

P 184

$$\begin{aligned} \text{Q4(a)} \quad 3(2)^x - 24 &= 0 \\ 3(2)^x &= 24 \\ (2)^x &= 8 \\ 2^x &= 2^3 \\ \underline{x=3} \end{aligned}$$

$$\begin{aligned} \text{b).} \quad & \begin{array}{c} \longleftarrow \\ 3(5)^x - 6 = 0 \\ 3(5)^x = 6 \\ 5^x = 2 \\ \underline{x = \log_5 2} \end{array} \end{aligned}$$

$$\begin{aligned} \text{c)} \quad 2(3)^x + 1 &= 0 \\ 2(3)^x &= -1 \\ 3^x &= -\frac{1}{2} \\ x &= \log_3^{-1/2} \\ x &= \emptyset \end{aligned}$$

$$\begin{aligned} \text{d).} \quad & \begin{array}{c} \longleftarrow \\ 3 \log_2 x - 6 = 0 \\ 3 \log_2 x = 6 \\ \log_2 x = 2 \\ x = 2^2 \\ \underline{x=4} \end{array} \end{aligned}$$

$$\begin{aligned} \text{e)} \quad 2 \log_3 x + 4 &= 0 \\ \log_3 x &= -\frac{4}{2} \\ \log_3 x &= -2 \\ x &= 3^{-2} \\ x &= \frac{1}{3^2} = \frac{1}{9} \end{aligned}$$

Q11

$$(a) \quad y = -2(3)^{2(x-1)} + 4$$

$$y - 4 = -2(3)^{2(x-1)}$$

$$\frac{y-4}{-2} = 3^{2(x-1)}$$

$$\frac{y-4}{-2} = \frac{9^x}{9}$$

$$\frac{9y-36}{-2} = 9^x$$

$$\log_9\left(\frac{9y-36}{-2}\right) = x$$

$$y = \log_9\left(\frac{9x-36}{-2}\right)$$

$$3^{2x-2} = \frac{3^{2x}}{3^2} = \frac{(3^2)^x}{3^2}$$

$$\frac{9^x}{9}$$

$$b) \quad y = 5 \log_2 3(x-1) - 10 \quad \leftarrow$$

$$y + 10 = 5 \log_2 (3x - 3)$$

$$\frac{y + 10}{5} = \log_2 (3x - 3)$$

$$2^{\frac{y+10}{5}} = 3x - 3$$

$$2^{\frac{y+10}{5}} + 3 = 3x$$

$$\frac{2^{\frac{y+10}{5}}}{3} + 1 = x$$

$$\frac{2^{\frac{x+10}{5}}}{3} + 1 = y$$

Q12:- $y = -3(2)^x + 1$

$$y = ac^x + k$$

$$(1, -5)$$

$$\underline{y=1}$$

$$y = ac^x + 1$$

$$(2, -11)$$

$$-5 = ac^1 + 1 \Rightarrow -5 - 1 = ac$$

$$\boxed{-6 = ac}$$

$$-11 = ac^2 + 1$$

$$-11 = \boxed{a}c + 1$$

$$-6 = a(2)$$

$$-11 = -6c + 1$$

$$a = \frac{-6}{2}$$

$$-11 - 1 = -6c$$

$$\boxed{a = -3}$$

$$-12 = -6c$$

$$\boxed{c = 2}$$

Q13:- $y = \log_3(x-1) + 1$

$$y = \log_c(x-h) + k \quad (4,2)$$

$$(10,3)$$

$$y = \log_c(x-1) + k$$

$$2 = \log_c 3 + k \Rightarrow 2 - \log_c 3 = k$$

$$3 = \log_c 9 + k \Rightarrow 3 - \log_c 9 = k$$

$$2 - \log_c 3 = 3 - \log_c 9$$

$$-\log_c 3 + \log_c 9 = 3 - 2$$

$$\log_c 9 - \log_c 3 = 1$$

$$\log_c 9/3 = 1$$

$$\log_c 3 = 1$$

$$3 = c^1$$

$$c = 3$$

$$2 - \log_3 3$$

$$2 - 1 = k$$

$$k = 1$$