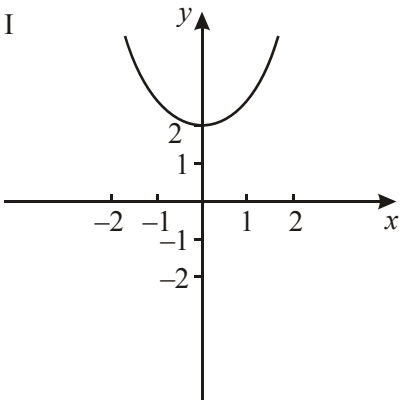
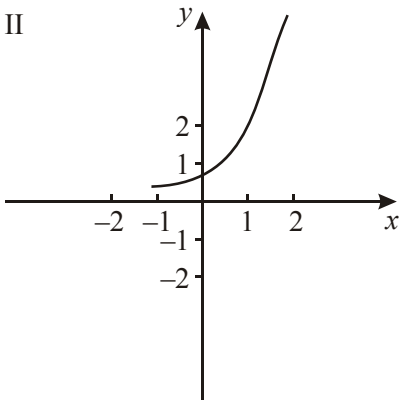
1. The following diagrams show the graphs of five functions.

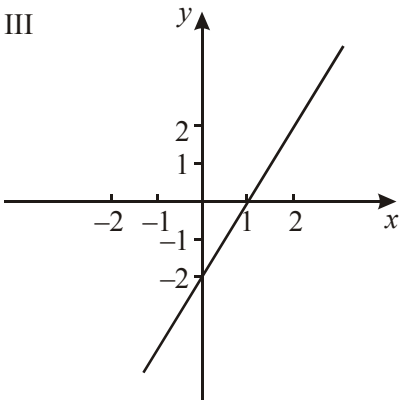
I



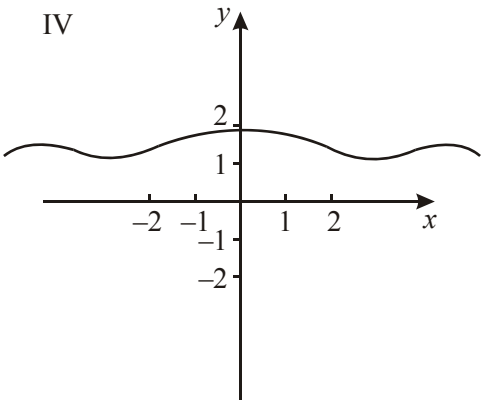
II



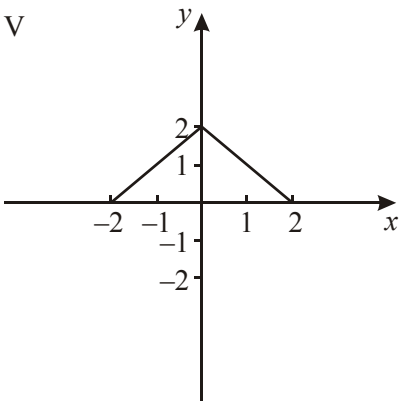
III



IV



V



Each of the following sets represents the range of one of the functions of the graphs.

(a) $\{y \mid y \in \mathbb{R}\}$

(b) $\{y \mid y \geq 2\}$

(c) $\{y \mid y > 0\}$

(d) $\{y \mid 1 \leq y \leq 2\}$

Write down which diagram is linked to each set.

Working:

Answers:

(a) ……..

(b) ……..

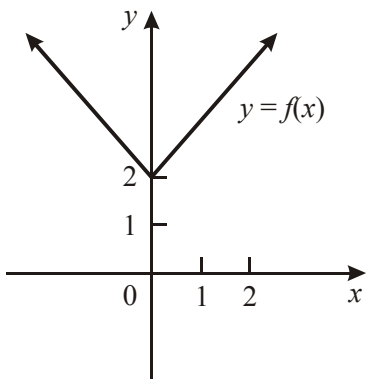
(c) ……..

(d) ……..

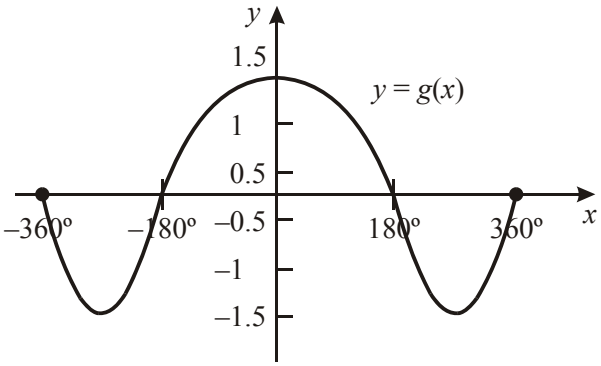
(Total 4 marks)

2. The diagrams below show the graphs of two functions, $y = f(x)$, and $y = g(x)$.

(a)



(b)



State the domain and range of

(a) the function f;

(b) the function g.

Working:

Answers:

(a) Domain of f .....

Range of f .....

