Fully-Worked Solutions

CHAPTER 9 Straight Lines

UPSKILL 9.1A

1 (a) Compare with $y = mx + c$
Gradient, $m = 3$
y-intercept, $c = -8$

(b) Compare with $y = mx + c$
Gradient, $m = -7$
y-intercept, $c = 13$

(c) $y = 5 - 10x$
$y = -10x + 5$
Compare with $y = mx + c$
Gradient, $m = -10$
y-intercept, $c = 5$

(d) $y = -\dfrac{x}{6}$
$y = -\dfrac{1}{6}x + 0$
Compare with $y = mx + c$
Gradient, $m = -\dfrac{1}{6}$
y-intercept, $c = 0$

2 (a) $2y = 10x + 3$
Divide all the terms by 2 so that the coefficient of y is 1.
$y = 5x + \dfrac{3}{2}$
Compare with $y = mx + c$
Gradient, $m = 5$
y-intercept, $c = \dfrac{3}{2}$

(b) $5y = -2x + 15$
Divide all the terms by 5 so that the coefficient of y is 1.
$y = -\dfrac{2}{5}x + 3$
Compare with $y = mx + c$
Gradient, $m = -\dfrac{2}{5}$
y-intercept, $c = 3$

(c) $\dfrac{1}{4}y = 1 - 2x$
Multiply all the terms with 4 so that the coefficient of y is 1.
$y = 4 - 8x$
$y = -8x + 4$
Compare with $y = mx + c$
Gradient, $m = -8$
y-intercept, $c = 4$

(d) $3y = -\dfrac{x}{2}$
Divide all the terms by 3 so that the coefficient of y is 1.
$y = -\dfrac{x}{2} \div 3$
$y = -\dfrac{x}{2} \times \dfrac{1}{3}$
$y = -\dfrac{1}{6}x$
Compare with $y = mx + c$
Gradient, $m = -\dfrac{1}{6}$
y-intercept, $c = 0$

3 (a) $y = -\dfrac{1}{3}x + 8$
Multiply all the terms with 3.
$3y = -x + 24$
$x + 3y = 24$

$x + 3y = 24$
Divide all the terms by 24.
$\dfrac{x}{24} + \dfrac{3y}{24} = \dfrac{24}{24}$
$\dfrac{x}{24} + \dfrac{y}{8} = 1$

(b) $y = 4x - 16$
$-4x + y = -16$

$-4x + y = -16$
Divide all the terms by -16.
$\dfrac{-4x}{-16} + \dfrac{y}{-16} = \dfrac{-16}{-16}$
$\dfrac{x}{4} + \dfrac{y}{(-16)} = 1$

(c) $2y = 7x + 14$
$-7x + 2y = 14$

$-7x + 2y = 14$
Divide all the terms by 14.
$\dfrac{-7x}{14} + \dfrac{2y}{14} = \dfrac{14}{14}$
$-\dfrac{x}{2} + \dfrac{y}{7} = 1$

4 (a) $\dfrac{x}{9} + \dfrac{y}{6} = 1$
Multiply every term with 18.
$2x + 3y = 18$

$2x + 3y = 18$
$3y = -2x + 18$
Divide every term by 3.
$y = -\dfrac{2}{3}x + 6$

(b) $-\dfrac{x}{3} + \dfrac{y}{10} = 1$
Multiply every term with 30.
$-10x + 3y = 30$

$-10x + 3y = 30$
$3y = 10x + 30$
Divide every term by 3.
$y = \dfrac{10}{3}x + 10$

(c) $\dfrac{x}{4} - \dfrac{2y}{3} = 1$
Multiply every term with 12.
$3x - 8y = 12$

$3x - 8y = 12$
$-8y = -3x + 12$
Divide all the terms by -8.
$y = \dfrac{3}{8}x - \dfrac{3}{2}$

5 (a) $2x + 7y = 28$
$7y = -2x + 28$
Divide every term by 7.
$y = -\dfrac{2}{7}x + 4$

