1. Find the equation of the line which has gradient 2 and crosses the y-axis at $y = 5$.

$$y = 2x + 5$$

2. Find the equation of the line which has gradient 4 and crosses the y-axis at $y = -3$.

$$y = 4x - 3$$

3. Find the equation of the line which has gradient 7 and crosses the y-axis at $y = 10$.

$$y = 7x + 10$$

4. Find the equation of the line which has gradient -3 and crosses the y-axis at $y = 20$.

$$y = -3x + 20$$

5. Find the equation of the line which has gradient 0.5 and crosses the y-axis at $y = 2$.

$$y = 0.5x + 2$$

6. (a) Write down the equation of Line A.

$$m = \frac{2}{1} = 2$$

$$y = 2x - 1$$

(b) Write down the equation of Line B.

$$m = \frac{1}{1} = 1$$

$$y = x + 1$$

(c) Write down the equation of Line C.

$$m = \frac{-1}{1} = -1$$

$$y = -x + 3$$
7. (a) Write down the equation of Line D.
\[ y = \frac{3}{1}x - 2 \]
(b) Write down the equation of Line E.
\[ y = \frac{1}{2}x + 5 \]
(c) Write down the equation of Line F.
\[ y = -2x + 5 \]

8. Find the equation of the line which has gradient 2 and passes through the point (1, 8).
\[ y = 2x + c \]
\[ (1, 8): 8 = 2 \cdot 1 + c \]
\[ 8 = 2 + c \]
\[ c = 6 \]
\[ y = 2x + 6 \]

9. Find the equation of the line which has gradient -3 and passes through the point (-2, 7).
\[ y = -3x + c \]
\[ (-2, 7): 7 = -3 \cdot (-2) + c \]
\[ 7 = 6 + c \]
\[ c = 1 \]
\[ y = -3x + 1 \]

10. Find the equation of the line which has gradient 4 and passes through the point (-1, 0).
\[ y = 4x + c \]
\[ (-1, 0): 0 = 4 \cdot (-1) + c \]
\[ 0 = -4 + c \]
\[ c = 4 \]
\[ y = 4x + 4 \]
11. Find the equation of the line that passes through the points (3, 1) and (6, 7).

\[ m = \frac{7 - 1}{6 - 3} = \frac{6}{3} = 2 \]

\[ y = 2x + c \]

(3, 1): \[ 1 = 2 \times 3 + c \]

\[ 1 = 6 + c \]

\[-6 \]

\[-5 = c \]

\[ y = 2x - 5 \]

12. Find the equation of the line that passes through the points (1, 4) and (5, 16).

\[ m = \frac{16 - 4}{5 - 1} = \frac{12}{4} = 3 \]

\[ y = 3x + c \]

(1, 4): \[ 4 = 3 \times 1 + c \]

\[ 4 = 3 + c \]

\[-3 \]

\[-1 = c \]

\[ y = 3x + 1 \]

13. Find the equation of the line that passes through the points (-2, -1) and (1, 8).

\[ m = \frac{8 - (-1)}{1 - (-2)} = \frac{9}{3} = 3 \]

\[ y = 3x + c \]

(1, 8): \[ 8 = 3 \times 1 + c \]

\[ 8 = 3 + c \]

\[-3 \]

\[ 5 = c \]

\[ y = 3x + 5 \]
14. Find the equation of the line that passes through (2, 6) and (8, 9).

\[ m = \frac{9 - 6}{8 - 2} = \frac{3}{6} = \frac{1}{2} \]

\[ y = \frac{1}{2} x + c \]

(2,6): \[ 6 = \frac{1}{2} \times 2 + c \]
\[ 6 = 1 + c \quad \rightarrow \quad 5 = c \]

\[ y = \frac{1}{2} x + 5 \]

15. Find the equation of the line that passes through (-3, 17) and (2, 7).

\[ m = \frac{7 - 17}{2 - (-3)} = \frac{-10}{5} = -2 \]

\[ y = -2x + c \]

(2,7): \[ 7 = -2 \times 2 + c \]
\[ 7 = -4 + c \quad \rightarrow \quad 11 = c \]

\[ y = -2x + 11 \]

16. Find the equation of the line that passes through (1, 7) and (4, -2).

\[ m = \frac{-2 - 7}{4 - 1} = \frac{-9}{3} = -3 \]

\[ y = -3x + c \]

(1,7): \[ 7 = -3 \times 1 + c \]
\[ 7 = -3 + c \quad \rightarrow \quad 10 = c \]

\[ y = -3x + 10 \]
17. The line \( y = 3x - 5 \) passes through the point \( P \). The point \( P \) has \( x \) co-ordinate 2.

