Fully-worked Solutions

Practice 6

Formative Practice

1 A Not a linear equation in one variable.
B Not a linear equation in one variable.
C A linear equation in one variable.
D Not a linear equation in one variable.
Answer: **C**

2 (a) No (b) Yes
(c) Yes (d) No

3 (a) The sum of a and 3 is 10. → $3 = a + 10$
(b) Three times a is 10. → $3a = 10$
(c) The difference between a and 10 is 3. → $a - 10 = 3$
(d) 3 is 10 more than a. → $a + 3 = 10$

4 (a) $5x = 12$
(b) $m + 70 = 150$

5 $2x + 3 = 23$

6 (a) $p - 3 = -8$ → -5
(b) $p + 7 = 11$ → 4
(c) $-5p = 10$ → -2
(d) $\frac{3p}{4} = -6$ → -8

7 $2y = 3 - 2y$
$4y = 3$
$y = \frac{3}{4}$
Answer: **C**

8 (a) $x = 2x + 1$ ✓
(b) $6x - 11 = 5x - 10$
(c) $\frac{1}{2}x + 3 = x + 4$
(d) $3x - 8 = 7x - 4$ ✓

9 (a) Time of journey for the car = $3\frac{1}{2}$ hours
$3\frac{1}{2} = 5 - x$
(b) $x = 5 - 3\frac{1}{2}$
$x = 1\frac{1}{2}$

10 (a) $900 = 4x$
(b) $x = \frac{900}{4}$
$= 225$

11 A A linear equation in two variables.
B Not a linear equation in two variables.
C A linear equation in two variables.
D A linear equation in two variables.
Answer: **B**

12 (a) $6x + 4y = 35$ (b) $x = 43 - y$

13 (a) $x = y + 16$
(b) $x : y = 5 : 3$
$\frac{x}{y} = \frac{5}{3}$
$3x = 5y$

14 (a) $3x + y = 12$
$3(2) + y = 12$
$6 + y = 12$
$y = 6$
Solution: (2, 6)
(b) $7x - 2y = 8$
$7x - 2(-4) = 8$
$7x + 8 = 8$
$7x = 0$
$x = 0$
Solution: (0, −4)
(c) $5x - 13y = -2$
$5(-3) - 13y = -2$
$-15 - 13y = -2$
$-13y = 13$
$y = -1$
Solution: (−3, −1)
(d) $-4x + 9y = 5$
$-4x + 9(-3) = 5$
$-4x - 27 = 5$
$-4x = 32$
$x = -8$
Solution: (−8, −3)

15 (a) $5x - 8y = 18$
When $x = -1$, $y = 2$,

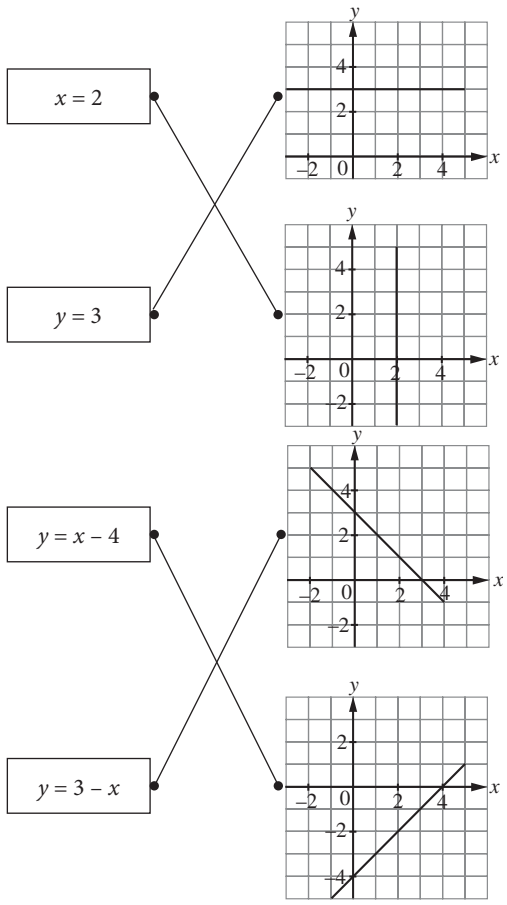
$5x - 8y = 5(-1) - 8(2)$
$= -5 - 16$
$= -21$
$\neq 18$
$x = -1, y = 2$ is not a solution for the equation $5x - 8y = 18$.
When $x = 2, y = -1$,
$5x - 8y = 5(2) - 8(-1)$
$= 10 + 8$
$= 18$
$x = 2, y = -1$ is a solution for the equation $5x - 8y = 18$.

(b) $7x + y = 26$
When $x = 3, y = 5$,
$7x + y = 7(3) + 5$
$= 21 + 5$
$= 26$
$x = 3, y = 5$ is a solution for the equation $7x + y = 26$.
When $x = -2, y = 12$,
$7x + y = 7(-2) + 12$
$= -14 + 12$
$= -2$
$\neq 26$
$x = -2, y = 12$ is not a solution for the equation $7x + y = 26$.