$2x + 7y = 28$
Divide every term by 28.
$\dfrac{x}{14} + \dfrac{y}{4} = 1$

(b) $-5x + 4y = 20$
$4y = 5x + 20$
Divide every term by 4.
$y = \dfrac{5}{4}x + 5$

$-5x + 4y = 20$
Divide every term by 20.
$\dfrac{x}{-4} + \dfrac{y}{5} = 1$

(c) $11x - 6y = 66$
$-6y = -11x + 66$
Divide every term by -6.
$y = \dfrac{11}{6}x - 11$

$11x - 6y = 66$
Divide every term by 66.
$\dfrac{x}{6} + \dfrac{y}{(-11)} = 1$

6 (a) $(2, 7)$; $y = 2x + 4$
Substitute $x = 2$ and $y = 7$ into the equation $y = 2x + 4$.
The left side, $y = 7$
The right side, $2x + 4 = 2(2) + 4$
$= 8$ (not equal to the left side)
$\therefore (2, 7)$ does not lie on $y = 2x + 4$.

(b) $(-3, 10)$; $y = -3x + 1$
Substitute $x = -3$ and $y = 10$ into the equation $y = -3x + 1$.
The left side, $y = 10$
The right side, $-3x + 1 = -3(-3) + 1$
$= 10$ (is equal to the left side)
Therefore, $(-3, 10)$ lies on $y = -3x + 1$.

(c) $(-15, 0)$; $y = \frac{1}{5}x + 3$

Substitute $x = -15$ and $y = 0$ into the equation $y = \frac{1}{5}x + 3$.
The left side, $y = 0$

The right side, $\frac{1}{5}x + 3 = \frac{1}{5}(-15) + 3$
$= 0$ (equal to the left side)

Therefore, $(-15, 0)$ lies on $y = \frac{1}{5}x + 3$.

7 $y = 4x + p$
$2 = 4(3) + p$
$2 = 12 + p$
$p = -10$

$y = 4x - 10$
$0 = 4q - 10$
$10 = 4q$
$q = 2.5$

UPSKILL 9.1B

1 (a) $y = 5x + 1$ $\quad m_1 = 5$
and $y + 5x = 0$
$y = -5x$ $\quad m_2 = -5$
$m_1 \neq m_2$
$\therefore$ The pair of straight lines is not parallel.

(b) $y = 3x - 6$ $\quad m_1 = 3$
and $2y = 6x + 5$ (Divide each term by 2)
$y = 3x + 2.5$ $\quad m_2 = 3$
$m_1 = m_2$
$\therefore$ The pair of straight lines is parallel.

(c) $x + 6y = 12$
$6y = -x + 12$
$y = -\frac{1}{6}x + 2$ $\quad m_1 = -\frac{1}{6}$
and $y = -\frac{1}{6}x - 7$ $\quad m_2 = -\frac{1}{6}$
$m_1 = m_2$
$\therefore$ The pair of straight lines is parallel.

(d) $2y - 14x = 9$
$2y = 14x + 9$
$y = 7x + 4.5$ $\quad m_1 = 7$
and $3y - 24x = 1$
$3y = 24x + 1$
$y = 8x + \frac{1}{3}$ $\quad m_2 = 8$
$m_1 \neq m_2$
$\therefore$ The pair of straight lines is not parallel.

2 (a) $y = \frac{3}{5}x - 7$ $\quad m_1 = \frac{3}{5}$
and $y = 0.6x + 8$ $\quad m_2 = 0.6 = \frac{3}{5}$
$m_1 = m_2$
$\therefore$ The pair of straight lines is parallel.

(b) $3y - 2x = 12$
$3y = 2x + 12$
$y = \frac{2}{3}x + 4$ $\quad m_1 = \frac{2}{3}$
and $y = -\frac{2}{3}x + \frac{1}{3}$ $\quad m_2 = -\frac{2}{3}$
$m_1 \neq m_2$
$\therefore$ The pair of straight lines is not parallel.

(c) $2x = 6y - 11$
$6y = 2x + 11$
$y = \frac{1}{3}x + \frac{11}{6}$ $\quad m_1 = \frac{1}{3}$
and $3y = x + 6$
$y = \frac{1}{3}x + 2$ $\quad m_2 = \frac{1}{3}$
$m_1 = m_2$
$\therefore$ The pair of straight lines is parallel.

