. 0

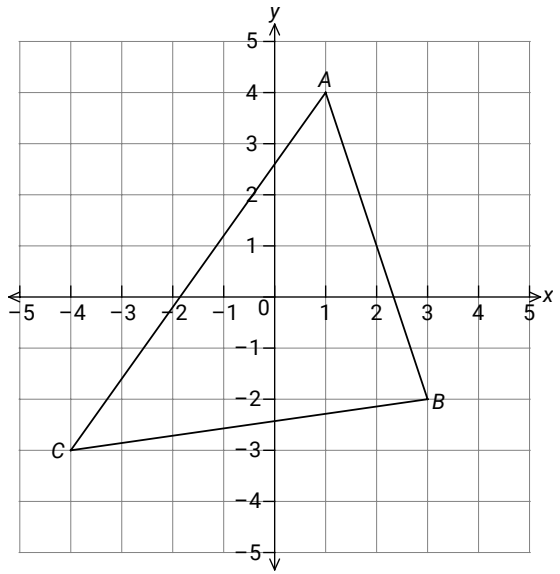
B. 2

C. 8

D. An infinite number

20. D Linear Relationships (250436) Core

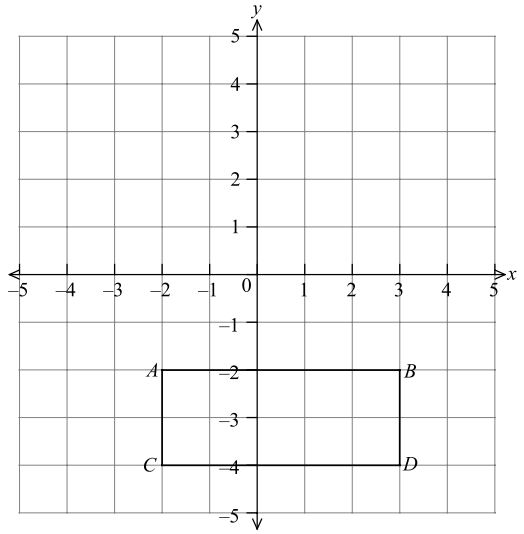
Christian draws a triangle on a number plane as shown below.



What are the coordinates of the point at vertex C? *(1 mark)*

21. D Linear Relationships (250430) Core

Karl draws a rectangle on a number plane as shown below.

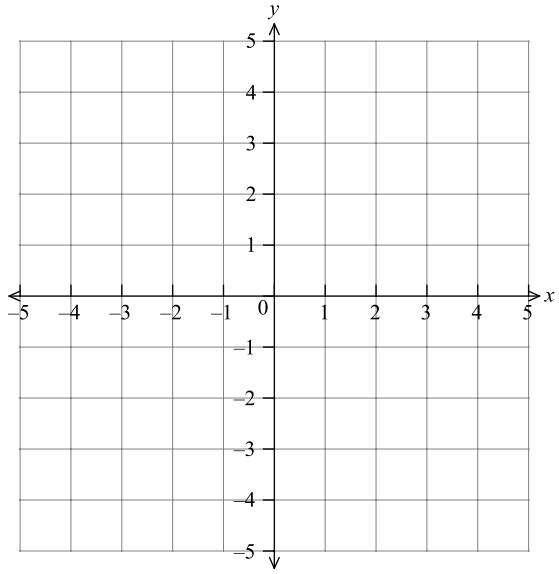


What are the coordinates of the point D? *(1 mark)*

22. D Linear Relationships (250335) Core

Plot and label the following points on the grid below. *(2 marks)*

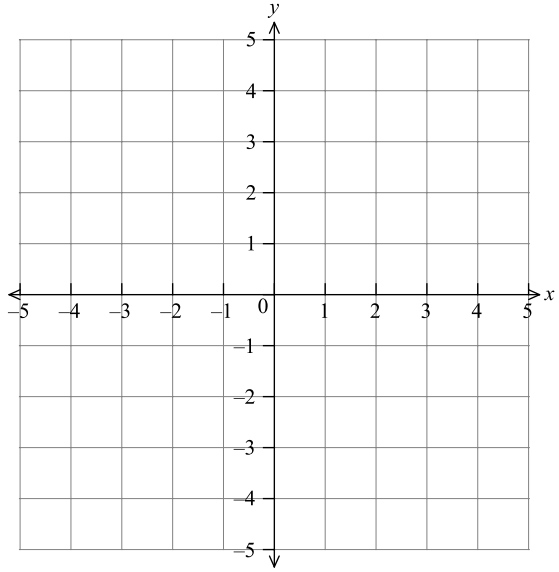
$A(-3,3)\ B(4,0)\ C(3,-2)\ D(-4,-2)$



23. D Linear Relationships (250299) Core

Plot and label the following points on the grid below. *(2 marks)*

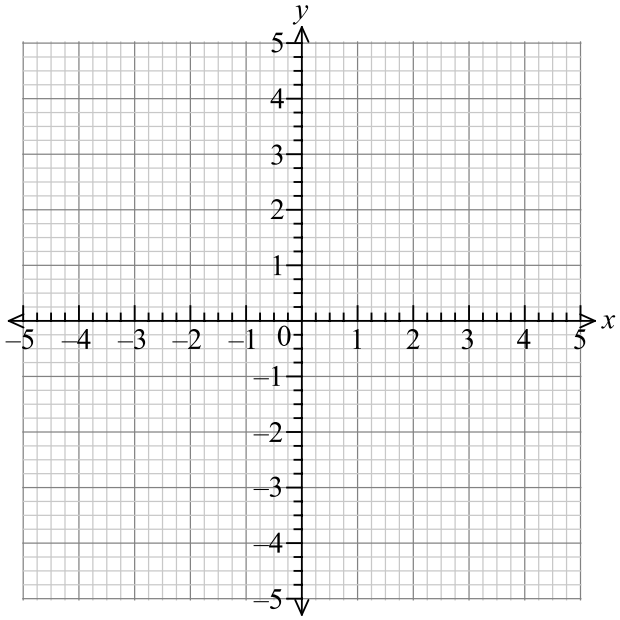
$A(2,3)\ B(-1,-4)\ C(-2,1)\ D(0,-1)$



24. D Linear Relationships (250510) Core

Plot and label the following points on the grid below. *(2 marks)*

$A(-2.5,-1.5)\ B(1.5,0)\ C(4.5,-2)\ D(-1.25,2)$



25. C Linear Relationships (252794) Core

Complete the table of values below for the given rule. *(2 marks)*

$y = 2 + x$

x	1	2	3	4
y				

26. C Linear Relationships (252820) Core

Complete the table of values below for the given rule. *(2 marks)*

$y = 2x + 1$

x	-2	-1	0	1
y				

27. C Linear Relationships (252851) Core

Complete the table of values below for the given rule. *(2 marks)*

$y = -x$

x	-2	-1	0	1	2
y					

---

28. C Linear Relationships (252860) Core

Complete the table of values below for the given rule. *(2 marks)*

$v = 4u - 3$

u	-2	-1	0	1	2
v					

---

29. C Linear Relationships (250840) Core

A surfboard can be hired for different numbers of hours, as shown in the table below.