Find the \( y \) co-ordinate of point \( P \).

\[
\begin{align*}
  y &= 3x - 5 \\
  x &= 2: \quad y &= 3 \times 2 - 5 \\
  \quad y &= 1
\end{align*}
\]

18. The line \( y = 2x + 8 \) passes through the point \( Q \). The point \( Q \) has \( x \) co-ordinate 3.

Find the \( y \) co-ordinate of point \( Q \).

\[
\begin{align*}
  y &= 2x + 8 \\
  x &= 3: \quad y &= 2 \times 3 + 8 \\
  \quad y &= 14
\end{align*}
\]

19. The line \( y = 5x - 13 \) passes through the point \( R \). The point \( R \) has \( y \) co-ordinate 2.

Find the \( x \) co-ordinate of point \( R \).

\[
\begin{align*}
  y &= 5x - 13 \\
  y &= 2: \quad 2 &= 5x - 13 \\
  +13 &= +13 \\
  \frac{15}{5} &= 5x \\
  x &= 3
\end{align*}
\]

20. The line \( y = 4x + 9 \) passes through the point \( S \). The point \( S \) has \( y \) co-ordinate 17.

Find the \( x \) co-ordinate of point \( S \).

\[
\begin{align*}
  y &= 4x + 9 \\
  y &= 17: \quad 17 &= 4x + 9 \\
  -9 &= -9 \\
  \frac{8}{4} &= 4x \\
  x &= 2
\end{align*}
\]

21. The line \( y = 10 - 3x \) passes through the point \( T \). The point \( T \) has \( x \) co-ordinate 4.

Find the \( y \) co-ordinate of point \( T \).

\[
\begin{align*}
  y &= 10 - 3x \\
  x &= 4: \quad y &= 10 - 3 \times 4 \\
  \quad y &= -2
\end{align*}
\]
22. The line \( y = 2x + 11 \) passes through the points U and V.  
The point U has y co-ordinate 19.  
The point V has x co-ordinate -3.

(a) Find the x co-ordinate of point U.
\[
y = 2x + 11
\]
\[
19 = 2x + 11
\]
\[
-2 = 2x
\]
\[
x = -1
\]

(b) Find the y co-ordinate of point V.
\[
y = 2x + 11
\]
\[
-3 = 2x
\]
\[
x = -6 + 11
\]

23. The line \( y = \frac{1}{2}x - 5 \) passes through the points W and X.

The point W has co-ordinates (8, a).  
The point X has co-ordinates (b, 8).

(a) Find a.
\[
y = \frac{1}{2}x - 5
\]
\[
x = 8: \quad y = \frac{1}{2} \cdot 8 - 5
\]
\[
4 - 5
\]

(b) Find b.
\[
y = \frac{1}{2}x - 5
\]
\[
y = 8: \quad 8 = \frac{1}{2}x - 5
\]
\[
+5
\]
\[
13 = \frac{1}{2}x
\]
\[
x = 26
\]

24. The line \( y = -5x + 9 \) passes through the points A and Z.  
The point A has co-ordinates (-2, c).  
The point Z has co-ordinates (d, -6).

(a) Find c.
\[
y = -5x + 9
\]
\[
x = -2: \quad y = -5(-2) + 9
\]
\[
10 + 9
\]
\[
c = 19
\]

(b) Find d.
\[
y = -5x + 9
\]
\[
y = -6: \quad -6 = -5x + 9
\]
\[
-15 = -5x
\]
\[
\div -5
\]
\[
x = 3
\]

\[d = 3\]
25. Does the line \( y = 3x + 11 \) pass through the point \((3, 20)\)?

\[
\begin{align*}
y &= 3x + 11 \\
(3,20): & \quad 20 = 3 \cdot 3 + 11 \\
& \quad 20 = 9 + 11 \\
& \quad 20 = 20 \checkmark \quad \text{Yes}
\end{align*}
\]

26. Does the line \( y = 4x - 7 \) pass through the point \((2, 1)\)?

\[
\begin{align*}
y &= 4x - 7 \\
(2,1): & \quad 1 = 4 \cdot 2 - 7 \\
& \quad 1 = 8 - 7 \\
& \quad 1 = 1 \checkmark \quad \text{Yes}
\end{align*}
\]

27. Does the line \( y = 9x + 1 \) pass through the point \((-1, 8)\)?

\[
\begin{align*}
y &= 9x + 1 \\
(-1,8): & \quad 8 = 9 \cdot (-1) + 1 \\
& \quad 8 = -9 + 1 \\
& \quad 8 = -8 \times
\end{align*}
\]

28. Does the line \( y = \frac{1}{2}x + 1 \) pass through the point \((4, 3)\)?

\[
\begin{align*}
y &= \frac{1}{2}x + 1 \\
(4,3): & \quad 3 = \frac{1}{2} \cdot 4 + 1 \\
& \quad 3 = 2 + 1 \\
& \quad 3 = 3 \checkmark \quad \text{Yes}
\end{align*}
\]

29. Does the line \( y = 11 - 4x \) pass through the point \((-1, 15)\)?

\[
\begin{align*}
y &= 11 - 4x \\
(-1,15): & \quad 15 = 11 - 4 \cdot (-1) \\
& \quad 15 = 11 + 4 \\
& \quad 15 = 15 \checkmark \quad \text{Yes}
\end{align*}
\]