(d) $8x + 4y = 32$
$4y = -8x + 32$
$y = -2x + 8$ $\quad m_1 = -2$
and $6x - 2y = 3$
$-2y = -6x + 3$
$y = 3x - \frac{3}{2}$ $\quad m_2 = 3$
$m_1 \neq m_2$
$\therefore$ The pair of straight lines is not parallel.

3 (a) $y = -5x + 2$ $\quad m_1 = -5$
and $y + hx = 10$
$y = -hx + 10$ $\quad m_2 = -h$
$m_1 = m_2$
$-5 = -h$
$\therefore h = 5$

(b) $4x + 5y = 6$
$5y = -4x + 6$
$y = -\frac{4}{5}x + \frac{6}{5}$ $\quad m_1 = -\frac{4}{5}$
and $3x + hy = 8$
$hy = -3x + 8$
$y = -\frac{3}{h}x + \frac{8}{h}$ $\quad m_2 = -\frac{3}{h}$
$m_1 = m_2$
$-\frac{4}{5} = -\frac{3}{h}$
$4h = 15$
$\therefore h = \frac{15}{4}$

(c) $\frac{x}{4} + \frac{y}{2} = 1$
$\frac{y}{2} = -\frac{x}{4} + 1$
$y = -\frac{1}{2}x + 2$ $\quad m_1 = -\frac{1}{2}$
and $6y - hx = 20$
$6y = hx + 20$
$y = \frac{h}{6}x + \frac{10}{3}$ $\quad m_2 = \frac{h}{6}$
$m_1 = m_2$
$-\frac{1}{2} = \frac{h}{6}$
$h = -\frac{1}{2} \times 6$
$= -3$

(d) $x + 6y - 5 = 0$
$6y = -x + 5$
$y = -\frac{1}{6}x + \frac{5}{6}$ $\quad m_1 = -\frac{1}{6}$
and $\frac{x}{h} - \frac{y}{9} = 1$
$\frac{y}{9} = \frac{x}{h} - 1$
$y = \frac{9}{h}x - 9$ $\quad m_2 = \frac{9}{h}$
$m_1 = m_2$
$-\frac{1}{6} = \frac{9}{h}$
$h = -54$

4 (a) $y = 3$ (b) $y = -2$
(c) $y = 4$ (d) $y = 0$

5 (a) $x = 6$ (b) $x = 2$
(c) $x = -4$ (d) $x = 8$

6 (a) $y = 7$ (b) $y = 3$
(c) $y = -1$ (d) $y = -5$

7 (a) $x = 3$ (b) $x = -1$
(c) $x = 10$ (d) $x = -12$

8 (a) Substitute $H(1, 3)$, $m = 1$ into $y = mx + c$.
$3 = 1 + c$
$c = 2$
$\therefore y = x + 2$

(b) Substitute $H(6, 4)$, $m = \frac{1}{2}$ into $y = mx + c$.

$4 = \frac{1}{2}(6) + c$

$4 = 3 + c$

$c = 1$

$\therefore y = \frac{1}{2}x + 1$

(c) Substitute $H(-4, 5)$, $m = -6$ into $y = mx + c$.

$5 = -6(-4) + c$

$5 = 24 + c$

$c = -19$

$\therefore y = -6x - 19$

(d) Substitute $H(-6, -5)$, $m = 0$ into $y = mx + c$.

$-5 = c$

$\therefore y = -5$

(e) Substitute $H\left(\frac{2}{3}, -2\right)$, $m = -9$ into $y = mx + c$.

$-2 = -9\left(\frac{2}{3}\right) + c$

$-2 = -6 + c$

$c = 4$

$\therefore y = -9x + 4$

(f) Substitute $H(8, 3)$, $m = -\frac{3}{4}$ into $y = mx + c$.

$3 = -\frac{3}{4}(8) + c$

$3 = -6 + c$

$c = 9$

$\therefore y = -\frac{3}{4}x + 9$

9 (a) (1, 6), (2, 8)

$m = \frac{8 - 6}{2 - 1}$

$= \frac{2}{1}$

$= 2$

Substitute $m = 2$, $x = 1$ and $y = 6$ into $y = mx + c$.