Number of hours	1	2	3	4
Cost in dollars	35	50	65	80

What is the rule connecting the number of hours of surfboard hire and the cost in dollars? *(2 marks)*

---

30. C Linear Relationships (250849) Core

A weekly gym membership can be purchased for different numbers of classes, as shown in the table below.

Number of classes	1	2	3	4
Cost in dollars	42	72	102	132

What is the rule connecting the number of classes purchased and the cost in dollars? *(2 marks)*

---

31. C Linear Relationships (252871) Core

a. Complete the table of values below for the rule $y = 5 - x$. *(2 marks)*

x	-1	0	1	2
y				

b. Use the table to list the coordinates of the points. *(2 marks)*

---

32. C Linear Relationships (252893) Core

a. Complete the table of values below for the rule $y = 4x - 7$. *(2 marks)*

x	-1	0	1	2
y				

b. Use the table to list the coordinates of the points. *(2 marks)*

---

33. B Linear Relationships (253121) Core

Renee and Leisa are saving money so they can visit their grandmother on a holiday.

Renee has $100 and plans to save $30 each week.

Leisa has $200 and plans to save $10 each week.

a. Write an equation to represent

(i) Renee's savings *(1 mark)*

(ii) Leisa's savings *(1 mark)*

b. Complete the following tables of values for the equations above. *(2 marks)*

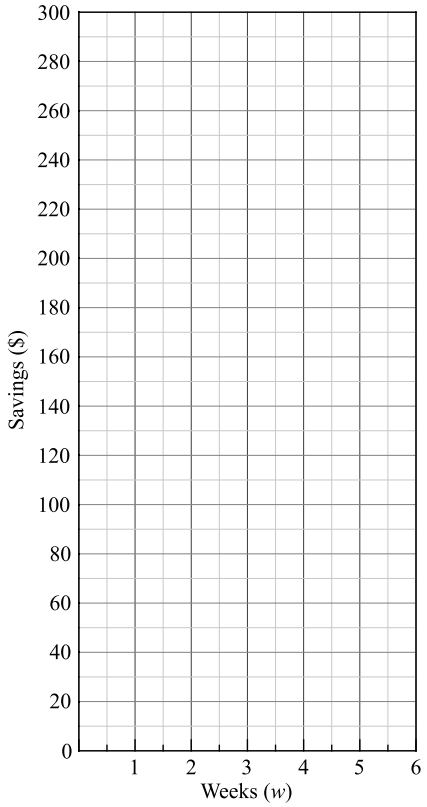
Renee's savings

Weeks (w)	0	1	2	3
Savings (s)				

Leisa's savings

Weeks (w)	0	1	2	3
Savings (s)				

c. Using the tables of values, graph both equations on the number plane below. Be sure to extend your lines to the end of the grid. *(2 marks)*



d. After how many weeks will Renee and Leisa have saved the same amount? *(1 mark)*

34. B Linear Relationships (250794) Core

The table below has a pattern. The top and bottom numbers are connected by a rule.

Top Number	21	18	15	12
Bottom Number	7	6	5	4

a. What is the rule connecting the top number and the bottom number? *(2 marks)*

b. What is the bottom number when the top number is -6? *(2 marks)*

35. B Linear Relationships (250801) Core

The table below has a pattern. The top and bottom numbers are connected by a rule.

Top Number	1	2	3	4
Bottom Number	0	-1	-2	-3

a. What is the rule connecting the top number and the bottom number? *(2 marks)*

b. What is the bottom number when the top number is 21? *(2 marks)*

36. B+ Linear Relationships (250758) Core

Sabre is saving to buy a new skateboard.

After one week she has saved $11.

She then saves the same amount of money each week.

Week	1	2	3	4
Total Amount Saved	$11	$18	$25	$32

a. State the rule linking the week and the total amount saved. *(2 marks)*

b. How much money will Sabre have saved by the end of week 10? *(2 marks)*

37. B+ Linear Relationships (250764) Core

The table below has a pattern. The top and bottom numbers are connected by a rule.

Top Number	2	4	6	8
Bottom Number	8	16	24	32

a. What is the rule connecting the top number and the bottom number? *(2 marks)*

b. What is the bottom number when the top number is 15? *(2 marks)*

---

38. B+ Linear Relationships (253177) Core

Verify that the points $(1, 1)$ and $(-2, 7)$ lie on the line $y = -2x + 3$? *(3 marks)*

---

39. B+ Linear Relationships (253161) Core

Verify that the points $(2, 5)$ and $(-1, -1)$ lie on the line $y = 2x + 1$? *(3 marks)*

---

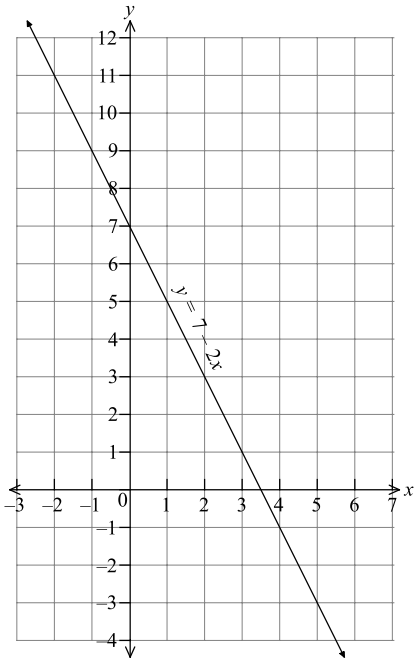
40. B+ Linear Relationships (253181) Core

