Graphs of Functions - Section Test (Answers)

1)

$y - x + 1 = 0$ can be written as $y = x - 1$

$y + x = 1$ can be written as $y = -x + 1$

$y = x + 1$ can be written as $y = x + 1$

$y + x + 1 = 0$ can be written as $y = -x - 1$

The line in the diagram has a positive gradient and a negative intercept, so $y - x + 1 = 0$ is the correct equation.

2) Gradient of PQ $= \frac{y_1 - y_2}{x_1 - x_2} = \frac{7 - (-3)}{2 - 6} = \frac{10}{-4} = -2.5$

3)

$y - y_1 = m(x - x_1)$

$y - 1 = -2(x - 4)$

$y - 1 = -2x + 8$

$y + 2x - 9 = 0$

4)

$y = 3x + 1$ and $y = 2x + 4$

Solving for x:

$3x + 1 = 2x + 4$

$3x - 2x = 4 - 1$

$x = 3$

Substitute this value to find y:

$y = 3x + 1$

$y = 3(3) + 1 = 9 + 1 = 10$

So, the point of intersection is (3, 10)

5)

(a) $y = x^2 - 3x + 2$
(b) $y = x^2 + 3x + 2$
(c) $y = x^2 - x - 2$
(d) $y = x^2 + x - 2$

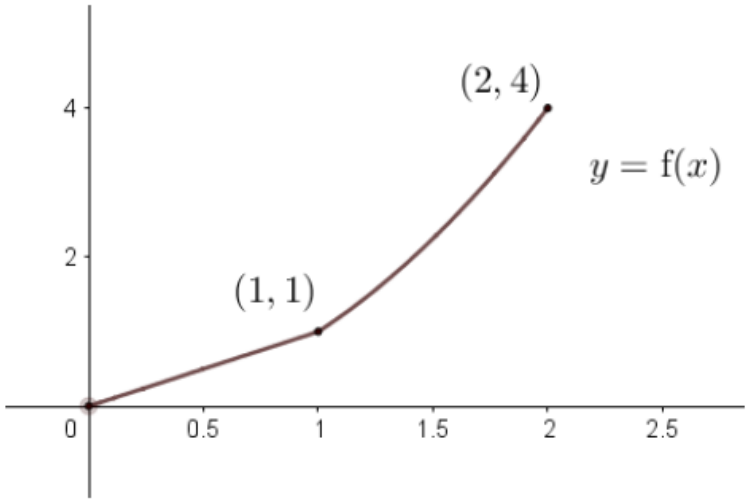
The graph crosses the positive y- axis so (c)and (d) are ruled out.
(a) can be written as $y = (x - 1)(x - 2)$ so crosses the x- axis at $x=1$ and $x=2$.
(b) can be written as $y = (x + 1)(x + 2)$ so crosses the x- axis at $x=-1$ and $x=-2$.
The points where the graph cuts the x-axis are both positive values so the diagram show graph (a).

6)

$y = x^2 + c$
$x = 1, y = 4$

$4 = 1^2 + c$

$c = 4 - 1 = 3$



7) We can see that the graph takes x values 0 to 2 inclusive so the domain is $0 \leq x \leq 2$

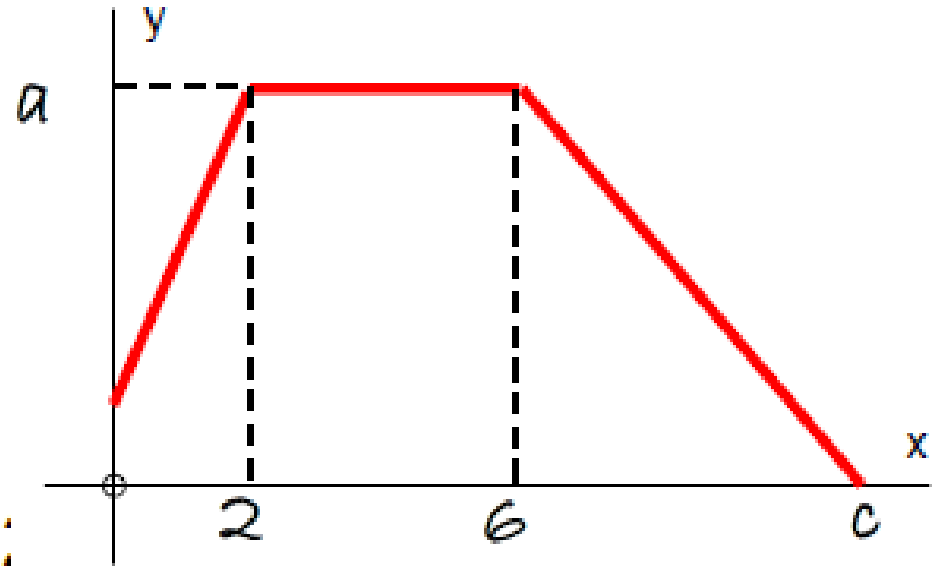
8) We can see that the graph takes y values 0 to 4 inclusive so the domain is $0 \leq y \leq 4$

9) From $0 \leq x \leq 1$, the graph has a gradient of 1 and a y intercept of 0. So, $f(x) = x$
From $1 < x \leq 2$, the graph is given by $f(x) = x^2$
So, the definition of f is:

$$f(x) = \begin{cases} x & \text{if } 0 \leq x \leq 1 \\ x^2 & \text{if } 1 < x \leq 2 \end{cases}$$

10)

$$f(x) = 2x + 1 \quad 0 \le x < 2$$
$$= a \quad 2 \le x < 6$$
$$= b - x \quad 6 \le x \le c$$



When $x = 2$, $f(x) = 2 \times 2 + 1 = 5$

so $a = 5$

When $x = 6$, $f(x) = 5$, so $b - x = 5$

$$b - 6 = 5 \quad \Rightarrow b = 11$$

When $x = c$, $f(c) = 0$

$$b - c = 0$$

$$11 - c = 0 \quad \Rightarrow c = 11$$

So $a = 5$, $b = 11$, $c = 11$