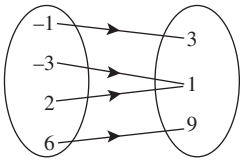
# Fully-worked Solutions

## Practice 8

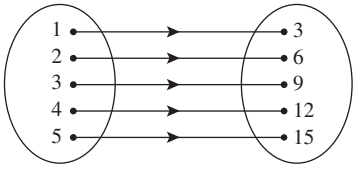
### Formative Practice

**1**




Answer: **C**

**2** (a)




(b) One, one

(c) (i) {1, 2, 3, 4, 5}

(ii) {3, 6, 9, 12, 15}

**3** (a) The relation between set *A* and set *B* is not a function.

(b) Element 9 in set *A* has two elements 8 and 10 in set *B*.

**4** (a) A function, each value of *x* has only one value of *y*.

(b) Not a function, 1 has two values 1 and 4.

**5** Yes, each value of *x* has only one value of *y*.

**6** (a) {(0, 1), (1, 3), (2, 5), (3, 7)}
A function, each value of *x* has only one value of *y*.

(b) {(0, 0), (1, 2), (1, −2), (4, 4)}
Not a function, the value of $x = 1$ has two values of $y = 2$ and $y = -2$.

**7** (a) {(3, 0), (1, 3), (4, 1), (8, 4)}

(b) {(5, 2), (2, 5), (4, 2), (6, 6)}

(c)

| *x* | −1 | 1 | 3 | 5 |
|---|---|---|---|---|
| *y* | 6 | 0 | 2 | −3 |

(d)

| *x* | −2 | 0 | 2 | 4 |
|---|---|---|---|---|
| *y* | 5 | 1 | 4 | 1 |

(a), (c) → One-to-one function

(b), (d) → Many-to-one function

**8** (a) One-to-one function

(b) Many-to-one function

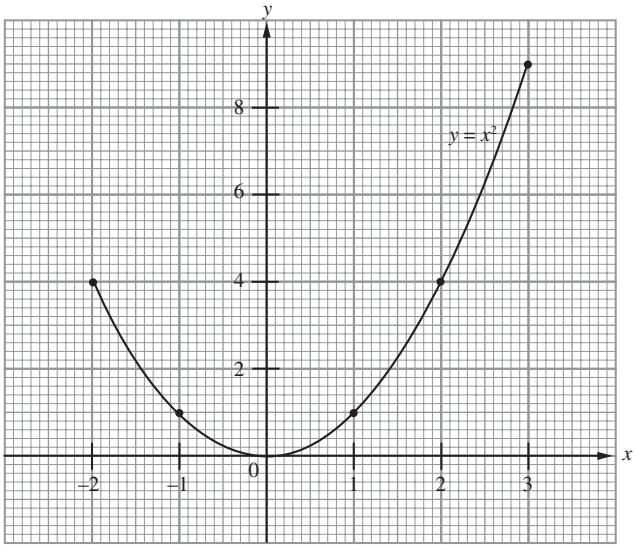
**9** When $x = -1$,
$y = 3(-1)^2 - 1$
$= 3 - 1$
$= 2$
When $x = 0$,
$y = 3(0)^2 - 1$
$= 0 - 1$
$= -1$
When $x = 1$,
$y = 3(1)^2 - 1$
$= 3 - 1$
$= 2$
Answer: **B**

**10** (a) $y = 4x + 9$

(b) $y = x^2 + 3x$

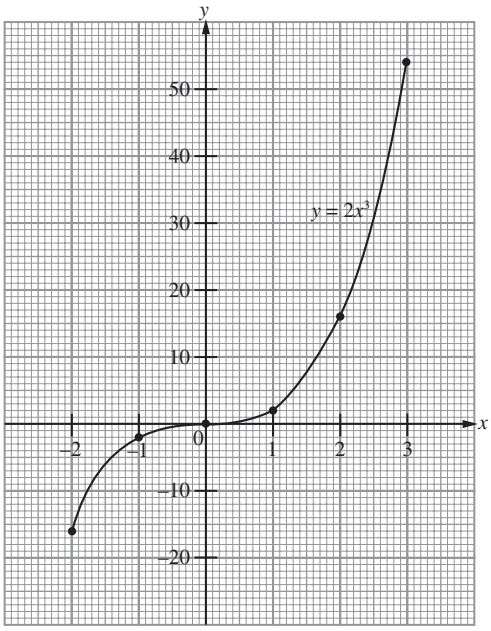
**11** (a)

| *x* | −2 | −1 | 0 | 1 | 2 | 3 |
|---|---|---|---|---|---|---|
| *y* | 4 | 1 | 0 | 1 | 4 | 9 |