Verify that the points $(1, -1)$ and $(-7, 3)$ lie on the line $x + 2y = -1$? *(3 marks)*

---

41. B+ Linear Relationships (253210) Core

Use the graph of $y = 7 - 2x$ below to find the solution to the equation $7 - 2x = -3$. *(2 marks)*

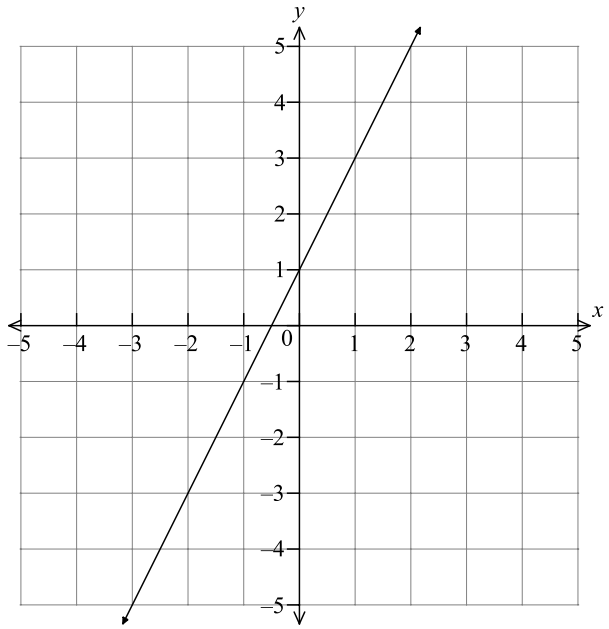


---

42. B+ Linear Relationships (252986) Core

a. Complete the table of values using the graph of the straight line below. *(2 marks)*

x	-2	-1	0	1	2
y					

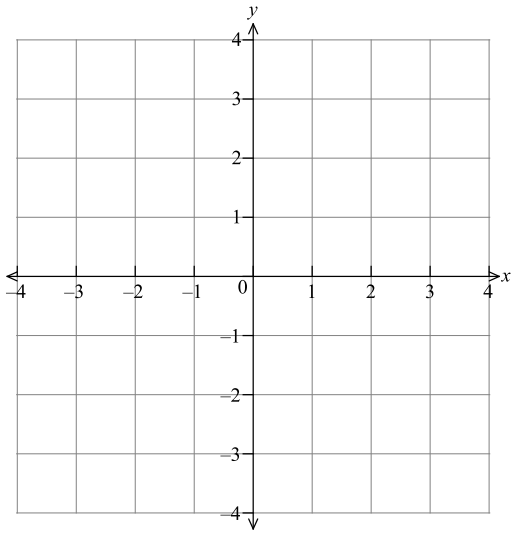


b. Using either the table or the graph, state the rule connecting x and y. *(1 mark)*

43. B+ Linear Relationships (252954) Core

a. Plot the points from the table on the number plane below and join the points using a ruler. *(2 marks)*

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

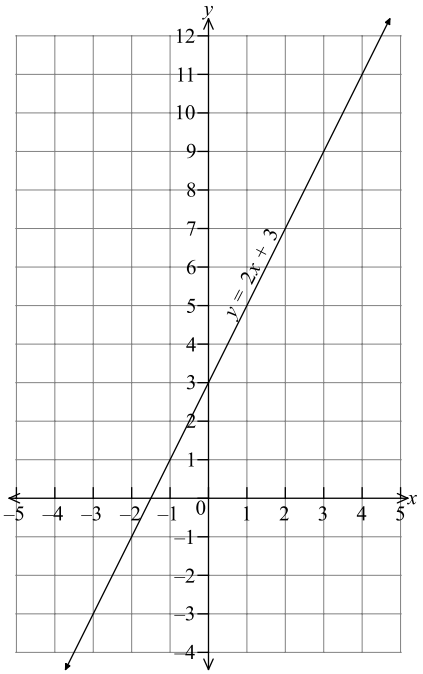


b. What do you notice about the points? *(1 mark)*

c. Using either the table or the graph, state the rule connecting x and y. *(1 mark)*

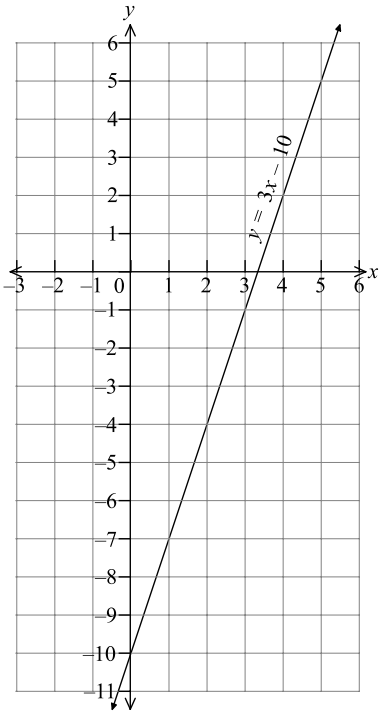
44. B+ Linear Relationships (253183) Core

Use the graph of $y = 2x + 3$ below to find the solution to the equation $2x + 3 = 11$. *(2 marks)*



45. A Linear Relationships (253216) Core

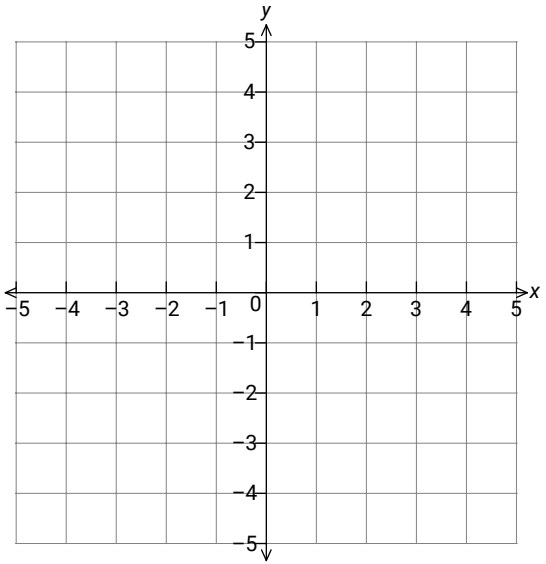
Use the graph of $y = 3x - 10$ below to find the solution to the equation $3x - 10 = -1$. *(2 marks)*