(c) $x - 10y = -5$
When $x = 5, y = 1$,
$x - 10y = 5 - 10(1)$
$= 5 - 10$
$= -5$
$x = 5, y = 1$ is a solution for the equation $x - 10y = -5$.
When $x = -7, y = -5$,
$x - 10y = -7 - 10(-5)$
$= -7 + 50$
$= 43$
$\neq -5$
$x = -7, y = -5$ is not a solution for the equation $x - 10y = -5$.

(d) $-2x + 3y = -4$
When $x = -3, y = -3$,
$-2x + 3y = 2(-3) + 3(-3)$
$= -6 - 9$
$= -15$
$\neq -4$
$x = -3, y = -3$ is not a solution for the equation $-2x + 3y = -4$.
When $x = -1, y = -2$,
$-2x + 3y = 2(-1) + 3(-2)$
$= 2 - 6$
$= -4$
$x = -1, y = -2$ is a solution for the equation $-2x + 3y = -4$.

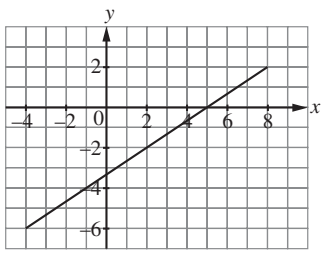
16 (a)



17 (a)

x	−4	2	8
y	−6	−2	2

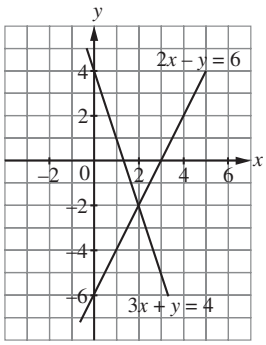
(b)



18 $2x + y = 12$ ..... ①
$x + 3y + 1 = 12$
$x + 3y = 11$ .....②
$2x + y = x + 3y + 1$
$x - 2y = 1$ .....③
Answer: **A**

19 (a) II, Unique solution
(b) III, No solution
(c) I, Infinite solutions

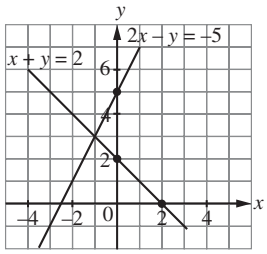
20 (a)



(b) (i) The two straight lines intersect.
(ii) The simultaneous linear equations $2x - y = 6$ and $3x + y = 4$ have unique solution.

(c) $x = 2, y = -2$

21 (a)



$x = -1, y = 3$

(b) (i) $x + y = 2$ ——— ①
$2x - y = -5$ ——— ②
From ①,
$y = 2 - x$ ——— ③
Substitute ③ into ②,

$$\begin{aligned} 2x - (2 - x) &= -5 \\ 2x - 2 + x &= -5 \\ 2x + x &= -5 + 2 \\ 3x &= -3 \\ x &= -1 \end{aligned}$$

Substitute $x = -1$ into ①,

$$\begin{aligned} -1 + y &= 2 \\ y &= 3 \end{aligned}$$

(ii) ① + ②,

$$\begin{aligned} x + 2x &= 2 + (-5) \\ 3x &= -3 \\ x &= -1 \end{aligned}$$

Substitute $x = -1$ into ①,

$$\begin{aligned} -1 + y &= 2 \\ y &= 3 \end{aligned}$$

22 (a) $x + y = 5$ …… ①
$x - y = -3$ …… ②
① + ②: $2x = 2$
$x = 1$
From ①, $1 + y = 5$
$y = 4$
$\therefore x = 1, y = 4$

(b) $2x - y = 7$ …… ①
$x + y = 8$ …… ②
① + ②: $3x = 15$
$x = 5$
From ②, $5 + y = 8$
$y = 3$
$\therefore x = 5, y = 3$

(c) $x + 3y = 16$ …… ①
$4x + y = -2$ …… ②
② × 3: $12x + 3y = -6$ …… ③
③ – ①: $11x = -22$
$x = -2$
From ②, $4(-2) + y = -2$
$-8 + y = -2$
$y = 6$
$\therefore x = -2, y = 6$

(d) $3x - 7y = 5$ …… ①
$5x - 2y = -11$ …… ②
① × 2: $6x - 14y = 10$ …….. ③
② × 7: $35x - 14y = -77$ …….. ④
④ – ③: $29x = -87$
$x = -3$
From ②, $5(-3) - 2y = -11$
$-15 - 2y = -11$
$-2y = 4$
$y = -2$
$\therefore x = -3, y = -2$

23 (a) $x = 14 + y$
$x + y = 154$

(b) $x - y = 14$ …….. ①
$x + y = 154$ …… ②
① + ②, $2x = 168$
$x = 84$
From ①, $84 - y = 14$
$y = 70$
$\therefore x = 84, y = 70$

