

Class Test 3

NO. :

Date :

Q1

$$(a) \left(\frac{4m^{-3}n^{-4}}{5m^5n^{-4}} \right)^{-3} = \left(\frac{4}{5} m^{-8} \right)^{-3} = \frac{125}{64} m^{24}$$

$$(b) 5x + 12^x = 5x + 7$$

$$12^x = 7$$

$$x = \log_{12} 7 \approx 0.7831$$

$$(c) \left(\frac{27t^3}{8} \right)^{\frac{2}{3}} = \left(\frac{27}{8} \right)^{\frac{2}{3}} \times (t^3)^{\frac{2}{3}} = \frac{9t^2}{4}$$

Q2

$$(a) \ln(3x-2) + \ln(x-1) = 2 \ln x$$

$$\ln(3x-2) + \ln(x-1) - \ln x^2 = 0$$

$$\ln \frac{(3x-2)(x-1)}{x^2} = 0$$

$$\ln \frac{3x^2 - 5x + 2}{x^2} = 0$$

$$\therefore \ln 1 = 0$$

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

$$3x^2 - 5x + 2 = x^2$$

$$2x^2 - 5x + 2 = 0$$

$$2(x-2)(x-\frac{1}{2}) = 0$$

$$\therefore x = 2 \text{ or } x = \frac{1}{2} \text{ (not possible)}$$

(b)

$$6 \log_3 z^2 + \frac{1}{4} \log_3 y^8 - 2 \log_3 z^4 y$$

$$= \log_3 z^{12} + \log_3 y^2 - 2 \log_3 z^4 y^4 - 2 \log_3 y^2$$

$$= \log_3 z^{12} + \log_3 y^2 - \log_3 z^8 y^8 - \log_3 y^2$$

$$= \log_3 \frac{z^{12} y^2}{z^8 y^8}$$

$$= \log_3 z^4$$

$$(ii) \log_{12} x + \log_{12} (x+1) = 1$$

$$\log_{12} x(x+1) = \log_{12} 12$$

$$\therefore x(x+1) = 12$$

$$x^2 + x - 12 = 0$$

$$(x+4)(x-3) = 0$$

$$\therefore x+4=0 \text{ or } x-3=0$$

$$x = -4 \quad x = 3$$

(not possible)

(c)

$$(i) \log_5 0.04$$

$$\log_3 18 - \log_3 2$$

$$= \log_5 4 - \log_5 100$$

$$= \frac{\log_3 18 - \log_3 2}{\log_3 5}$$

$$= \frac{\log_3 18 - \log_3 2}{\log_3 5}$$

$$= \frac{\log_3 0.04}{\log_3 5} \times \frac{\log_3 9}{\log_3 9}$$

$$= \frac{\log_3 0.04}{\log_3 5} \times \frac{\log_3 9}{\log_3 9}$$

$$= \frac{\log_3 0.04}{\log_3 5} \times \frac{\log_3 9}{2 \log_3 3}$$

$$= -2 \times \frac{1}{2}$$

$$= -1$$