46. A Linear Relationships (252970) Core

a. Plot the points from the table on the number plane below and join the points using a ruler. *(2 marks)*

x	-2	-1	0	1	2
y	5	4	3	2	1



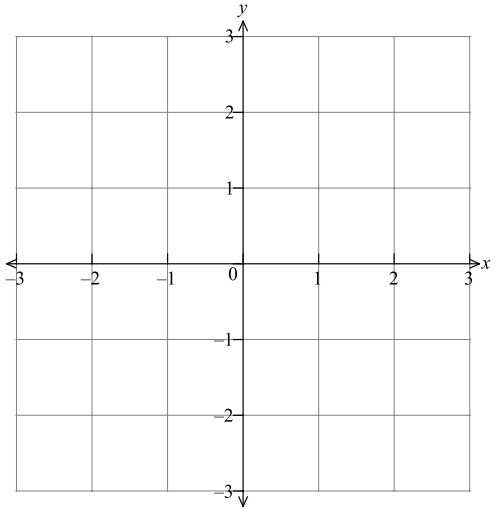
b. What do you notice about the points? *(1 mark)*

c. Using either the table or the graph, state the rule connecting x and y. *(1 mark)*

47. A Linear Relationships (252978) Core

a. Plot the points from the table on the number plane below and join the points using a ruler. *(2 marks)*

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



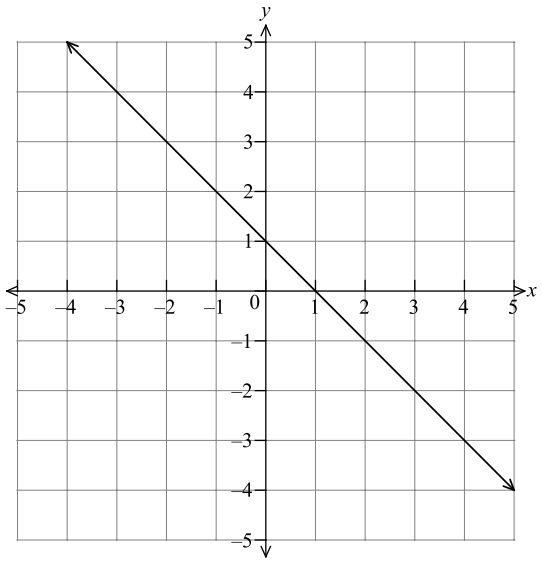
b. What do you notice about the points? *(1 mark)*

c. Using either the table or the graph, state the rule connecting x and y. *(1 mark)*

48. A Linear Relationships (252989) Core

a. Complete the table of values using the graph of the straight line below. *(2 marks)*

x	-2	-1	0	1	2
y					



b. Using either the table or the graph, state the rule connecting x and y. *(1 mark)*

---

49. A Linear Relationships (252993) Core

a. Complete the tables of values below for each given rule. *(3 marks)*

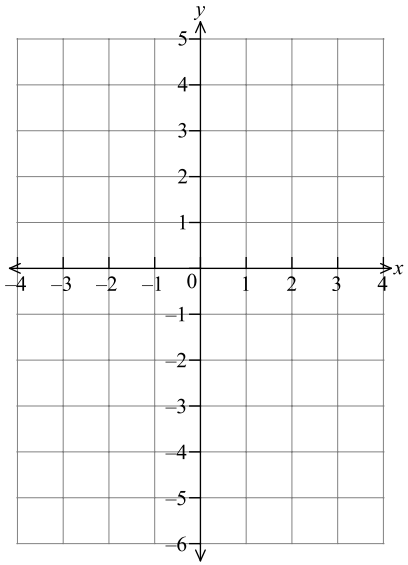
$y = 2x + 1$

x	-1	0	1	2
y				

$y = x - 2$

x	-1	0	1	2
y				

b. On the number plane below, graph the equations from part (a). *(2 marks)*



c. Using the graph, find the point of intersection of the two lines. *(1 mark)*

---

50. A Linear Relationships (253026) Core

a. Complete the tables of values below for each given rule. *(3 marks)*

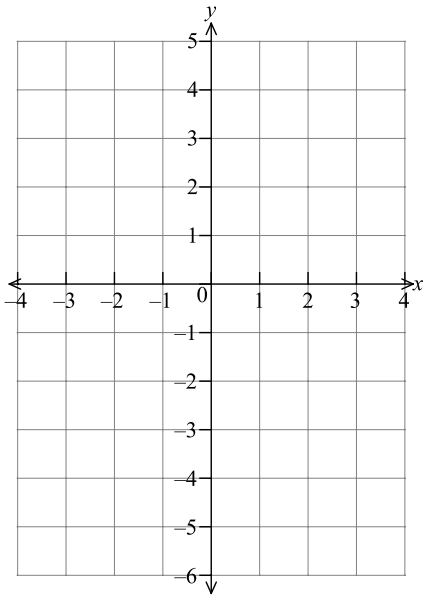
$y = 3 - x$

x	-1	0	1	2
y				

$y = 3x - 1$

x	-1	0	1	2
y				

b. On the number plane below, graph the equations from part (a). *(2 marks)*



c. Using the graph, find the point of intersection of the two lines. *(1 mark)*

Worked Solutions

1. D Linear Relationships (250531) Core

Top number $\times$ 3 = Bottom number

Top number $\times$ 3 = 27

$\therefore$ Top number $= \dfrac{27}{3} = 9$

$\Rightarrow C$

2. D Linear Relationships (250522) Core

Top number $\times$ 4 = Bottom number

Top number $\times$ 4 = 28

$\therefore$ Top number $= \dfrac{28}{4} = 7$

$\Rightarrow B$

3. C Linear Relationships (250834) Core

Rule: Country B = Country A + 30

$\Rightarrow B$

4. C Linear Relationships (250827) Core

Consider Option C:

1st table: $1 \times 4 + 2 = 6$ people

2nd table: $2 \times 4 + 2 = 10$ people

3rd table: $3 \times 4 + 2 = 14$ people

$\therefore$ number of tables $\times 4 + 2$ is the correct rule.