$6 = 2(1) + c$

$6 = 2 + c$

$c = 4$

Substitute $m = 2$ and $c = 4$ into $y = mx + c$.

The equation of the line is $y = 2x + 4$.

(b) (5, 2), (3, 10)

$m = \frac{10 - 2}{3 - 5}$

$= \frac{8}{-2}$

$= -4$

Substitute $m = -4$, $x = 5$ and $y = 2$ into $y = mx + c$.

$2 = -4(5) + c$

$2 = -20 + c$

$c = 22$

Substitute $m = -4$ and $c = 22$ into $y = mx + c$.

The equation of the line is $y = -4x + 22$.

(c) (4, –1), (6, –5)

$m = \frac{-5 - (-1)}{6 - 4}$

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

$= -2$

Substitute $m = -2$, $x = 4$ and $y = -1$ into $y = mx + c$.

$-1 = -2(4) + c$

$-1 = -8 + c$

$c = 7$

Substitute $m = -2$ and $c = 7$ into the equation $y = mx + c$.

The equation of the line is $y = -2x + 7$.

(d) (–5, –3), (–8, 1)

$m = \frac{1 - (-3)}{-8 - (-5)}$

$= \frac{4}{-3}$

$= -\frac{4}{3}$

Substitute $m = -\frac{4}{3}$, $x = -8$ and $y = 1$ into $y = mx + c$.

$1 = -\frac{4}{3}(-8) + c$

$1 = \frac{32}{3} + c$

$c = -\frac{29}{3}$

Substitute $m = -\frac{4}{3}$ and $c = -\frac{29}{3}$ into the equation $y = mx + c$.

The equation of the line is $y = -\frac{4}{3}x - \frac{29}{3}$.

10 (a) $A(5, 9)$, $B(-1, 3)$

$m = \frac{3 - 9}{-1 - 5}$

$= \frac{-6}{-6}$

$= 1$

Substitute $m = 1$, $x = 5$ and $y = 9$ into $y = mx + c$.

$9 = 1(5) + c$

$9 = 5 + c$

$c = 4$

Substitute $m = 1$ and $c = 4$ into the equation $y = mx + c$.

The equation of the line is $y = x + 4$.

(b) $B(-1, 3)$, $C(3, -5)$

$m = \frac{-5 - 3}{3 - (-1)}$

$= \frac{-8}{4}$

$= -2$

Substitute $m = -2$, $x = -1$ and $y = 3$ into $y = mx + c$.

$3 = -2(-1) + c$

$3 = 2 + c$

$c = 1$

Substitute $m = -2$ and $c = 1$ into the equation $y = mx + c$.

The equation of the line is $y = -2x + 1$.

(c) $A(5, 9)$, $C(3, -5)$

$m = \frac{-5 - 9}{3 - 5}$

$= \frac{-14}{-2}$

$= 7$

Substitute $m = 7$, $x = 3$ and $y = -5$ into $y = mx + c$.

$-5 = 7(3) + c$

$-5 = 21 + c$

$c = -26$

Substitute $m = 7$ and $c = -26$ into the equation $y = mx + c$.

The equation of the line is $y = 7x - 26$.

11 (a) Substitute $m = 3$ and $Q(2, 10)$ into $y = mx + c$.

$10 = 3(2) + c$

$10 = 6 + c$

$c = 4$

Substitute $m = 3$ and $c = 4$ into $y = mx + c$.

The equation of PQ is $y = 3x + 4$.

(b) $\frac{x}{2} + \frac{y}{4} = 1$

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

$= -2$

Substitute $m = -2$ and $Q(5, 0)$ into $y = mx + c$.
$0 = -2(5) + c$
$0 = -10 + c$
$c = 10$
Substitute $m = -2$ and $c = 10$ into the equation $y = mx + c$.
The equation of PQ is $y = -2x + 10$.

(c) $m = -\frac{8}{-5} = \frac{8}{5}$

Substitute $m = \frac{8}{5}$ and $(4, 1)$ into $y = mx + c$.