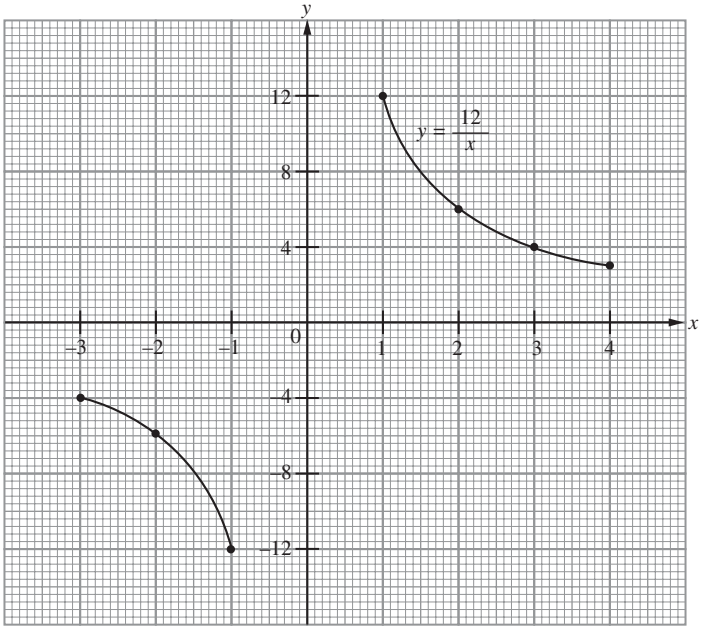
(b)

| $x$ | −2 | −1 | 0 | 1 | 2 | 3 |
|---|---|---|---|---|---|---|
| $y$ | −16 | −2 | 0 | 2 | 16 | 54 |




(c)

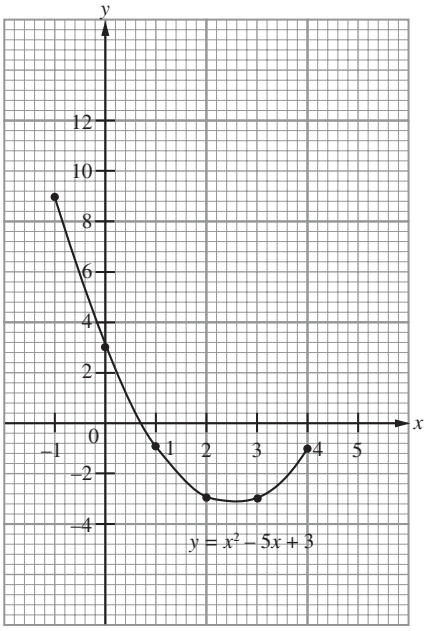
| $x$ | −3 | −2 | −1 | 1 | 2 | 3 | 4 |
|---|---|---|---|---|---|---|---|
| $y$ | −4 | −6 | −12 | 12 | 6 | 4 | 3 |



**12** (a)

| $x$ | −1 | 0 | 1 | 2 | 3 | 4 |
|---|---|---|---|---|---|---|
| $y$ | 9 | 3 | −1 | −3 | −3 | −1 |

(b)




**13** (a) $x = -1$ → $y = 5.2$

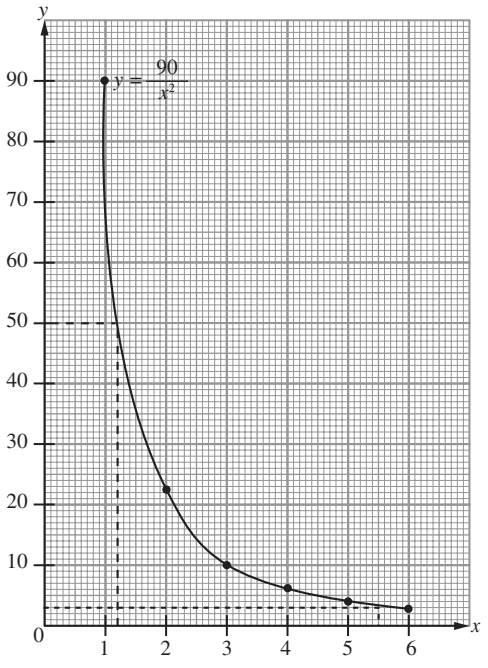
(b) $x = 3$ → $y = 4.8$

(c) $x = 0$ → $y = 2$

**14** (a)

| $x$ | 2 | 3 | 5 | 6 |
|---|---|---|---|---|
| $y$ | 22.5 | 10 | 3.6 | 2.5 |

(b)