$\Rightarrow C$

5. C Linear Relationships (252674) Core

Number of triangles (t)	1	2	3	$\cdots$
Number of pins (p)	3	6	9	$\cdots$

$\therefore$ The number of pins = Number of triangles $\times$ 3

$\Rightarrow D$

6. C Linear Relationships (252699) Core

Number of squares	1	2	3
Number of pins	4	7	10

$\therefore$ The number of pins $= 3 \times$ Number of squares $+ 1$
$\Rightarrow B$

---

7. C Linear Relationships (250634) Core

Consider Option D : Week $+ 2$

Week $1 \longrightarrow 1 + 2 = 3 \checkmark$
Week $2 \longrightarrow 2 + 2 = 4 \checkmark$
Week $3 \longrightarrow 3 + 2 = 5 \checkmark$
Week $4 \longrightarrow 4 + 2 = 6 \checkmark$

$\Rightarrow D$

---

8. C Linear Relationships (253033) Core

The lines all pass through the point $(1, 2)$.
$\therefore$ They all intersect at the point $(1, 2)$.
$\Rightarrow C$

---

9. C Linear Relationships (250533) Core

Consider Option C : Week $\times 3 + 5$

Week $1 \longrightarrow 1 \times 3 + 5 = 8$ ✓
Week $2 \longrightarrow 2 \times 3 + 5 = 11 \checkmark$
Week $3 \longrightarrow 3 \times 3 + 5 = 14 \checkmark$
Week $4 \longrightarrow 4 \times 3 + 5 = 17 \checkmark$

$\Rightarrow C$

---

10. C Linear Relationships (253146) Core

Check each option by substituting into $y = 10 + x$

Option A: $7 \neq 10 + 3$
Option B: $8 = 10 + -2$ ✓
Option C: $-8 \neq 10 + 2$
Option D: $-4 \neq 10 + -6$
$\therefore (-2, 8)$ lies on the line $y = 10 + x$
$\Rightarrow B$

---

11. B Linear Relationships (253157) Core

Check each option by substituting into $y = 2x - 4$

Option A: $2 \neq 2 \times 0 - 4 = -4$
Option B: $8 \neq 2 \times (-2) - 4 = -8$
Option C: $-1 \neq 2 \times 2 - 4 = 0$
Option D: $-6 = 2 \times (-1) - 4 = -6$ ✓

$\therefore (-1, -6)$ lies on the line $y = 2x - 4$
$\Rightarrow B$

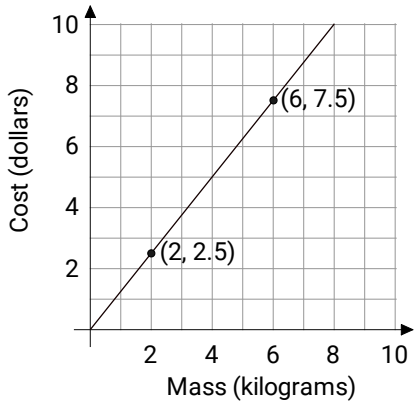
---

12. B Linear Relationships (253044) Core

The lines are parallel.
$\Rightarrow B$

---

13. B Linear Relationships (253117) Core



$\Rightarrow D$

---

14. B Linear Relationships (253051) Core

Neither of the lines pass through the point $(-1, 0)$.
$\Rightarrow D$

15. B+ Linear Relationships (250655) Core

Testing Option A equation with the table values:

$90 = 50 + 1 \times 40$ ✓
$130 = 50 + 2 \times 40$ ✓
$170 = 50 + 3 \times 40$ ✓
$210 = 50 + 4 \times 40$ ✓

$\Rightarrow A$

16. B+ Linear Relationships (250670) Core

Testing Option C equation with the table values:

$85 = 1 \times 55 + 30$ ✓
$140 = 2 \times 55 + 30$ ✓
$195 = 3 \times 55 + 30$ ✓
$250 = 4 \times 55 + 30$ ✓

$\Rightarrow C$

17. B+ Linear Relationships (252938) Core

T increases by 6 each shape.
Consider $T = 6N–4$:
When $N = 1$, $T = 6 \times 1 - 4 = 2$
When $N = 2$, $T = 6 \times -4 = 8$
When $N = 3$, $T = 6 \times -4 = 14$
$\therefore T = 6N - 4$ is correct
$\Rightarrow D$

18. B+ Linear Relationships (250642) Core

Consider Option B : $20 - \text{Hour} \times 4$

Hour $0 \longrightarrow 20 - 4 \times 0 = 20$✓
Hour $1 \longrightarrow 20 - 4 \times 1 = 16$✓
Hour $2 \longrightarrow 20 - 4 \times 2 = 12$✓
Hour $3 \longrightarrow 20 - 4 \times 3 = 8$ ✓

$\Rightarrow B$

19. A Linear Relationships (253017) Core

Straight lines are made up of an infinite number of points.
$\Rightarrow D$

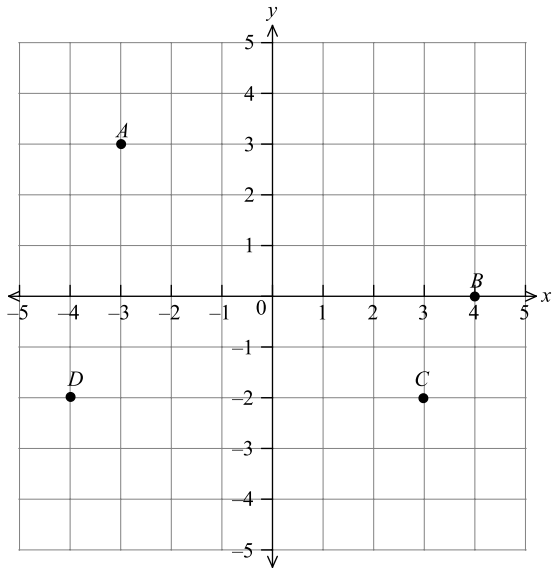
20. D Linear Relationships (250436) Core

Coordinates are: $C(-4, -3)$

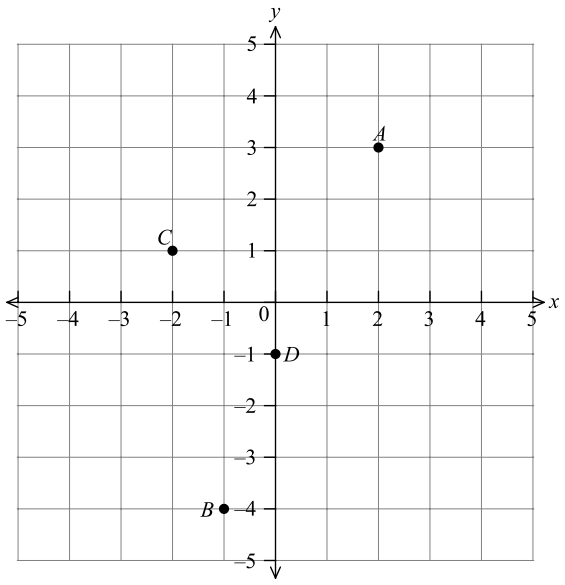
21. D Linear Relationships (250430) Core