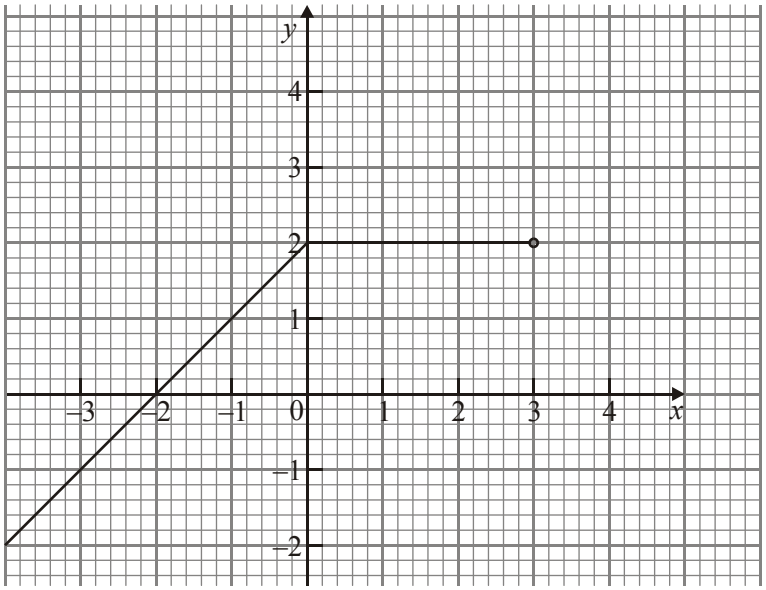
(b) Domain of g .....

Range of g .....

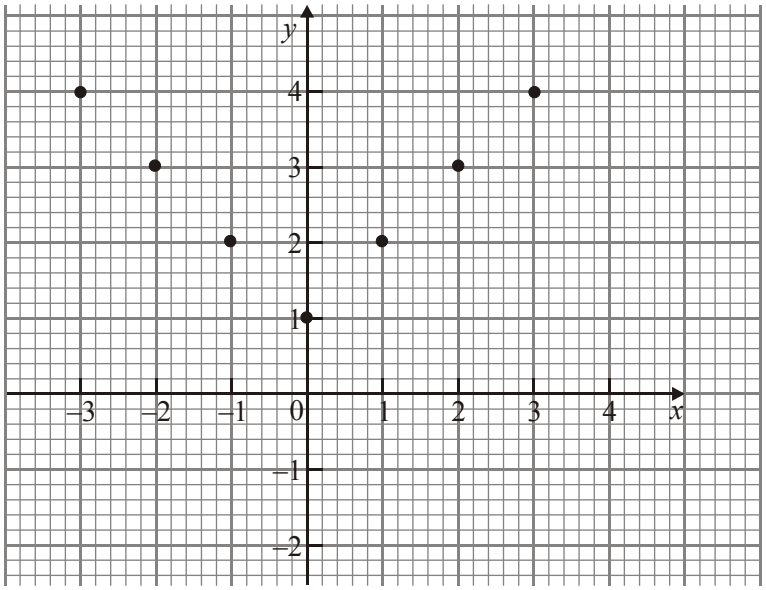
(Total 8 marks)

3. Write down the domain and range of the following functions.

(a)



(b)



Working:

Answers:

(a) .....

.....

(b) .....

.....

(Total 8 marks)

4. (a) Factorize the expression $x^2 - 3x - 10$.

(2)

(b) A function is defined as $f(x) = 1 + x^3$ for $x \in \mathbb{Z}, -3 \leq x \leq 3$.

(i) List the elements of the domain of $f(x)$.

(ii) Write down the range of $f(x)$.

(4)

Working:

Answers:

(a) .....

(b) (i).....

(ii).....

(Total 6 marks)

1. (a) III (A1)

(b) I (A1)

(c) II (A1)

(d) IV (A1)

[4]

2. (a) (i) Domain: $\mathbb{R}$ (A2)

(ii) Range: $\{y \mid y \geq 2\}$ accept $y \geq 2$ (A2)(C4)

(b) (i) Domain: $\{x \mid -360° \leq x \leq 360°\}$ (A2)

Accept $-360 \leq x \leq 360$

(ii) Range: $\{y \mid -1.5 \leq y \leq 1.5\}$ (A2)(C4)

Accept –1.5 ≤ y ≤ 1.5

[8]

3. (a) Domain $x < 3$ (accept $-4 \leq x < 3$) Range $y \leq 2$ (accept $-2 \leq y \leq 2$) (A2)(A2)

Note: *Award (A1) for $x \leq 3$ and (A1) for $y < 2$. If the domain and range are reversed award [0 marks] in this part of the question. Allow for other notation such as $[-\infty, 3]$ or $[\infty, 3]$ for domain and $[-\infty, 2]$ for range.*

(b) Domain {–3, –2, –1, 0, 1, 2, 3} Range {1, 2, 3, 4} (A2)(A2)

Note: *Award (A2) ft, (A2) ft if domain and range are reversed.*
Award (A1) if 1 number is omitted from the domain and (A1) if 1 number is omitted from the range.
Award (A0) if more than 1 number is omitted from the domain and (A0) if more than 1 number is omitted from the range.
Award (A0) for $-3 \leq x \leq 3$ and $1 \leq y \leq 4$.

[8]

4. (a) $(x - 5)(x + 2)$ (A1)(A1)

Note: *Award (A1) for $(x + 5)(x-2)$, (A0) otherwise.*
If equation is equated to zero and solved by factorizing award (A1) for both correct factors, followed by (A0). (C2)

(b) (i) $-3, -2, -1, 0, 1, 2, 3$ (A1)(A1)

Notes: *Award (A2) for all correct answers seen and no others.*
Award (A1) for 3 correct answers seen. (C2)

(ii) $-26, -7, 0, 1, 2, 9, 28$ (A1)(A1)

Notes: *Award (A2) for all correct answers seen and no others.*
Award (A1) for 3 correct answers seen.
If domain and range are interchanged award (A0) for (b)(i) and (A1)(ft)(A1)(ft) for (b)(ii). (C2)

[6]