7.5 Answers

7.5.1 Solution to 7.2 Example (Introductory Example)

(i) $y = (x - 7)^2 - 3$

(ii) $(7, -3)$ **(iii)** -3 **(iv)** 7

[4 marks]

7.5.2 Solutions to 7.3 Exercise

Answer 1

(i) $y = (x - 4)^2 - 11$ **(ii)** $(4, -11)$ **(iii)** -11

[3 marks]

Answer 2

$D = 12^2 - 4 \times 3 \times 19 = -84$

As this is negative the graph does not cross the x-axis.

[2 marks]

Answer 3

(i) $y = (x + 5)^2 - 7$ **(ii)** $(-5, -7)$ **(iii)** -5

[3 marks]

Answer 4

$$\begin{aligned} 3x^2 + 12x + 19 &= 3\left[x^2 + 4x\right] + 19 \\ &= 3\left[(x + 2)^2 - 4\right] + 19 \\ &= 3(x + 2)^2 - 12 + 19 \\ &= 3(x + 2)^2 + 7 \end{aligned}$$

$$\therefore p = 3,\ q = 2 \text{ and } r = 7$$

[3 marks]

Answer 5

(i) 11 **(ii)** $\frac{3}{8}$ **(iii)** -1 **(iv)** $-\frac{3}{4}$

[4 marks]

Answer 6

(i) 8 **(ii)** $\frac{2}{5}$ **(iii)** -2.4 **(iv)** 8

[4 marks]

Answer 7

$$\left(\sqrt{k} - 1\right)^2 \geqslant 0$$
$$k - 2\sqrt{k} + 1 \geqslant 0$$
$$k + 1 \geqslant 2\sqrt{k}$$
$$\frac{k+1}{\sqrt{k}} \geqslant 2 \qquad \square$$

[4 marks]

Answer 8

(i) $y = 3(x+5)^2 + 1$ (ii) $(-5,\ 1)$ (iii) 1

[3, 1, 1 marks]

Answer 9

$$x^2 + (2k+3)x + k^2 + 3k + 1 = 0$$
$$D = (2k+3)^2 - 4 \times 1 \times \left(k^2 + 3k + 1\right)$$
$$= 4k^2 + 12k + 9 - 4k^2 - 12k - 4 > 0$$
$$= 5$$

As the discriminant is positive the quadratic equation has two distinct real roots $\square$

[4 marks]

Answer 10

(i) $y = \left(x + \frac{1}{2}\right)^2 + \frac{3}{4}$ **(ii)** $\left(-\frac{1}{2}, \frac{3}{4}\right)$ (iii) $-\frac{1}{2}$

[3 marks]

Answer 11

Knowing the binomial theorem is helpful although the question can be done without. The coefficient matching technique will be new to some students.

$$(x - A)^3 - 4 = x^3 - 6x^2 + 12x + B$$
$$x^3 - 3x^2A + 3xA^2 - A^3 - 4 = x^3 - 6x^2 + 12x + B$$
$$\therefore 3A = 6 \Rightarrow A = 2$$
$$-A^3 - 4 = B \Rightarrow B = -12$$

[5 marks]

Answer 12

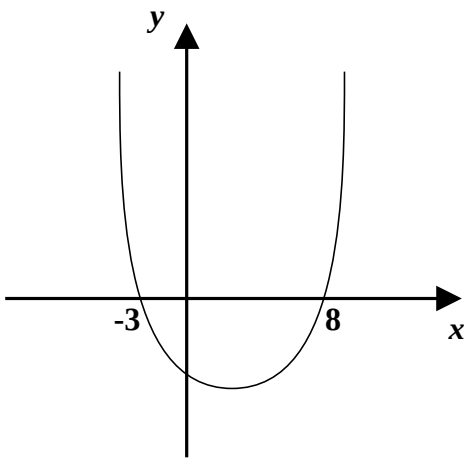
(i) $y = (x + 3)(x - 8)$

[1 mark]

(ii) $(-3,\ 0), (8,\ 0)$

[2 marks]

(iii)



[2 marks]