Coordinates are: $D(3, -4)$

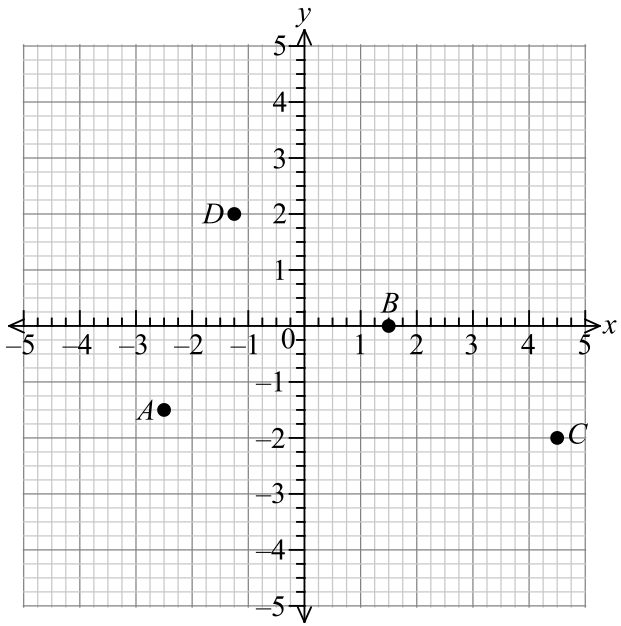
22. D Linear Relationships (250335) Core



23. D Linear Relationships (250299) Core



24. D Linear Relationships (250510) Core



25. C Linear Relationships (252794) Core

x	1	2	3	4
y	$2+1=3$	$2+2=4$	$2+3=5$	$2+4=6$

26. C Linear Relationships (252820) Core

x	-2	-1	0	1
y	$2\times-2+1=-1$	$2\times-1+1=-1$	$2\times0+1=1$	$2\times1+1=3$

27. C Linear Relationships (252851) Core

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

28. C Linear Relationships (252860) Core

u	-2	-1	0	1	2
v	$4\times-2-3=-11$	$4\times-1-3=-7$	$4\times0-3=-3$	$4\times1-3=1$	$4\times2-3=5$

29. C Linear Relationships (250840) Core

Firstly, look at the increase in the cost with each hour of hire

$\longrightarrow$ 35, 50, 65, 80 $\longrightarrow$ The price increases by \$15 every hour

Secondly, if we look at the difference between 35 and 15 in the first hour we get 20 which needs to be added to each hiring fee

$\therefore$ Rule: Cost in dollars $= 15 \times$ Number of hours $+ 20$

30. C Linear Relationships (250849) Core

Firstly, look at the increase in the cost with each additional class

$\longrightarrow$ 42, 72, 102, 132 $\longrightarrow$ The cost increases by \$30 every class

Secondly, if we look at the difference between 42 and 30 in the first class we get 12 which needs to be added to each membership

$\therefore$ Rule: Cost in dollars $= 30 \times$ Number of classes $+ 12$

31. C Linear Relationships (252871) Core

a. Table of values

x	-1	0	1	2
y	$5-(-1)=6$	$5-0=5$	$5-1=4$	$5-2=3$

b. $(-1,6)$ $(0,5)$ $(1,4)$ $(2,3)$

32. C Linear Relationships (252893) Core

a. Table of values

x	-1	0	1	2
y	$4\times(-1)-7=-11$	$4\times(0)-7=-7$	$4\times1-7=-3$	$4\times2-7=1$

b. $(-1,-11)$ $(0,-7)$ $(1,-3)$ $(2,1)$

33. B Linear Relationships (253121) Core

a. (i) $s=100+30w$

(ii) $s=200+10w$

b.

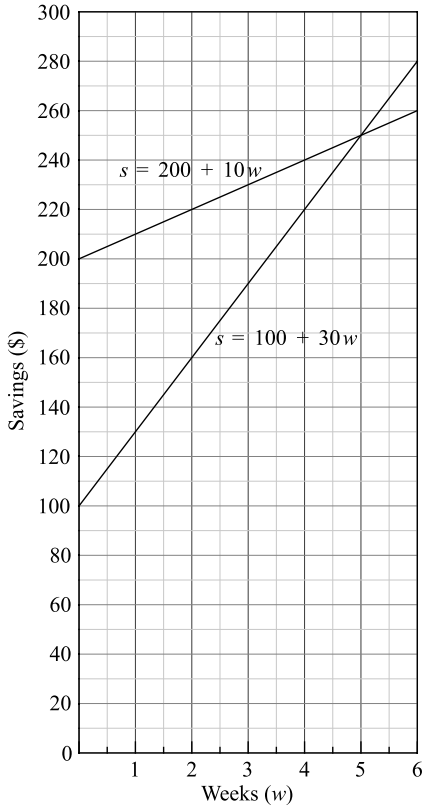
Renee's savings: $s=100+30w$

Weeks (w)	0	1	2	3
Savings (s)	100	130	160	190

Leisa's savings: $s=200+10w$

Weeks (w)	0	1	2	3
Savings (s)	200	210	220	230

c.



d. Method 1 – Graphically by inspection

Lines intersect when $w=5$ and $s=\$250$

Method 2 – Algebraically

Solve $s=100+30w$ and $s=200+10w$ simultaneously

$$100+30w=200+10w$$
$$30w-10w=200-100$$
$$20w=100$$
$$w$$

$= \frac{100}{20} = 5$

$\therefore$ Amounts are equal after 5 weeks.

34. B Linear Relationships (250794) Core

a.

Top Number	21	18	15	12
Bottom Number	$21 \div 3 = 7$	$18 \div 3 = 6$	$15 \div 3 = 5$	$12 \div 3 = 4$

Rule: Bottom number $=$ Top number $\div 3$

b. Bottom number $=$ Top number $\div 3 = -6 \div 3 = -2$

35. B Linear Relationships (250801) Core

a.