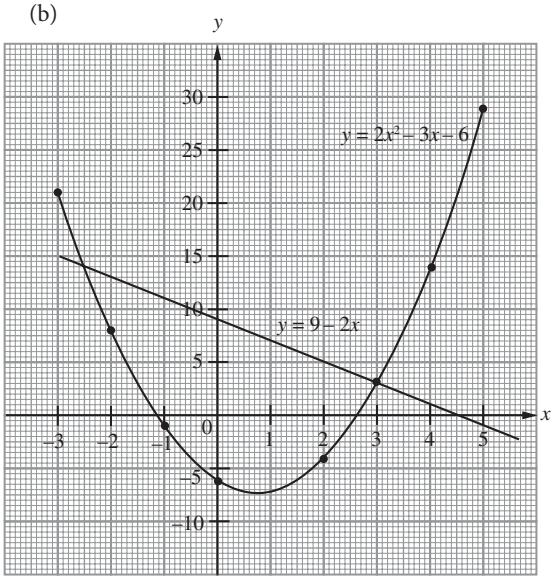



(c) (i) 3 (ii) 1.2

**15** (a)

| $x$ | −2 | −1 | 2 | 3 |
|---|---|---|---|---|
| $y$ | 8 | −1 | −4 | 3 |

(b)




(c) $y = 2x^2 - 3x - 6$…….. ①

$2x^2 - x - 15 = 0$…….. ②

From ②,

$2x^2 = x + 15$

$y = (x + 15) - 3x - 6$

$y = 9 - 2x$

$x = -2.5, x = 3$

## Summative Practice

**1** When $x = -3$,

$y = (-3)^2 - 5(-3) + 9$

$= 9 + 15 + 9$

$= 33$

Answer: **D**

**2** **A** $y = 3 - 2x^2$

When $x = -1$,

$y = 3 - 2(-1)^2$

$= 3 - 2$

$= 1$

When $x = 0$,

$y = 3 - 2(0)^2$

$= 3 - 0$

$= 3$

When $x = 1$,

$y = 3 - 2(1)^2$

$= 3 - 2$

$= 1$

When $x = 2$,

$y = 3 - 2(2)^2$

$= 3 - 8$

$= -5$

When $x = 3$,
$y = 3 - 2(3)^2$
$= 3 - 18$
$= -15$

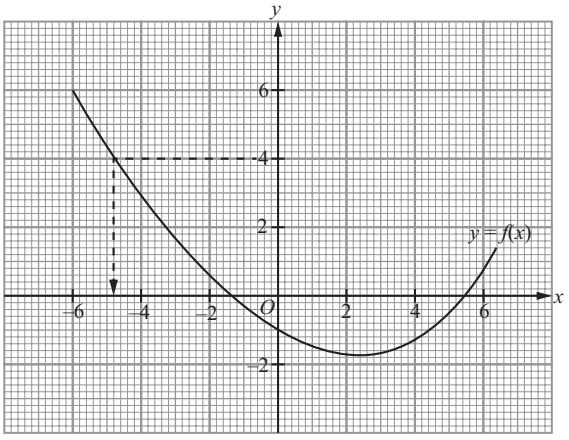
**B** $y = 3 + x - x^2$
When $x = -1$,
$y = 3 + (-1) - (-1)^2$
$= 3 - 1 - 1$
$= 1$
When $x = 0$,
$y = 3 + 0 - 0^2$
$= 3$
When $x = 1$,
$y = 3 + 1 - 1^2$
$= 3 + 1 - 1$
$= 3$
$\neq 1$

