Exponents and Logarithms

January 2014

Question 3 (calculator) 2 marks

An earthquake in Vancouver had a magnitude of 6.3 on the Richter scale. An earthquake in Japan had magnitude of 8.9 on the Richter Scale.

How many times more intense was the Japan earthquake than the Vancouver earthquake?

You may use the formula below:

$$M = \log\left(\frac{A}{A_0}\right)$$

M – Magnitude of earthquake
A – Intensity of vibrations
A_0 – Intensity of a standard earthquake

Express your answer as a whole number

Question 32 4 marks

Solve the following equation:

$$2\log_4 x - \log_4(x+3) = 1$$

Question 39 1 mark

Which of the following equations could be solved without the use of logarithms? Without actually solving the problem, explain your choice.

$4^x = 10^{3x+1}$ or $\left(\frac{1}{3}\right)^{2x+1} = 27^{4x-1}$

Question 5 (calculator) 3 marks

Given $\log_a 9 = 1.129$ and $\log_a 4 = 0.712$, find the value of $\log_a 12$.

June 2013

Question 8 3 marks

Solve the following equation algebraically:

$$\log_3(x-4)+\log_3(x-2)=1$$

Question 30 1 mark

Which expression has a larger value?

$\log_2 36$ or $\log_3 80$

Justify your answer.

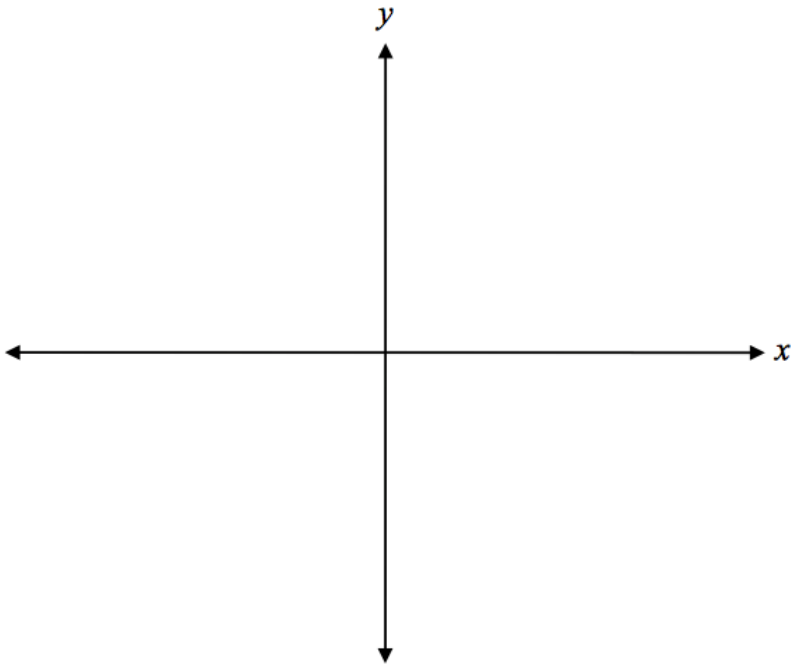
Question 13 3 marks

Determine the value of y in the following equation:

$$\log_x 27 - \log_x 3 = 2\log_x y$$

Question 40 a) 2 marks b) 2 marks

a) Sketch the graph of $y = \ln(x)$



b) Sketch the graph of $y = -\ln(x - 2)$.