30. Does the line \( y = -5x + 1 \) pass through the point \((-5, 26)\)?

\[
\begin{align*}
y &= -5x + 1 \\
(-5,26): & \quad 26 = -5 \cdot (-5) + 1 \\
& \quad 26 = 25 + 1 \\
& \quad 26 = 26 \checkmark \quad \text{Yes}
\end{align*}
\]
31. The line L has equation \( y = 3x + 13 \).
Circle the line(s) that are parallel to L.

\[
\begin{align*}
\text{y} = 2x + 13 & \quad \text{y} = 3x + 1 & \quad \text{y} = 4x + 12 & \quad \text{y} = -3x + 13
\end{align*}
\]

32. The line M has equation \( y = 5x - 5 \).
Circle the line(s) that are parallel to M.

\[
\begin{align*}
\text{y} = 5x + 5 & \quad \text{y} = -5x + 5 & \quad \text{y} = 5x & \quad \text{y} = -5x
\end{align*}
\]

33. The line N has equation \( y = \frac{1}{2} x + 3 \).
Circle the line(s) that are parallel to N.

\[
\begin{align*}
\text{y} = 2x + 1 & \quad \text{y} = \frac{1}{2} x + 1 & \quad \text{y} = x + \frac{1}{2} & \quad \text{y} = 3x + 10
\end{align*}
\]

34. The line O has equation \( y = 11 - 2x \).
Circle the line(s) that are parallel to O.

\[
\begin{align*}
\text{y} = 11 + 2x & \quad \text{y} = 10 - 2x & \quad \text{y} = -2x + 5 & \quad \text{y} = 11 - 3x
\end{align*}
\]

35. The line A has equation \( y = 4x - 10 \).
The line B is parallel to line A and crosses the y-axis at \( y = 1 \).
Find the equation of the line B.

\[
y = 4x + 1
\]

36. The line C has equation \( y = 5x + 2 \).
The line D is parallel to line C and passes through the point \((1, 3)\).
Find the equation of the line D.

\[
y = 5x - 2
\]

37. The line E has equation \( y = 20 - 7x \).
The line F is parallel to line E and passes through the point \((-1, 10)\).
Find the equation of the line F.

\[
y = -7x + 3
\]
38.
The line L passes through the points (4, 2) and (7, 11).

(a) Find the equation of L.

\[ m = \frac{11-2}{7-4} = \frac{9}{3} = 3 \]

\[ y = 3x + c \]

\[ (4,2): \quad 2 = 3\times4 + c \]
\[ 2 = 12 + c \]
\[ 2 = 10 + c \]
\[ -12 = -12 \]
\[ -10 = c \]

(b) Does Line L pass through the point (-1, 13)?

\[ y = 3x - 10 \]

\[ (-1,13): \quad 13 = 3\times-1 - 10 \]
\[ 13 = -13 \]

No

(c) L passes through the point P.
P has x co-ordinate 5.
Find the y co-ordinate of point P.

\[ y = 3x + 10 \]
\[ x = 5: \quad y = 3\times5 + 10 \]
\[ = 15 + 10 \]
\[ = 25 \]
\[ y = 25 \]

39.
The line M passes through the points (-1, 9) and (3, 17).

(a) Find the equation of M.

\[ m = \frac{17-9}{3-(-1)} = \frac{8}{4} = 2 \]

\[ y = 2x + c \]

\[ (3,17): \quad 17 = 2\times3 + c \]
\[ 17 = 6 + c \]
\[ -6 = 11 = c \]

\[ y = 2x + 11 \]

(b) The line N has equation \( y = 2x - 2 \).
Are the lines N and M parallel? Explain your answer.

Yes, because they both have a gradient of 2.
40.
The line Q passes through the points (-2, 20) and (3, 5).

(a) Find the equation of Q.

\[ m = \frac{5 - 20}{3 - (-2)} = \frac{-15}{5} = -3 \]

\[ y = -3x + c \]

(3, 5): \[ 5 = -3 \times 3 + c \]

\[ 5 = -9 + c \]

\[ +9 \]

\[ 14 = c \]

(b) Does Q pass through the point (-5, 29)?

\[ y = -3x + 14 \]

(-5, 29): \[ 29 = -3 \times (-5) + 14 \]

\[ 29 = 15 + 14 = 29 \]

Yes

41.
The line R passes through the point (10, 9) and crosses the x-axis at x = -8.

(a) Find the equation of R.

\[ m = \frac{9 - 0}{10 - (-8)} = \frac{9}{18} = \frac{1}{2} \]

\[ y = \frac{1}{2}x + c \]

(-8, 0): \[ 0 = \frac{1}{2} x - 8 + c \]

\[ +4 \]

\[ 4 = c \]

(b) R passes through the point (11, a).

Find a.

\[ y = \frac{1}{2}x + 4 \]

x = 11: \[ y = \frac{1}{2} \times 11 + 4 = 5.5 + 4 = 9.5 \]

\[ a = 9.5 \]

(c) R also passes through the point (b, 20).

Find b.

\[ y = \frac{1}{2}x + 4 \]

\[ y = 20 \]

\[ 20 = \frac{1}{2} x + 4 \]

\[ -4 \]

\[ 16 = \frac{1}{2}x \]

\[ x \]

\[ b = 32 \]