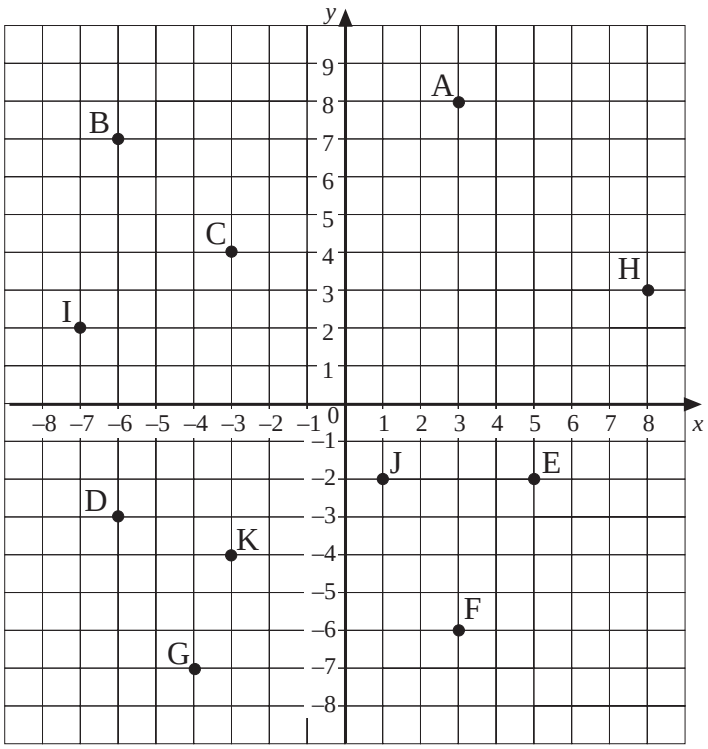
UNIT 5 *Linear Graphs and Equations* Extra Exercises 5.1

1. Write down the coordinates of each point marked on the following axes:



2. The coordinates of 3 corners, A, B, C, of a square are (1, 5), (1, – 2) and (– 6, 5) respectively.

   (a) Draw the square.

   (b) What are the coordinates of D, the other corner?

3. The coordinates of 3 corners, A, B, C, of a rectangle are (– 1, – 2), (– 3, 1) and (8, 4).

   (a) Draw the rectangle.

   (b) What are the coordinates of D, the other corner of the rectangle?

4. Join the points with the following coordinates, in order.

   (1, – 1), (1, – 2), (– 3, – 2), (– 3, – 1), (0, 2), (– 3, 2), (– 3, 3),
   (1, 3), (1, 2), (– 2, – 1), (1, – 1)

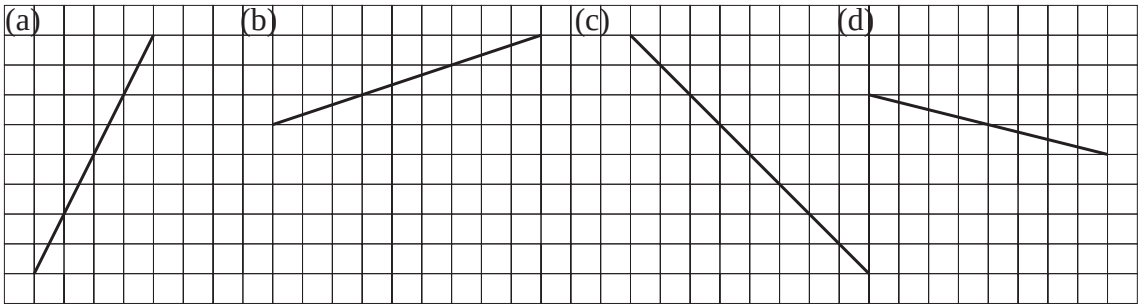
   What letter have you drawn?

