



Course: Mathematics Methods Year 12
Assessment Task: Test 4 – Logarithms

Student Name: _____
Date: 26th June 2017

Assessment Score: _____ / 43

Year Score: _____

Comments: _____

Teacher signature: _____

Parent/ Guardian signature: _____

Comments: _____

No notes or calculators allowed for this section.

Question 1

Evaluate the following, giving your answer as a single log term:

??

Question 2

Solve each of the following equations. Leave answers in logarithmic form where necessary.

(a)

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

(4 marks)

(b) $3^{2x+1} - 5(3^x) - 2 = 0$

(5 marks)

Question 3

(5 marks)

If $\log_{10} 2 = x$ and $\log_{10} 3 = y$. Express the following in terms of x and y

(a) $\log_{10} 0.6$

(2 marks)

(b) $\log_{10} 45$

(3 marks)

EXTRA WORKING

$$\int \frac{5e^{-2x}}{1+e^{-2x}} dx$$

Determine the following anti-derivative, simplifying your answer using logarithmic laws if necessary:

Question 9

(2 marks)

The tangent to the curve $y = \ln(kx - 1)$ has a gradient of 1 when $x = 2$. Determine the value of k .

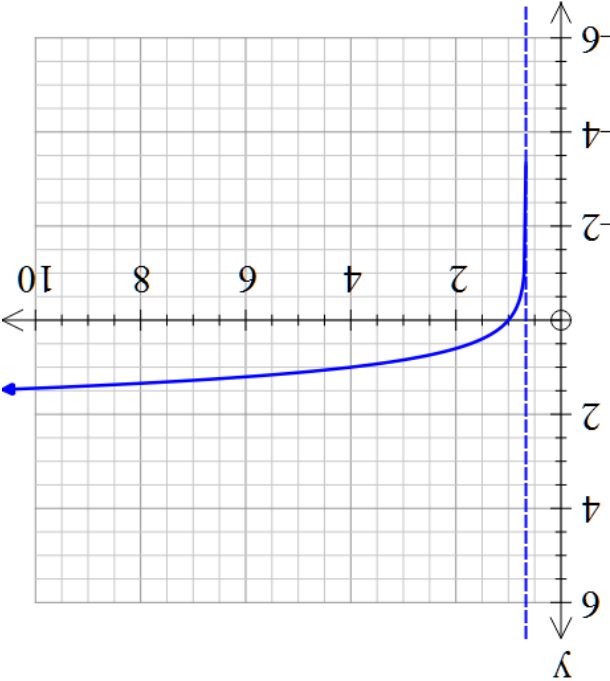
Question 8

(3 marks)

The function $f(x) = \log(bx - 2)$ is drawn below.

Question 4

(3 marks)



(a) Determine the value of b .

(2 marks)

(b) Use the graph to approximate the solution to $\log(bx - 2) = 1$

(1 marks)

Question 5**(3 marks)**

If $x = \frac{1}{\sqrt{3}}$, show that $\log(1-x^4) - \log(1-x) - \log(1+x) = 2\log 2 - \log 3$.

Question 6**(4 marks)**

State the following as y in terms of x

$$2\log_2(xy) = 5\log_2 x$$

Question 7**(9 marks)**

Differentiate each of the following with respect to x .

(a) $y = \sqrt{x} \ln\left(\frac{x}{3}\right)$

(3 marks)

(b) $y = \ln\left[\frac{(x+4)^2}{(3x-1)}\right]$

(3 marks)

(c) $y = \frac{\cos^2 x}{\ln x}$ (do not simplify)

(3 marks)