Top Number	1	2	3	4
Bottom Number	$1 - 1 = 0$	$1 - 2 = -1$	$1 - 3 = -2$	$1 - 4 = -3$

Rule: Bottom number $= 1 -$ Top number

b. Bottom number $= 1 -$ Top number $= 1 - 21 = -20$

36. B+ Linear Relationships (250758) Core

a. Total at end of week $1 = \$11$

Extra earned each week (after week 1) $= \$7$

$\therefore$ Total at end of week $2 = \$11 + 1 \times 7 = \$18$

$\therefore$ Total at end of week $3 = \$11 + 2 \times 7 = \$25$

$\therefore$ Total at end of week $4 = \$11 + 3 \times 7 = \$32$

$\therefore$ Rule: Amount saved $= \$11 + (\text{week} - 1) \times 7$

b. Total savings at end of week 10

$= 11 + (10 - 1) \times 7$

$= 11 + 9 \times 7$

$= \$74$

37. B+ Linear Relationships (250764) Core

a.

Top Number	2	4	6	8
Bottom Number	$4 \times 2 = 8$	$4 \times 4 = 16$	$4 \times 6 = 24$	$4 \times 8 = 32$

Rule: Bottom number $= 4 \times$ Top number

b. Rule: Bottom number $= 4 \times$ Top number $= 4 \times 15 = 60$

38. B+ Linear Relationships (253177) Core

Check points by substituting into $y = -2x + 3$

$(1\ ,\ 1) \longrightarrow RHS = -2 \times 1 + 3$

$= 1$

$= LHS$

$(-2,\ 7) \longrightarrow RHS = -2 \times (-2) + 3$

$= 7$

$= LHS$

$\therefore$ $(1\ ,\ 1)$ and $(-2,\ 7)$ both lie on the line $y = -2x + 3$

39. B+ Linear Relationships (253161) Core

Check points by substituting into $y = 2x + 1$

$(2\ ,\ 5) \longrightarrow RHS = 2 \times 2 + 1$

$= 5$

$= LHS$

$(-1, -1) \longrightarrow RHS = 2 \times (-1) + 1$

$= -1$

$= LHS$

$\therefore$ $(2\ ,\ 5)$ and $(-1, -1)$ both lie on the line $y = 2x + 1$

40. B+ Linear Relationships (253181) Core

Check points by substituting into $x + 2y = -1$

$(1, -1) \longrightarrow LHS = 1 + 2 \times (-1)$

$= 1 - 2 = -1$

$= RHS$

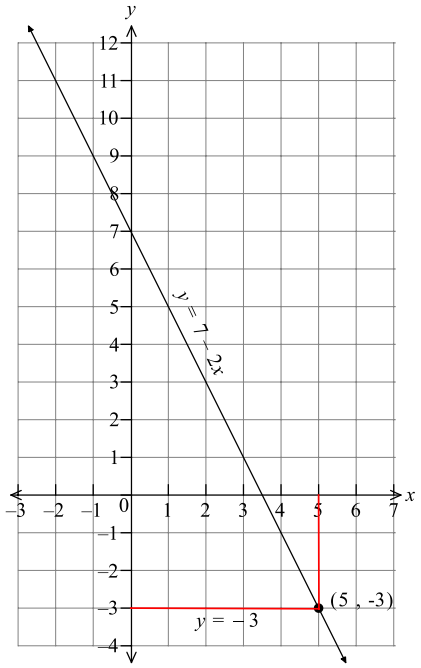
$(-7, 3) \longrightarrow LHS = -7 + 2 \times 3$

$= -7 + 6 = -1$

$= RHS$

$\therefore$ $(1, -1)$ and $(-7, 3)$ both lie on the line $x + 2y = -1$

41. B+ Linear Relationships (253210) Core



To solve $7 - 2x = -3$ graphically, find the point of intersection of the lines $y = -3$ and $y = 7 - 2x$

i.e. $(5, -3)$

$\therefore$ The solution is $x = 5$

42. B+ Linear Relationships (252986) Core

a. Table of values

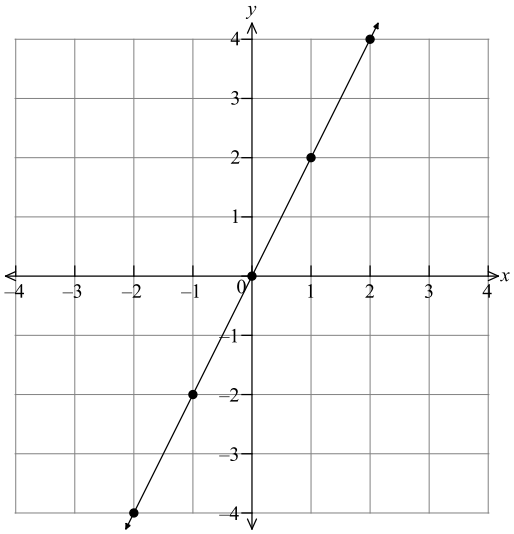
x	-2	-1	0	1	2
y	-3	-1	1	3	5

b. The y values are increasing by 2 and when $x = 0$, $y = 1$

$\therefore$ Rule: $y = 2x + 1$

43. B+ Linear Relationships (252954) Core

a.



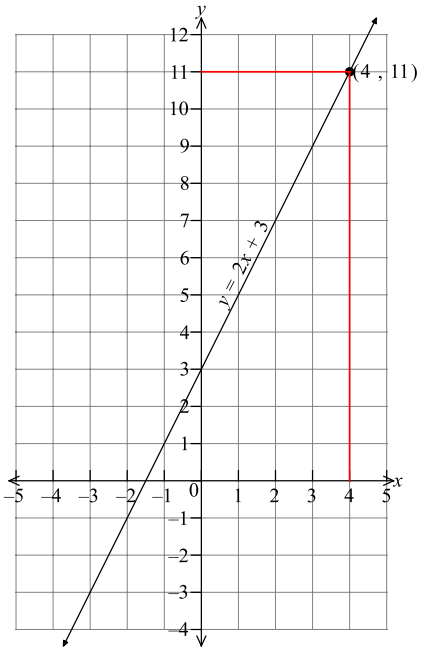
b. They form a straight line.

c.