UNIT 5 *Linear Graphs and Equations* Extra Exercises 5.2

1. Copy and complete the following table for $y = 5 - 2x$, and then draw the graph with equation $y = 5 - 2x$.

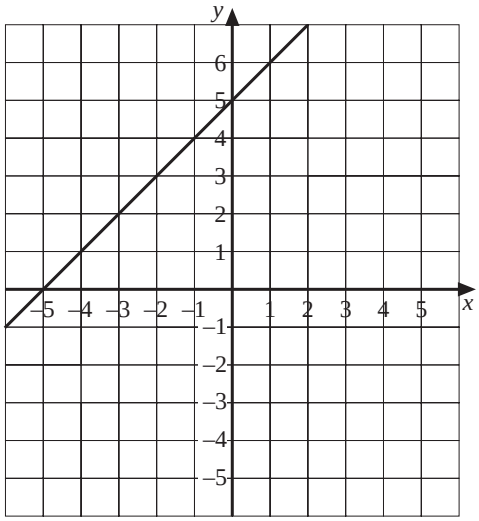
x	-2	-1	0	1	2	3	4	5
y								

2. Determine the *gradient* of each of the following lines:

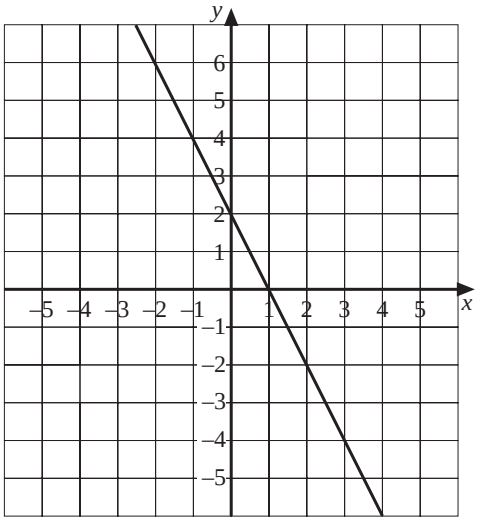


3. Determine the *equation* of each of the following lines:

(a)



(b)



4. Copy and complete the following table:

Equation of Line	*Gradient*	*Intercept*
$y = 4x + 2$		
$y = 8x - 2$		
	4	3
	2	9

UNIT 5 *Linear Graphs and Equations* Extra Exercises 5.3

1. Solve the following equations:

(a) $x - 7 = 22$ (b) $x + 8 = 14$ (c) $5x = 30$

(d) $\frac{x}{2} = 16$ (e) $x - 9 = 11$ (f) $x + 8 = 60$

(g) $\frac{x}{4} = 3$ (h) $7x = 21$ (i) $4x = 90$

2. Solve the following equations:

(a) $3x + 2 = 17$ (b) $11x - 8 = 25$ (c) $4(x + 2) = 20$

(d) $6x - 7 = 23$ (e) $11(x - 7) = 44$ (f) $\frac{x}{3} - 7 = 11$

(g) $16x - 4 = 140$ (h) $5(x + 3) = 55$ (i) $\frac{1}{4}(x - 3) = 13$

3. (a) Draw the graph of $y = 2x + 1$ and the graph of $y = 7 - x$.

(b) Use your graph to write down the solution to the equation

$$2x + 1 = 7 - x$$

4. (a) Draw the lines with equations

$$y = 3x - 1 \text{ and } y = x + 5$$

(b) Write down the solution to the equation

$$3x - 1 = x + 5$$

UNIT 5 *Linear Graphs and Equations* Extra Exercises 5.4

1. (a) Draw the line with equation $y = x + 1$.

   (b) Draw a parallel line that passes through the point with coordinates (0, 4).

   (c) Write down the equation of the parallel line.

2. The equations of 5 lines are listed below:

   A $y = 6x - 2$

   B $y = 2x - 6$

   C $y = 2x + 6$

   D $y = 6x + 2$

   E $y = -\frac{1}{2}x + 6$

   (a) Which line is parallel to A ?

   (b) Which line is parallel to C ?