$1 = \frac{8}{5}(4) + c$

$1 = \frac{32}{5} + c$

$1 - \frac{32}{5} = c$

$c = -\frac{27}{5}$

Substitute $m = \frac{8}{5}$ and $c = -\frac{27}{5}$ into the equation $y = mx + c$.

The equation of PQ is $y = \frac{8}{5}x - \frac{27}{5}$

12 (a) $A(2, 1)$, $y = x - 4$
Gradient of straight line $y = x - 4$ is 1.
Parallel lines have the same gradient.
Therefore, $m = 1$ and point $A(2, 1)$
$1 = 1(2) + c$
$1 = 2 + c$
$c = 1 - 2 = -1$
$\therefore y = x - 1$

(b) $A(-1, 3)$ $y = -4x + 7$
Gradient of straight line $y = -4x + 7$ is -4.
Parallel lines have the same gradient.
Therefore, $m = -4$ and point $A(-1, 3)$
$3 = -4(-1) + c$
$3 = 4 + c$
$c = 3 - 4 = -1$
$\therefore y = -4x - 1$

(c) $A(7, -4)$ $y = -\frac{5}{7}x - 2$

Gradient of straight line $y = -\frac{5}{7}x - 2$ is $-\frac{5}{7}$.

Parallel lines have the same gradient.

Therefore, $m = -\frac{5}{7}$ and point $A(7, -4)$

$-4 = -\frac{5}{7}(7) + c$

$-4 = -5 + c$
$c = -4 + 5$
$= 1$

$\therefore y = -\frac{5}{7}x + 1$

(d) $A(9, 0)$, $3y - x = 5$
$3y - x = 5$
$3y = x + 5$

$y = \frac{1}{3}x + \frac{5}{3}$

Gradient is $\frac{1}{3}$.

Parallel lines have the same gradient.

Therefore, $m = \frac{1}{3}$ and point $A(9, 0)$

$0 = \frac{1}{3}(9) + c$

$0 = 3 + c$
$c = -3$

$\therefore y = \frac{1}{3}x - 3$

(e) $A(-2, -5)$, $2x - y = 8$
$2x - y = 8$
$2x - 8 = y$
$y = 2x - 8$
Gradient is 2.
Parallel lines have the same gradient.
Therefore, $m = 2$ and point $A(-2, -5)$
$-5 = 2(-2) + c$
$-5 = -4 + c$
$c = -1$
$\therefore y = 2x - 1$

(f) $A(0, -2)$, $3x + 4y - 15 = 0$
$3x + 4y = 15$
$4y = -3x + 15$

$y = -\frac{3}{4}x + \frac{15}{4}$

Gradient is $-\frac{3}{4}$.

Parallel lines have the same gradient.

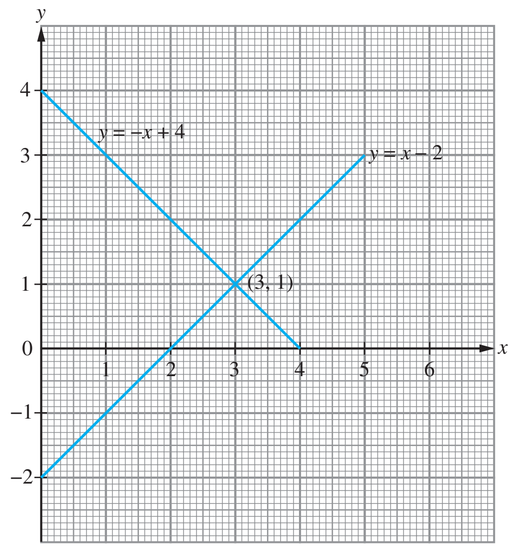
Therefore, $m = -\frac{3}{4}$ and point $A(0, -2)$

