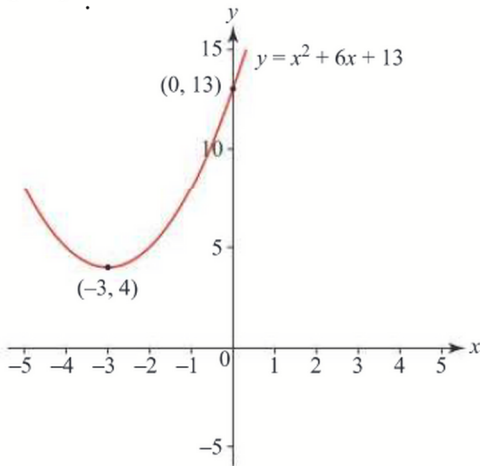


Assessment 1

- 1 a i 2^{m+n} ii 5^{m-2n+1} iii $3^{\frac{5m}{2}}$
 b 2^{2p+q}
 2 a i $4\sqrt{3}$ ii $-1-\sqrt{2}$ iii $\frac{-12+5\sqrt{7}}{31}$
 b $6+2\sqrt{5}$

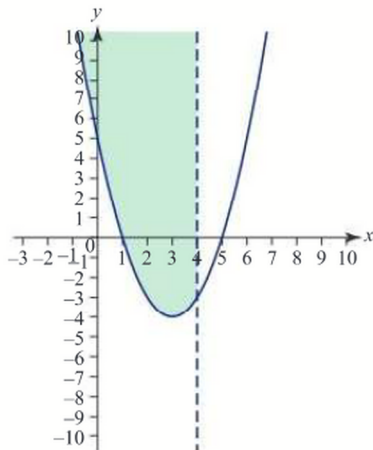
3 $y = \frac{2}{3}x + \frac{7}{3}$ or $2x - 3y + 7 = 0$

- 4 a $(x+3)^2 + 4$
 b



- 5 $x = 7, x = -1; y = -11, y = 5$
 6 $x(x+4) = x+4 + 2x-5 \Rightarrow x^2 + x + 1 = 0$
 $\Rightarrow \Delta = 1^2 - 4 \times 1 \times 1 = -3 < 0 \Rightarrow$ No real solutions
 7 a i $x < 4$ ii $1 \leq x \leq 5$

b



- 8 $x = \sqrt{5}$
 9 a i $(5, -1)$ ii 7
 b $\left(1 - \frac{\sqrt{34}}{2}, 3 - \frac{\sqrt{34}}{2}\right), \left(1 + \frac{\sqrt{34}}{2}, 3 + \frac{\sqrt{34}}{2}\right)$

10 $k < -\frac{3}{4}$ or $k > 3$

11 $(\sqrt{a} - \sqrt{b})^2 \geq 0$

$$a - 2\sqrt{a}\sqrt{b} + b \geq 0$$

$$a + b \geq 2\sqrt{ab}$$

$$\frac{a+b}{2} \geq \sqrt{ab}$$

12 a $(2u-1)(u-8)$ b $x = -1$ or $x = 3$

13 a $x^2 + (mx+2)^2 + 4x - 6(mx+2) + 10 = 0$
 $\Rightarrow x^2 + m^2x^2 + 4mx + 4 + 4x - 6mx - 12 + 10 = 0$
 $\Rightarrow (m^2+1)x^2 + 2(2-m)x + 2 = 0$

b $m = -2 \pm \sqrt{6}$

14 a 4 b $x = 4\frac{2}{3}, y = -\frac{2}{3}$

15 a False: eg $a = 4, b = -5$

b True: $n^2 + n \equiv n(n+1)$; either n or $(n+1)$ must be even

c True: $(b-2a)^2 \geq 0 \Rightarrow b^2 - 4ab + 4a^2 \geq 0 \Rightarrow b^2 \geq 4ab - 4a^2$

d False: eg $n = 4$

16 a $(0, 9)$

b $(2, 1)$

c $C(3 - \sqrt{2}, 7 - 4\sqrt{2}), D(3 + \sqrt{2}, 7 + 4\sqrt{2})$

17 $(x+3)^2 - 9 + (y-2)^2 - 4 - 2 = 0$; Centre, $C_1 = (-3, 2)$;

Radius, $r_1 = \sqrt{15}$

$(x-1)^2 - 1 + (y-5)^2 - 25 - 55 = 0$; Centre, $C_2(1, 5)$;

Radius, $r_2 = 9$

Distance $|C_1C_2| = \sqrt{(1-(-3))^2 + (5-2)^2} = 5$; $|C_1C_2| + r_1 < r_2$