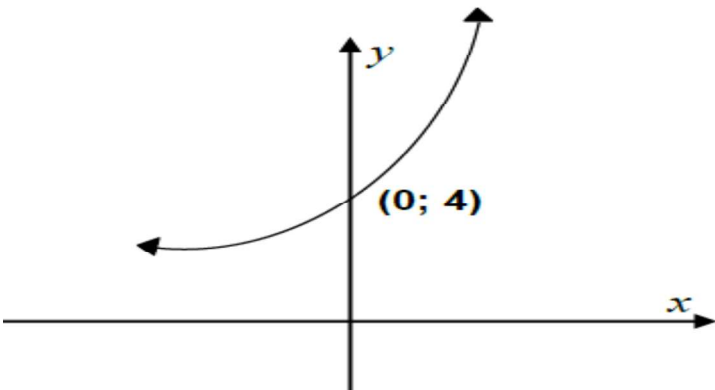


QUESTION 1

1.1	$-2x^2 - x + 3 = 0$ $2x^2 + x - 3 = 0$ $(2x + 3)(x - 1) = 0$ $x = -\frac{3}{2} \text{ or } x = 1$ $AD = 1 - \left(-\frac{3}{2}\right) = \frac{5}{2} \text{ units}$ $OB = 3 \text{ units}$ Turning point: $x = -\frac{1}{4}$ $OD = \frac{1}{4} \text{ units}$ $f\left(-\frac{1}{4}\right) = \frac{25}{8}$ $ED = \frac{25}{8}$	✓AC ✓OB ✓OD ✓✓ED
1.2	$m = \frac{-3 - 0}{0 + 1,5}$ $m = -2$ $c = -3$	✓ $m = -2$ ✓ $c = -3$
1.3	$-2x - 3 = -2x^2 - x + 3$ $2x^2 - x - 6 = 0$ $(2x + 3)(x - 2) = 0$ $x = -\frac{3}{2} \text{ or } x = 2$ $g(2) = -7$ $F(2; -7)$ $GF = 7$	✓ $f(x) = g(x)$ ✓ $F(2; -7)$ ✓ $GF = 7$
1.4	$f(x) = -2\left(x^2 + \frac{1}{2}x - \frac{3}{2}\right)$ $-2\left(x^2 + \frac{1}{2}x + \left(\frac{1}{4}\right)^2 - \frac{3}{2} + \left(\frac{1}{4}\right)^2\right)$ $= -2\left[\left(x + \frac{1}{4}\right)^2 - \frac{25}{16}\right]$ $= -2\left(x + \frac{1}{4}\right)^2 + \frac{25}{8}$	✓ -2 factor ✓2 nd step ✓3 rd step ✓answer
1.5	$= -2\left(x + \frac{5}{4}\right)^2 + \frac{9}{8}$ $= -2x^2 - 5x - 2$	✓✓answers

QUESTION 2

2.1	$x = -2 \text{ and } y = 1$	✓✓answers
2.2	$-2 = \frac{k}{0 + 2} + 1$	✓subs ✓k-value ✓answer

	$-2 = \frac{k}{2} + 1$ $k = -6$ $y = \frac{-6}{x+2} + 1$	
2.3	$0 = \frac{-6}{x+2} + 1$ $-1 = \frac{-6}{x+2}$ $x+2 = 6$ $x = 4$	✓subs ✓simplify ✓x=4 ✓writing point D
2.4	$y = a(x+2)(x-4)$ $-2 = a(0+2)(0-4)$ $-2 = a(-8)$ $a = \frac{1}{4}$ $y = \frac{1}{4}(x^2 - 2x - 8)$ $y = \frac{1}{4}x^2 - \frac{1}{2}x - 2$	✓sub x-intercepts ✓sub B(0;-2) ✓ $a = \frac{1}{4}$ ✓simplification ✓correct answer
2.5		✓Shape ✓Y-intercept ✓Graph not crossing x-axis
2.6	$y = 2^{x-1}$	✓✓answer
2.7	$y \in R; y \neq 1$	✓✓answer

QUESTION 3

3.1	$p = 1 \quad q = -2$ $y = \frac{k}{x-1} - 2$ Sub(2; 6) ; $6 = \frac{k}{2-1} - 2$ $k = 8$	✓ $p = 1$ ✓ $q = -2$ ✓ $k = 8$
3.2	Sub(2; 6); $y = 2^{x-m} - 2$ $6 = 2^{2-m} - 2$ $8 = 2^{2-m}$ $3 = 2 - m$ $m = -1$ $\therefore f(x) = 2^{x+1} - 2$	✓ $y = 2^{x-m} - 2$ ✓Sub(2; 6); ✓ $m = -1$
3.3	(1; -2) $m = 1$ $y + 2 = 1(x - 1)$	✓✓answer