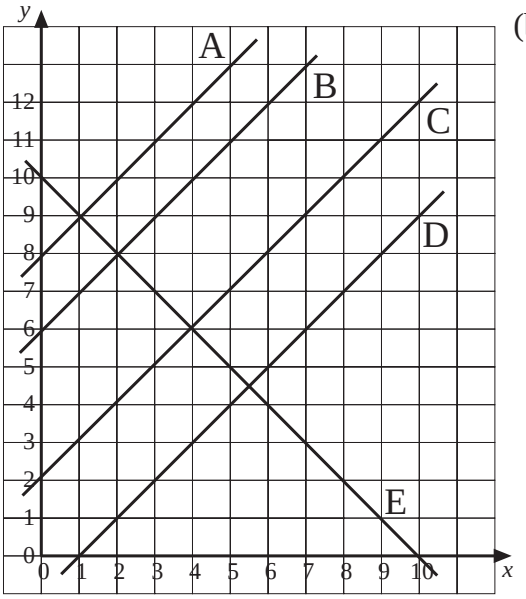
   (c) Which line is perpendicular to B and C ?

3. For each of the following diagrams,

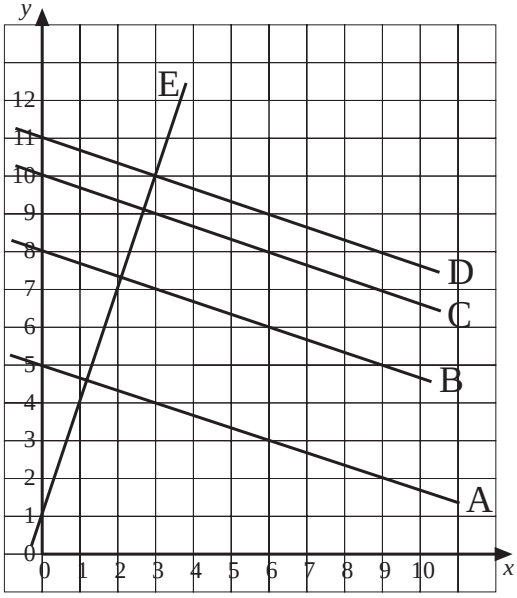
   (i) Calculate the gradient and equation of the line A,

   (ii) Write down the equations of the other lines.

(a)



(b)



UNIT 5 *Linear Graphs and Equations* Extra Exercises 5.5

1. (a) Draw the lines with equations $y = 4x + 3$ and $y = 2x + 11$.

   (b) Write down the coordinates of the point where the two lines cross.

   (c) Write down the solution of the simultaneous equations:

$$y = 4x + 3$$
$$y = 2x + 11$$

2. Use a graph to solve the simultaneous equations:

$$x + 2y = 10$$
$$3x + y = 10$$

3. Use an algebraic method to solve the following pairs of simultaneous equations:

   (a) $x + y = 12$, $x - y = 2$

   (b) $2x + 3y = 7$, $4x - 3y = 5$

   (c) $2x + y = 16$, $x + 2y = 11$

   (d) $5x + y = 19$, $2x + 4y = 22$

   (e) $2x - y = 17$, $x + 3y = 12$

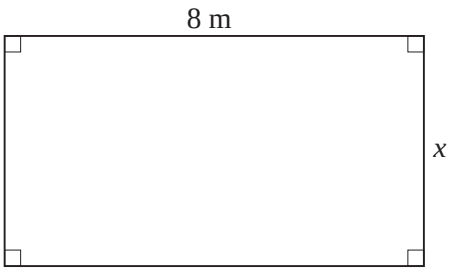
   (f) $5x - 2y = 46$, $8x + 4y = 88$

4. Ben buys 2 pencils and a pen, costing a total of 50p.
   Adam buys 3 pencils and 2 pens, costing a total of 85p.

   Given that $x =$ cost of a pencil and $y =$ cost of a pen, write down a pair of simultaneous equations and solve them for x and y.

UNIT 5 *Linear Graphs and Equations* Extra Exercises 5.6

1. The area of the rectangle shown is 36 m^2.



   (a) Write down an equation using this information.

   (b) Solve the equation.