$c = -2$

$\therefore y = -\frac{3}{4}x - 2$

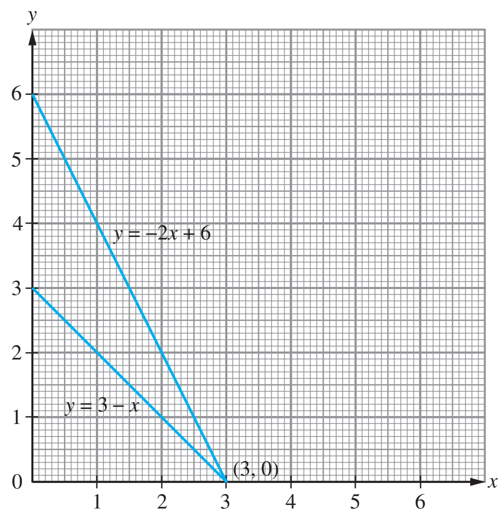
UPSKILL 9.1C

1 (a) $y = x - 2$, $y = -x + 4$



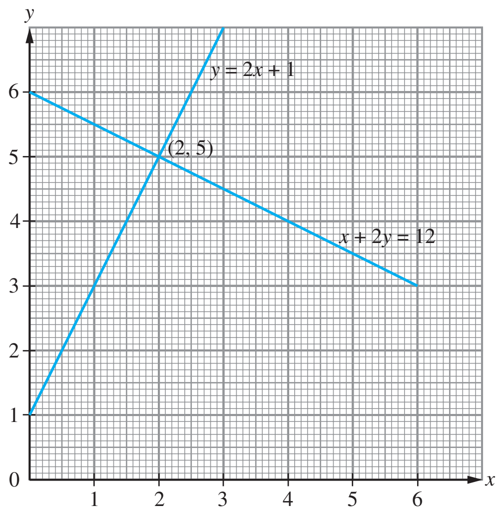
$\therefore$ The point of intersection is $(3, 1)$.

(b) $y = 3 - x$, $y = -2x + 6$



$\therefore$ The point of intersection is $(3, 0)$.

(c) $y = 2x + 1$, $x + 2y = 12$



$\therefore$ The point of intersection is (2, 5).

2 (a) $y = 5x - 2$ ...(1)

$y = -x + 1$ ...(2)

(1) – (2): $0 = 6x - 3$

$6x = 3$

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

Substitute $x = \frac{1}{2}$ into (2): $y = -\frac{1}{2} + 1$

$= \frac{1}{2}$

$\therefore$ The point of intersection is $\left(\frac{1}{2}, \frac{1}{2}\right)$.

(b) $y = 3x - 7$ ...(1)

$y = 5 - 3x$ ...(2)

Substitute (1) into (2): $3x - 7 = 5 - 3x$

$3x + 3x = 5 + 7$

$6x = 12$

$x = 2$

Substitute $x = 2$ into (1): $y = 3(2) - 7$

$= -1$

$\therefore$ The point of intersection is (2, –1).

(c) $3x + 2y = 6$ ...(1)

$x + y = 4$ ...(2)

(2) × 3: $3x + 3y = 12$ ...(3)

(1) – (3): $-y = -6$

$y = 6$

Substitute $y = 6$ into (2): $x + 6 = 4$

$x = 4 - 6 = -2$

$\therefore$ The point of intersection is (–2, 6).

3 (a) $5 + k = 8$

$k = 8 - 5 = 3$

(b) $x = 3$

(c) $y = -x + 8$

$m_{CD} = -1$

$AB \parallel CD$, therefore $m_{AB} = m_{CD} = -1$

Substitute $m = -1$ and $A(-1, 3)$ into $y = mx + c$.

$3 = -1(-1) + c$

$3 = 1 + c$

$c = 3 - 1 = 2$

The equation of straight line AB is $y = -x + 2$.

4 (a) $MN = LM = KL = KN = 5$ units

$ON = 3$ units

$OM = \sqrt{5^2 - 3^2} = 4$ units, $M(0, 4)$

$m_{MN} = -\frac{y\text{-intercept}}{x\text{-intercept}}$

$= -\frac{4}{-3}$

$= \frac{4}{3}$

(b) $L(5, 4)$

(c) $m_{KL} = m_{MN} = \frac{4}{3}$

Substitute $m = \frac{4}{3}$ and $L(5, 4)$ into $y = mx + c$.