	$y = x - 3$	
3.4	$y = \frac{8}{-3-1} - 2$ $y = -4$ $y = 2^{-3-1}$ $= -1\frac{3}{4}$	$\checkmark y = -4$ $\checkmark y = -1\frac{3}{4}$ $\checkmark CD = 2\frac{1}{4} \text{ units}$
3.5	$y > -2 \quad \text{or} \quad y \in (-2; \infty)$	$\checkmark$ answer

QUESTION 4

4.1	$x = 2$	$\checkmark$ answer
4.2	$B(4; 0)$	$\checkmark$ answer
4.3	$x \in (2; \infty)$	$\checkmark$ answer
4.4	$f(x) > 0 \quad x \in (0; 4)$	$\checkmark \checkmark x \in (0; 4)$
4.5	Sub (0;0) $y = a(x-2)^2 + 3$ $0 = 4a + 3$ $a = -\frac{3}{4}$ $y = -\frac{3}{4}x^2 + 3x$ Or $y = -\frac{3}{4}(x-2)^2 + 3$	$\checkmark$ sub $\checkmark a = -\frac{3}{4}$ $\checkmark$ equation
4.6	Sub : (2;3) $y = p^x - 1$ $3 = p^2 - 1$ $p^2 = 4$ $p = 2$ $y = 2^x - 1$	$\checkmark$ sub $\checkmark$ p-value $\checkmark$ equation
4.7	$y \in (0; \infty)$	$\checkmark$ answer
4.8	$TP(-2; 8)$	$\checkmark \checkmark$ each coordinate
4.9	$y = \frac{3}{4}x^2 - 3x$ Or $y = \frac{3}{4}(x-2)^2 - 3$	$\checkmark \checkmark$ equation
4.10	Roots real and unequal	$\checkmark$ description
4.11	$k > 3$	$\checkmark$ answer
4.12	$x \in [0; 2]$	$\checkmark \checkmark$ brackets + interval

QUESTION 5

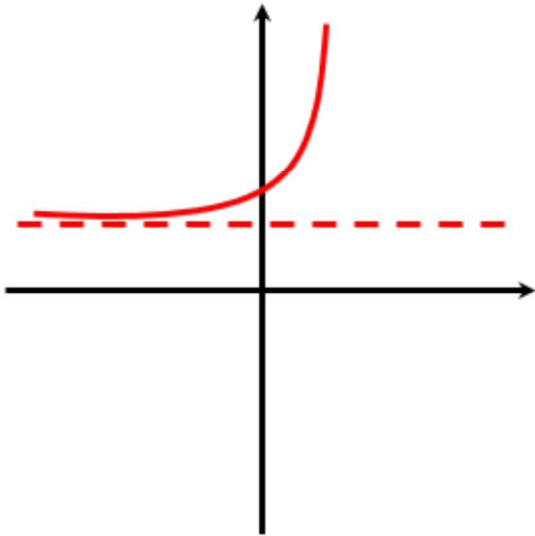
5.1	$k(x) = a \cdot 3^{x-1} - 18$ $-16 = a \cdot 3^{1-1} - 18$ $18 - 16 = a$ $2 = a$	$\checkmark$ sub $\checkmark$ simplification
5.2	$y = -18$	$\checkmark$ answer
5.3	$y = (2) \cdot 3^{x-1} - 18$ $y = 2 \cdot 3^{0-1} - 18$ $y =$ $0 = (2) \cdot 3^{x-1} - 18$ $18 = 2 \cdot 3^{x-1}$ $9 = 3^{x-1}$ $3^{x-1} = 3^2$ $x - 1 = 2$ $x = 3$	$\checkmark$ same bases $\checkmark x = 3$ $\checkmark$ $\checkmark y =$