**C** $y = 2x^2 - 4x + 3$
When $x = -1$,
$y = 2(-1)^2 - 4(-1) + 3$
$= 2 + 4 + 3$
$= 9$
$\neq 1$

**D** $y = 3 + 2x - 4x^2$
When $x = -1$,
$y = 3 + 2(-1) - 4(-1)^2$
$= 3 - 2 - 4$
$= -3$
$\neq 1$

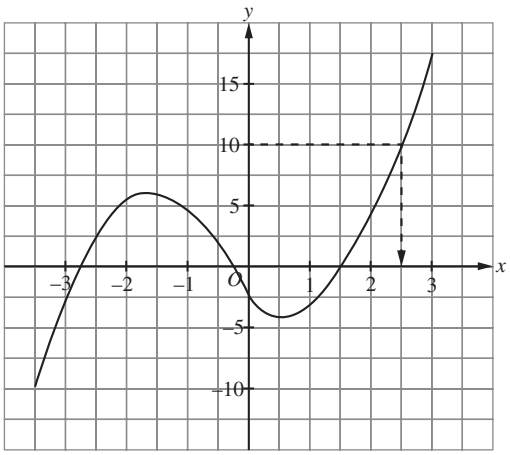
Answer: **A**

**3**




When $y = 4$, $k = -4.8$
Answer: **A**

**4**



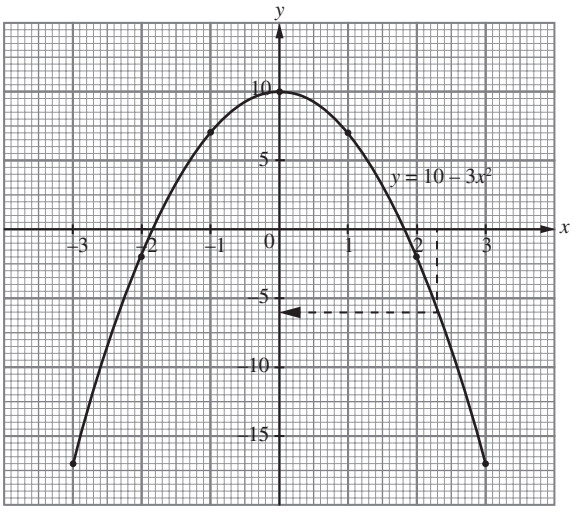

When $y = 10$, $x = 2.5$
Answer: **D**

**5** (a) A function, each value of $x$ has only one value of $y$.
(b) Not a function, 3 is a prime number and an odd number.
(c) A function, each value of $x$ has only one value of $y$.

**6** (a)

| $x$ | −3 | −2 | −1 | 0 | 1 | 2 | 3 |
|---|---|---|---|---|---|---|---|
| $y$ | −17 | −2 | 7 | 10 | 7 | −2 | −17 |

(b)

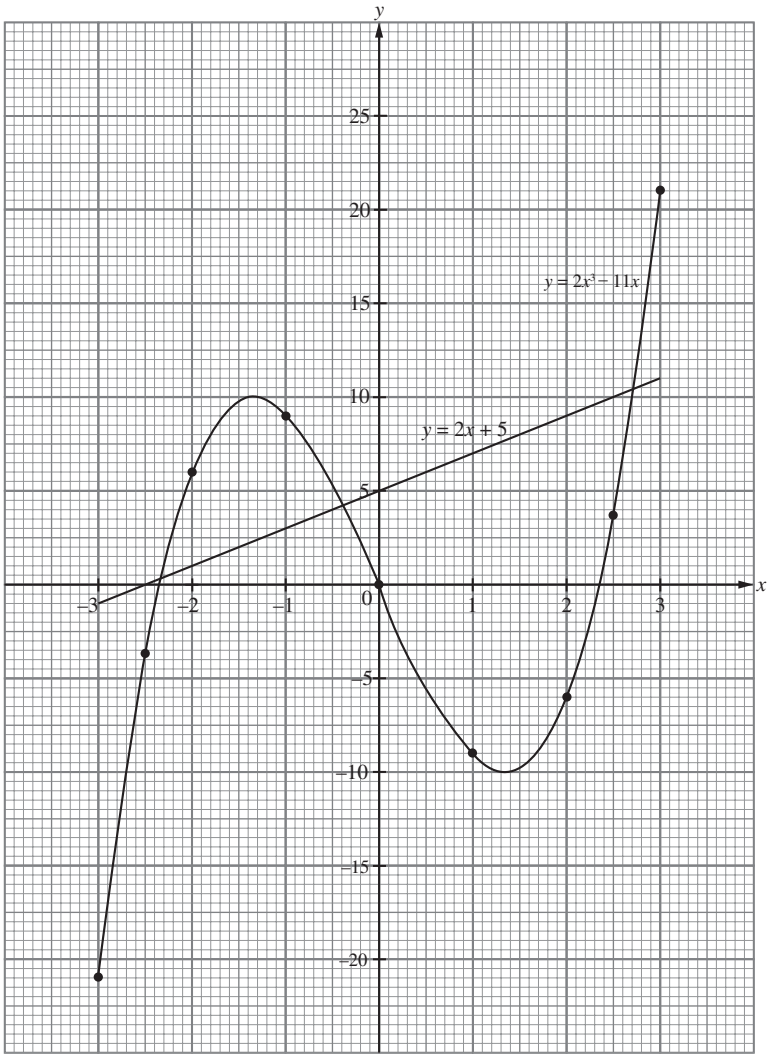



(c) From graph, when $x = 2.3$, $y = -6$,
$y = 10 - 3x^2$
$-6 = 10 - 3(2.3^2)$
$3(2.3^2) = 16$
$2.3^2 = \frac{16}{3}$

7 (a)

| $x$ | −3 | −2.5 | −2 | −1 | 0 | 1 | 2 | 2.5 | 3 |
|---|---|---|---|---|---|---|---|---|---|
| $y$ | −21 | −3.75 | 6 | 9 | 0 | −9 | −6 | 3.75 | 21 |

(b)




(c) $y = 2x^3 - 11x$

$2x^3 = y + 11x$

$2x^3 - 13x = 5$

$y + 11x - 13x = 5$

$y = 2x + 5$

From graph, $x = -2.35, -0.35, 2.7$.