$4 = \frac{4}{3}(5) + c$

$4 = \frac{20}{3} + c$

$c = 4 - \frac{20}{3} = -\frac{8}{3}$

$\therefore y = \frac{4}{3}x - \frac{8}{3}$

5 Let the age of Haslina = x and the age of Aishah = y

$x - y = 6$ ...(1)

$x + y = 40$ ...(2)

(1) + (2): $2x = 46$

$x = 23$

Substitute $x = 23$ into equation (2): $23 + y = 40$

$y = 17$

6 $2x + 2y = 480$ ...(1)

$y = 2x$ ...(2)

Substitute (2) into (1): $2x + 2(2x) = 480$

$6x = 480$

$x = 80$

Substitute $x = 80$ into equation (2): $y = 2(80)$

$= 160$

7 Let the marks scored by Pravin = x and the marks scored by Satish = y.

$x - y = 16$ ...(1)

$x + y = 170$ ...(2)

(1) + (2): $2x = 186$

$x = 93$

Substitute $x = 93$ into equation (2): $93 + y = 170$

$y = 170 - 93$

$= 77$

8 The cost of a netball = RMx and the cost of a tennis ball = RMy

$x - y = 8$ ...(1)

$4x + 5y = 140$ ...(2)

(1) × 5: $5x - 5y = 40$ ...(3)

(2) + (3): $9x = 180$

$= 20$

Substitute $x = 20$ into equation (1): $20 - y = 8$

$y = 20 - 8$

$= 12$

9 (a) x-intercept of JK:

$y = 0$, $2x - 0 = 5$

$x = 2.5$

$\therefore$ Equation of straight line KL is $x = 2.5$

(b) $2x - y = 5$

$2x - 5 = y$

$y = 2x - 5$

$m_{JK} = m_{LM} = 2$

Substitute $m = 2$, $x = 8$ and $y = 5$ into $y = mx + c$.

$5 = 2(8) + c$

$5 - 16 = c$

$c = -11$

$\therefore$ Thus, the equation of straight line LM is $y = 2x - 11$.

Substitute $y = 0$ into $y = 2x - 11$.

$2x - 11 = 0$

$x = \frac{11}{2}$ or 5.5

$\therefore x$-intercept $= \frac{11}{2}$ or 5.5

Summative Practice 9

Section A

1 For x-intercept, $y = 0$

$$y = -\frac{2}{5}x + 4$$

$$0 = -\frac{2}{5}x + 4$$

$$\frac{2}{5}x = 4$$

$$x = 4 \times \frac{5}{2}$$

$$= 10$$

Answer: **C**

2 $4x - 7y = 5$

$x = 3,\quad 4(3) - 7y = 5$

$12 - 7y = 5$

$-7y = -7$

$y = 1$

$\therefore (3, 1)$ lies on the straight line.

Answer: **D**

3 Substitute $m = 4$ and $(3, 7)$ into $y = mx + c$.

$7 = 4(3) + c$

$7 = 12 + c$

$7 - 12 = c$

$c = -5$

$y = 4x - 5$

Answer: **A**

4 PQ: $2x + 7y = 5$

$7y = -2x + 5$

$$y = -\frac{2}{7}x + \frac{5}{7}$$

RS: $2x = -7y + 6$

$7y = -2x + 6$

$$y = -\frac{2}{7}x + \frac{6}{7}$$

The straight lines PQ and RS have the same gradient.
Thus the two straight lines are parallel.

Answer: **B**

5 The gradient is 50, for every hour of usage, the charge will increase by RM50.

Answer: **B**

6 $3x - 8y = 16$

$3x - 16 = 8y$

$8y = 3x - 16$

$$y = \frac{3}{8}x - 2$$

Answer: **C**

7 $M(0, y)$ and $N(6, 10)$

$$\frac{y - 10}{0 - 6} = -\frac{1}{3}$$

$$y - 10 = -\frac{1}{3} \times (-6)$$

$y - 10 = 2$

$y = 12$

$OM = 12$ units, $LM = 13$ units

$OL = \sqrt{13^2 - 12^2} = 5$ units

x-intercept of LM is -5.

