Topical Revision Paper 5

Term 2 Unit 5: Exponents & Logarithms

Question 1:

(i) Show that $\log_{\sqrt{3}}(x-1)+\log_{\sqrt{3}}\sqrt{3}=\log_3 3(x-1)^2$. [4]

(ii) Hence, solve the equation $\log_3(x+1)-\log_{\sqrt{3}}(x-1)=\log_{\sqrt{3}}\sqrt{3}$. [4]

Answer : (ii) $x=\frac{1}{3}$ (n.a.) or $x=2$

Question 2:

Solve the simultaneous equations

$$\log_2 xy = 7$$
$$\log_4 x = 2\log_8 y$$

[4]

Answer : $y=8$, $x=16$

Question 3:

Solve for x, given that $3^{2x-1}+3^{x-2}=3^x-\frac{4}{9}$. [4]

Answer : $x=\frac{\lg 2}{\lg 3}$ or 0.631 or $x=\frac{\lg\frac{2}{3}}{\lg 3}$ or -0.369

Question 4: Solve the following equations

(a)

$\log_8[2+\log_2(x-4)]=\log_{125}5$

(b) $e^{2\ln y}=\lg 1.6$

Answer : (a) $x=5$ (b) $y=0.452$

Question 5:

The mass, *m* grams, of a radioactive substance after *t* years is given by the formula $m=ae^{-kt}$, where *a* and *k* are constants. At the beginning, the mass of radioactive substance is 83 g. After 35 years, there was only 26 g of the radioactive substance left.

(i) Find the value of a and of k . [4]

(ii) Sketch the graph of *m* against *t*. [2]

Answer : (i) $a = 83$ $\qquad k = \dfrac{\ln \dfrac{26}{83}}{-35} = 0.0332$