5.4		✓shape ✓intercepts ✓asymptote
5.5	$h(x) = -2 \cdot 3^x + 18$	✓✓ answer

QUESTION 6

6.1	$0 = x^2 - 2x - 3$ $0 = (x + 1)(x - 3)$ $x = -1 \text{ or } x = 3$ $\therefore AB = 4 \text{ units.}$	✓Factors ✓x-values ✓answer
6.2	$f(2) = -3$ $m = \frac{0 - (-3)}{-1 - 2} = -1$ $y = -x + c$ $0 = -(-1) + c$ $c = -1$	✓ $f(2) = -3$ ✓ $m = \frac{0 - (-3)}{-1 - 2}$ ✓ $0 = -(-1) + c$
6.3	$y = x^2 - 2x + 1 - 3 - 1$ $y = (x - 1)^2 - 4$	✓✓x-value of TP ✓y-value of TP
6.4	$y \in [-4; \infty)$	✓answer
6.5	$PQ = (x^2 - 2x - 3) - (-x - 1)$ $= x^2 - x - 2$ $x^2 - x - 2 = 10$ $x^2 - x - 12 = 0$ $(x + 3)(x - 4) = 0$ $x = -3 \text{ or } x = 4$ $\therefore OR = 4 \text{ units}$	✓ $f(x) - g(x)$ ✓Std form ✓Factors ✓answer
6.6	$x \geq 3 \text{ or } x = -1$	✓✓ answers
6.7	$f(x) - w = 0$ $w < -4$	✓✓ answer

QUESTION 7

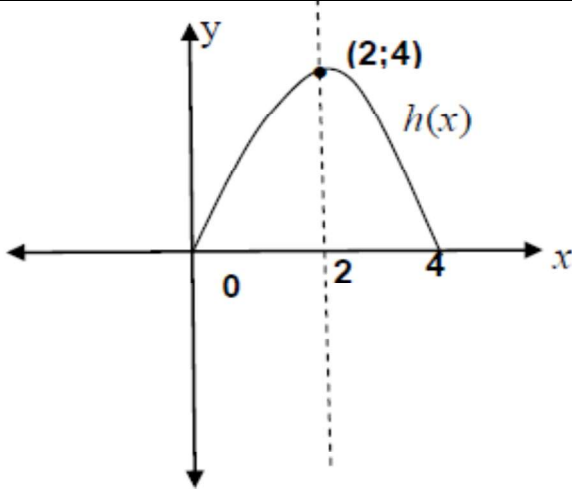
7.1		✓✓ Shape ✓ asymptote
7.2	$H = \left(-\frac{1}{4}x^2 + \frac{3}{2}x + 2\right) - \left(-\frac{1}{2}x + 5\right)$ $= -\frac{1}{4}x^2 + 2x - 3$ $x = \frac{-2}{2\left(-\frac{1}{4}\right)} = 4$ $H = -\frac{1}{4}(4)^2 + 2(4) - 3$ $H = 1 \text{ metre above the ground.}$	✓ Top -bottom ✓ $-\frac{1}{4}x^2 + 2x - 3$ ✓ $x=4$ ✓ Sub of 4 ✓ answer

QUESTION 8

8.1	$CD = 2x + 3 - (-2x^2 + 14x + k)$ $2x^2 - 12x + 3 - k$	✓ $f(x) - g(x)$ ✓ answer
8.2	$x = -\frac{b}{2a}$ $= \frac{12}{2(2)}$ $= 3$ min value $5 = 2(3)^2 - 12(3) + 3 - k$ $5 = 18 - 36 + 3 - k$ $k = -20$	✓ $x = -\frac{b}{2a}$ ✓ x-value of min ✓ sub 5 ✓ answer

QUESTION 9

9.1	$x \in [0; 4]$	✓✓ answer
9.2	$h(x) = -(x^2 - 4x + 4 - 4)$ $= -(x - 2)^2 - 4$	✓ a ✓ p ✓ q

9.3		✓Shape ✓TP ✓y-cut ✓showing + values only
9.4	$ \begin{aligned} h(x) &= -x^2 + 4x \\ &= -(x - 5)^2 + 4(x - 5) \\ &= -(x^2 - 10x + 25) + 4x - 20 \\ &= -x^2 + 10x - 25 + 4x - 20 \\ \therefore h(x - 5) &= -x^2 + 14x - 45 \end{aligned} $	✓Sub ✓Simplification ✓answer
9.5	$k(x) = x^2 - 4x$	✓✓answer
9.6	$ \begin{aligned} p(-3) &= \frac{9}{2} & p(-1) &= \frac{1}{2} \\ &\frac{4,5 - 0,5}{-3 - (-1)} \\ \text{Av grad} &= -2 \end{aligned} $	✓4,5 ✓0,5 ✓answer