24 (a) $a + b = 72$
$a = 2b$

(b) $a + b = 72$ ……..①
$a - 2b = 0$ ……②
① – ②: $3b = 72$
$b = 24$
From ①, $a + 24 = 72$
$a = 48$
$\therefore a = 48, b = 24$

25 (a) $x + 4y = 12$ …… ①
$3x + 7y = 26$ …… ②

(b) ① × 3: $3x + 12y = 36$ …….. ③
③ – ②: $5y = 10$
$y = 2$
From ①, $x + 4(2) = 12$
$x + 8 = 12$
$x = 4$
$\therefore x = 4, y = 2$

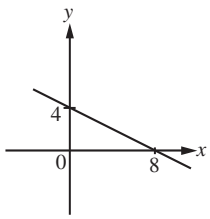
Summative Practice

1 A A linear equation in one variable.
B Not a linear equation in one variable.
C A linear equation in one variable.
D A linear equation in one variable.
Answer: **B**

2 $p - 5 = 15 - 4p$
$p + 4p = 15 + 5$
$5p = 20$
$p = 4$
Answer: **C**

3 $(x + 9) + (2x - 3) + 7 = 34$
$3x + 13 = 34$
$3x = 21$
$x = 7$
Answer: **B**

4 $x + 2y = 8$
When $x = 0$, $y = 4$
When $y = 0$, $x = 8$



Answer: **B**

5 When $x = -9$, $y = 10$,
$2x + 3y = 2(-9) + 3(10)$
$= -18 + 30$
$= 12$
$x = -9$, $y = 10$ is a possible solution.
When $x = 3$, $y = 2$,
$2x + 3y = 2(3) + 3(2)$
$= 6 + 6$
$= 12$
$x = 3$, $y = 2$ is a possible solution.
When $x = -6$, $y = 8$,
$2x + 3y = 2(-6) + 3(8)$
$= -12 + 24$
$= 12$
$x = -6$, $y = 8$ is a possible solution.
When $x = -4$, $y = 6$,
$2x + 3y = 2(-4) + 3(6)$
$= -8 + 18$
$= 10$
$\neq 12$
$x = -4$, $y = 6$ is not a possible solution.
Answer: **D**

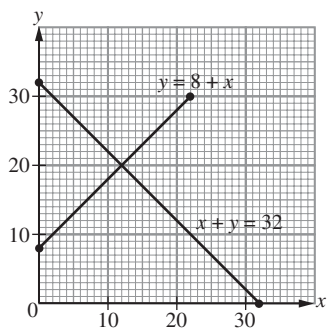
6 (a) $75 = k + 12$
(b) The height of Anas is twice the height of Dahlia

7 $\frac{2x - 5}{3} = \frac{19 - x}{4}$
$4(2x - 5) = 3(19 - x)$
$8x - 20 = 57 - 3x$
$8x + 3x = 57 + 20$
$11x = 77$
$x = 7$

8 (a) $2 + 0.5(t - 1) = 9$
(b) $2 + 0.5t - 0.5 = 9$
$0.5t = 7.5$
$t = 15$

9 (a) $5m + 20n = 825$
$m + 4n = 165$
(b) $m = 165 - 4n$
$30 < m < 40$
$30 < 165 - 4n < 40$
$165 - 40 < 4n < 165 - 30$
$125 < 4n < 135$
$31.25 < n < 33.75$
$n = 32$ or $n = 33$
When $n = 32$, $m = 165 - 4(32)$
$= 37$
When $n = 33$, $m = 165 - 4(33)$
$= 33$
$\therefore$ $m = 33$, $n = 33$ or $m = 37$, $n = 32$

10 (a) $x + y = 32$
$y = 8 + x$
(b)



(c) $x = 12$, $y = 20$

11 $x + 2y = 8$ ..... ①
$3x - 7y = 11$ ..... ②
From ①, $x = 8 - 2y$
From ②,
$3(8 - 2y) - 7y = 11$
$24 - 6y - 7y = 11$
$24 - 13y = 11$
$-13y = -13$
$y = 1$
$x = 8 - 2(1)$
$= 6$
$\therefore$ $x = 6$, $y = 1$

12 $4m - 9n = 59$ ..... ①
$2m - 3n = 25$ ..... ②
② × 3: $6m - 9n = 75$ .....③
③ – ①: $2m = 16$
$m = 8$
From ②, $2(8) - 3n = 25$
$16 - 3n = 25$
$-3n = 9$
$n = -3$
$\therefore$ $m = 8$, $n = -3$

13 (a) $x = 30 + y$

$x - y = 30$

$x + 7 = 3(y + 7)$

$x + 7 = 3y + 21$

$x - 3y = 14$

(b) $x - y = 30$ ..... ①

$x - 3y = 14$..... ②

① – ②, $2y = 16$

$y = 8$

From ①, $x - 8 = 30$

$x = 38$

Rahman: 38 years old

Zainal: 8 years old

14 (a) (0, –9), (1, –6), (4, 3)

(b)