Answer: **B**

8 $5x - 2y = 15$

$5x - 15 = 2y$

$2y = 5x - 15$

$$y = \frac{5}{2}x - \frac{15}{2}$$

The y-intercept of the straight line is $-\frac{15}{2}$.

Answer: **C**

9 $$m = -\frac{y\text{-intercept}}{x\text{-intercept}}$$

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

$$= 2$$

Answer: **D**

10 Substitute $m = 3$ and $P(-2, 5)$ into $y = mx + c$.

$5 = 3(-2) + c$

$5 = -6 + c$

$c = 11$

$y = 3x + 11$

When $x = -1$, $y = 3(-1) + 11$

$= 8$

$\therefore Q(-1, 8)$

Answer: **C**

11 $$m = -\frac{y\text{-intercept}}{x\text{-intercept}}$$

$$-\frac{1}{3} = -\frac{-5}{x\text{-intercept}}$$

x-intercept $= -3 \times 5$

$= -15$

Answer: **B**

12 $4x + 8y + 5 = 0$

$8y = -4x - 5$

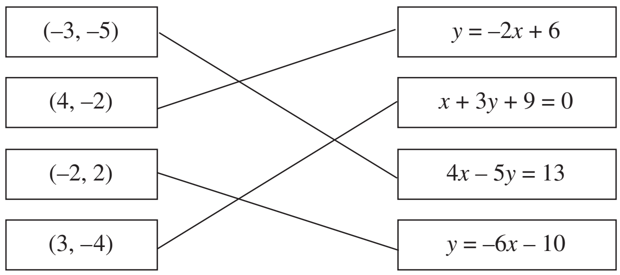
$$y = -\frac{1}{2}x - \frac{5}{8}$$

Gradient, $m = -\frac{1}{2} = -0.5$

Answer: **C**

Section B

1



2 (a) (i) $y = 4$

(ii) $x = -2$

(b) (i) False

(ii) True

Section C

1 (a) (i) $y - 4x = 10$

$y = 4x + 10$

y-intercept $= 10$

Thus, the equation of straight line NP is $y = 10$.

(ii) $m_{MN} = m_{PQ} = 4$

$y = 4x + c$

$1 = 4(2) + c$

$1 - 8 = c$

$c = -7$

$\therefore y = 4x - 7$

x-intercept: $y = 0$

$0 = 4x - 7$

$4x = 7$

$$x = \frac{7}{4}$$

$\therefore x$-intercept $= \frac{7}{4}$

(b) (i) $9x + 3y = 8$

$3y = -9x + 8$

$$y = -3x + \frac{8}{3}$$

$m_{RS} = m_{PQ} = -3$

Substitute $m = -3$ and $R(-4, -2)$ into $y = mx + c$

$-2 = -3(-4) + c$

$-2 = 12 + c$

$c = -2 - 12$

$= -14$

$y = -3x - 14$

(ii) When $y = 0$, $0 = -3x - 14$

$3x = -14$

$x = -\frac{14}{3}$

x-intercept $= -\frac{14}{3}$

2 (a) (i) $K(-4, 0)$, $L(0, 8)$

Equation of straight line LM: $y = 8$

(ii) $m_{KL} = -\frac{y\text{-intercept}}{x\text{-intercept}}$

$= -\frac{8}{-4}$

$= 2$

$m_{MN} = m_{KL} = 2$,

Substitute $m = 2$ and $N(8, 10)$ into $y = mx + c$.

$10 = 2(8) + c$

$10 = 16 + c$

$c = 10 - 16$

$= -6$

$y = 2x - 6$

When $y = 0$, $0 = 2x - 6$

$2x = 6$

$x = 3$

x-intercept $= 3$

(b) $2x - \frac{1}{3}y = 8$ ...(1)

$3x + y = 21$ ...(2)

(1) × 3: $6x - y = 24$ ...(3)

(2) + (3): $9x = 45$

$x = 5$

Substitute $x = 5$ into equation (2): $3(5) + y = 21$

$15 + y = 21$

$y = 6$

Thus, the point of intersection is (5, 6).