x	-2	-1	0	1	2
y	$2 \times -2 = -4$	$2 \times -1 = -2$	$2 \times 0 = 0$	$2 \times 1 = 2$	$2 \times 2 = 4$

$\therefore$ Rule: $y = 2x$

44. B+ Linear Relationships (253183) Core

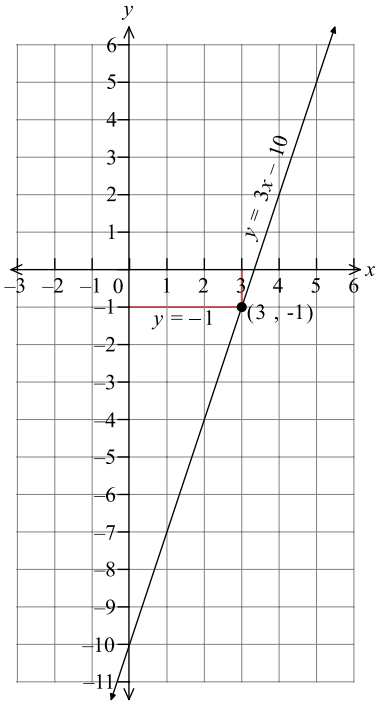


To solve $2x + 3 = 11$ graphically, find the point of intersection of the lines $y = 11$ and $y = 2x + 3$

i.e. $(4\ ,\ 11)$

$\therefore$ The solution is $x = 4$

45. A Linear Relationships (253216) Core



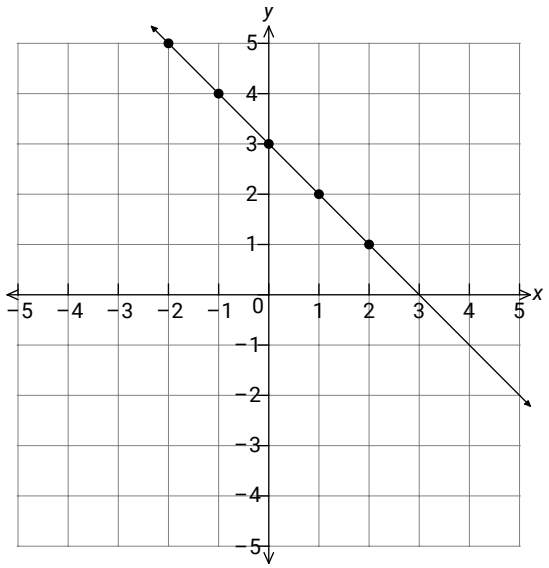
To solve $3x - 10 = -1$ graphically, find the point of intersection of the lines $y = -1$ and $y = 3x - 10$

i.e. $(3\ ,\ -1)$

$\therefore$ The solution is $x = 3$

46. A Linear Relationships (252970) Core

a.



b. They form a straight line.

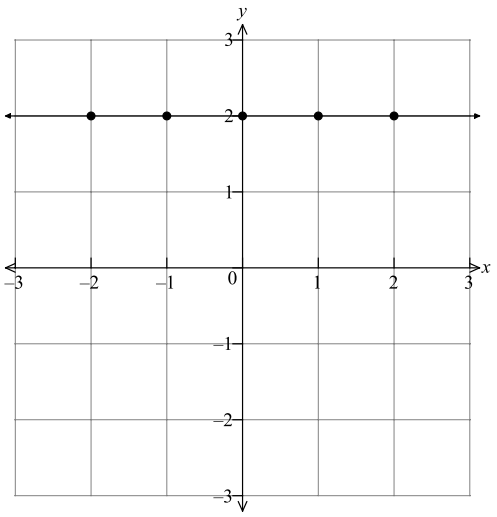
c.

x	-2	-1	0	1	2
y	$3-(-2)=5$	$3-(-1)=4$	$3-0=3$	$3-1=2$	$3-2=1$

$\therefore$ Rule: $y = 3 - x$

47. A Linear Relationships (252978) Core

a.



b. They form a horizontal straight line.

c.

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

$y = 2$ regardless of the value of x

$\therefore$ Rule: $y = 2$

48. A Linear Relationships (252989) Core

a. Table of values

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

b. The y values are decreasing by 1 and when $x = 0$, $y = 1$

$\therefore$ Rule: $y = -x + 1$

49. A Linear Relationships (252993) Core

a.

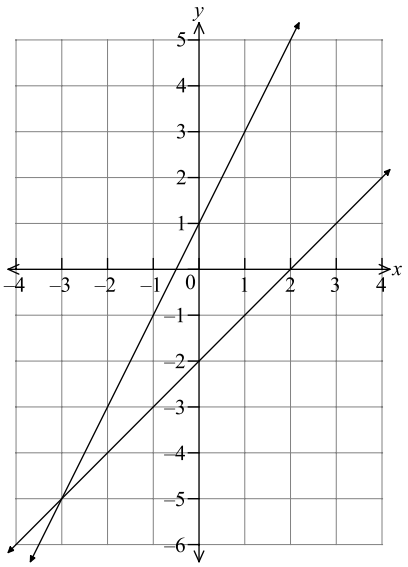
$y = 2x + 1$

x	-1	0	1	2
y	-1	1	3	5

$y = x - 2$

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

b.



c. Point of intersection: $(-3, -5)$

50. A Linear Relationships (253026) Core

a.

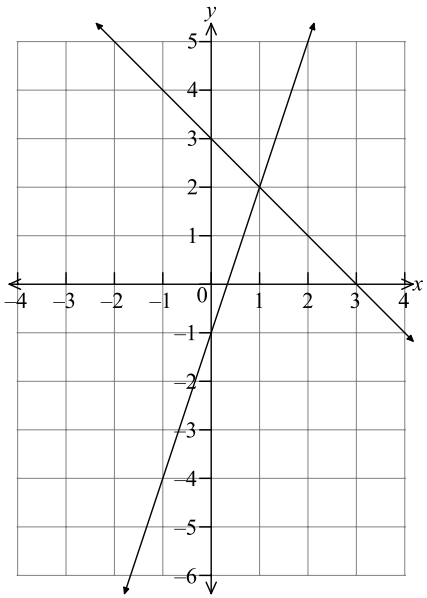
$y = 3 - x$

x	-1	0	1	2
y	4	3	2	1

$y = 3x - 1$

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

b.



c. Point of intersection: $(1, 2)$