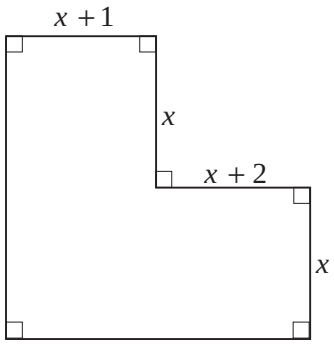
2. The formula $N = 2x + 1$ is used to give odd numbers.

   (a) What is the value of N when $x = 19$?

   (b) If $N = 77$, write down an equation and solve it to find x.

   (c) What is the value of x if $N = 193$?

3. (a) Write down the perimeter, in terms of x, of the shape shown.



   (b) If the perimeter is 94 cm, determine the value of x.

4. The cost of hiring a concrete mixer is £25, plus £6 per day.

   (a) Write down a formula for the cost of hiring the concrete mixer for n days.

   (b) The concrete mixer is hired for n days at a total cost of £67. Write down an equation and solve it to obtain n.

5. Two consecutive multiples of 7 are added together.

   (a) If the first multiple is $7n$, what is the second multiple?

   (b) If the two multiples added together give 301, determine the value of n.

Extra Exercises 5.1 Answers

1. A (3, 8) G (– 4, – 7)
   B (– 6, 7) H (8, 3)
   C (– 3, 4) I (– 7, 2)
   D (– 6, – 3) J (1, – 2)
   E (5, – 2) K (– 3, – 4)
   F (3, – 6)
2. (b) (– 6, – 2)
3. (b) (6, 7)
4. Z

Extra Exercises 5.2 Answers

1.

x	– 2	– 1	0	1	2	3	4	5
y	9	7	5	3	1	– 1	– 3	– 5

2. (a) 2 (b) $\frac{1}{3}$ (c) -1 (d) $-\frac{1}{4}$
3. (a) $y = x + 5$ (b) $y = -2x + 2$
4.

Equation of Line	*Gradient*	*Intercept*
$y = 4x + 2$	4	2
$y = 8x - 2$	8	– 2
$y = 4x + 3$	4	3
$y = 2x + 9$	2	9

Extra Exercises 5.3 Answers

1. (a) $x = 29$ (b) $x = 6$ (c) $x = 6$
   (d) $x = 32$ (e) $x = 20$ (f) $x = 52$
   (g) $x = 12$ (h) $x = 3$ (i) $x = 22\frac{1}{2}$
2. (a) $x = 5$ (b) $x = 3$ (c) $x = 3$
   (d) $x = 5$ (e) $x = 11$ (f) $x = 54$
   (g) $x = 9$ (h) $x = 8$ (i) $x = 55$
3. (b) $x = 2$
4. (b) $x = 3$

Extra Exercises 5.4 Answers

1. (c) $y = x + 4$

2. (a) D (b) B (c) E

3. (a) A $y = x + 8$
   B $y = x + 6$
   C $y = x + 2$
   D $y = x - 1$
   E $y = 10 - x$ or $y = -x + 10$

   (b) A $y = -\frac{1}{3}x + 5$
   B $y = -\frac{1}{3}x + 8$
   C $y = -\frac{1}{3}x + 10$
   D $y = -\frac{1}{3}x + 11$
   E $y = 3x + 1$

Extra Exercises 5.5 Answers

1. (b) (4, 19) (c) $x = 4,\ y = 19$

2. $x = 2,\ y = 4$

3. (a) $x = 7,\ y = 5$ (b) $x = 2,\ y = 1$
   (c) $x = 7,\ y = 2$ (d) $x = 3,\ y = 4$
   (e) $x = 9,\ y = 1$ (f) $x = 10,\ y = 2$

4. $2x + y = 50$ $x = 15,\ y = 20$
   $3x + 2y = 85$

Extra Exercises 5.6 Answers

1. (a) $8x = 36$ (b) $x = 4.5$ m

2. (a) $N = 39$ (b) $77 = 2x + 1,\ x = 38$
   (c) $x = 96$

3. (a) $8x + 6$ (b) $x = 11$

4. (a) $25 + 6n$ (b) $67 = 25 + 6n,\ n = 7$

5. (a) $7n + 7$ (b) $14n + 7 = 301,\ n = 21$