1. Total Cost = Deposit + Installments
   $$= \$100 + (12 \times \$ 85)$$
   $$= \underline{\$ 1120}$$

2. (a) $\log 4 + \log 6 = \log (4 \times 6) = \underline{\log 24}$

   (b) $\log xy + \log z = \underline{\log x y z}$

   (c) $\log 2x^2 + \log x^2 - \log x = \underline{\log 2x^3}$

3. (a) $\sqrt{3} + \sqrt{12}$
   $\sqrt{3} + (\sqrt{4} \times \sqrt{3})$
   $\sqrt{3} + (2\sqrt{3})$
   $= 3\sqrt{3}$

   (b) $\sqrt{27} - \sqrt{12} + \sqrt{20} - \sqrt{45}$
   $\sqrt{3} (\sqrt{9} - \sqrt{4}) + \sqrt{5} (\sqrt{4} - \sqrt{9})$
   $\sqrt{3} (3 - 2) + \sqrt{5} (2 - 3)$
   $= \sqrt{3} - \sqrt{5}$

4.

x	0	1	2	3
0	0	0	0	0
1	0	1	2	3
2	0	2	0	2
3	0	3	2	1

   The above system is not a group because all elements do not have a unique Inverse.

5. (a) $2^{5m} \times 2^{3m} = 2^{8m}$
   (b) $(3x^3)^2 = 9x^6$
   (c) $\left(\frac{16}{25}\right)^{-1/2} = \frac{5}{4}$

6. (a) $\frac{16^{n+2} \times 2^n}{2^{5n+3}}$
   $\frac{2^{4(n+2)} \times 2^n}{2^{5n+3}}$
   $\frac{2^{4n+8} \times 2^n}{2^{5n+3}}$
   $\frac{2^{5n+8}}{2^{5n+3}} = 2^5$

   (b) $\frac{2^{x+2} + 2^x}{2^x}$
   $\frac{2^x(2^2 + 1)}{2^x}$
   $(2^2 + 1)$
   $= 5$

   (c) $\frac{9^{2x}}{3^x}$
   $\frac{(3^2)^{2x}}{3^x}$
   $\frac{3^{4x}}{3^x}$
   $= 3^{3x}$

7. (a) $3^{3x+3} = 81$

  $3^{3x+3} = 3^4$ (same base on both sides, so base can cancel off))

  $3x + 3 = 4$ (equate the powers and solve for x)

  $x = \dfrac{1}{3}$

  (b) $2^{n+3} = 35$

  $n + 3\log 2 = \log 35$

  $n + 3 = \dfrac{\log 35}{\log 2}$

  $n + 3 = 5.13$

  $n = 2.13$

8. (a) $1 + 3$ in mod 4

  $4 \bmod 4$

  $= 0$

  (b) $2 + 1 \bmod 5$

  $2 + (1 \bmod 5)$

  $2 + 1$

  $= 3$

1. $y = x^2 + 3x + 2$

   $y = (x + 1)(x + 2)$ (Type 1 factorisation)

   <u>x-intercept (y=0)</u>   <u>y-intercept (x=0)</u>

   $(x + 1) = 0$ $(x + 2) = 0$ $y = x^2 + 3x + 2$

     <u>**$x = -1$**</u>   <u>**$x = -2$**</u> $y = (0)^2 + 3(0) + 2$

                                             <u>**$y = 2$**</u>

<u>Turning Point (Vertex)</u>

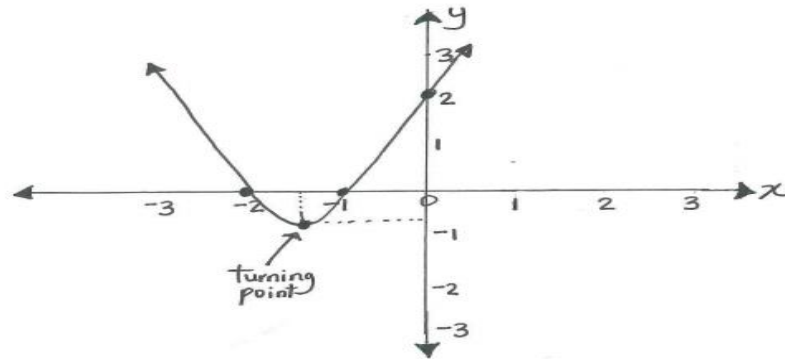 $x = \dfrac{x_1 + x_2}{2} = \dfrac{-1 + -2}{2} = -1.5$ $y = x^2 + 3x + 2$

                                           $y = (-1.5)^2 + (-1.5) + 2$

                                           $y = -0.25$

Therefore Turning Point = (-1.5 ,-0.25)

2. $f(x) = 3x - x^2$

   <u>x-intercept (y=0)</u>   <u>y-intercept (x=0)</u>

   $f(x) = x(3 - x)$ $f(x) = x(3 - x)$

    <u>**$x = 0$**</u> $3 - x = 0$ $f(0) = 0(3 - 0)$

                   <u>**$x = 3$**</u>   **$= 0$**

   <u>Turning Point (Vertex)</u>

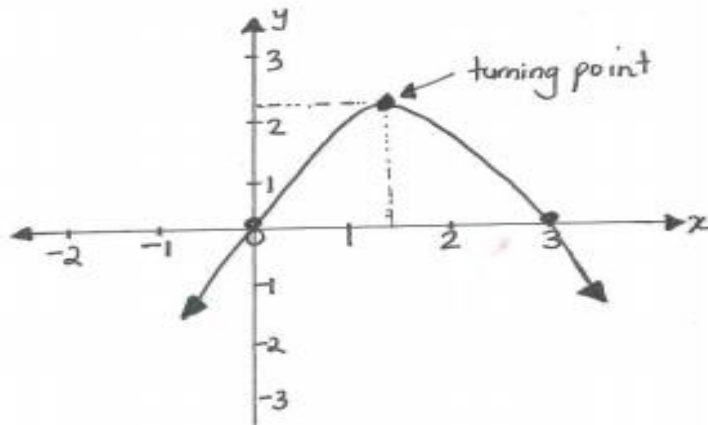 $x = \dfrac{x_1 + x_2}{2} = \dfrac{0 + 3}{2} = 1.5$ $f(x) = x(3 - x)$

                                           $f(1.5) = 1.5(3-1.5)$

                                               $= 2.25$

   Therefore Turning Point = (1.5 ,2.25)

3. $y = (2x - 1)(x - 3)$

<u>x-intercept (y=0)</u>

$(2x - 1) = 0$ $(x - 3) = 0$

x = 0.5   **x= 3**

<u>y-intercept (x=0)</u>

$y = (2x - 1)(x - 3)$

$y = (2(0) - 1)(0 - 3)$

y = 3

<u>Turning Point (Vertex)</u>

$x = \dfrac{x_1 + x_2}{2} = \dfrac{0.5 + 3}{2} = 1.75$

$y = (2x - 1)(x - 3)$

$y = (2(1.75) - 1)(1.75 - 3)$

y = -3.125

Therefore Turning Point = (1.75 , -3.125)