KINGSWAY CHRISTIAN COLLEGE

MATHS DEPARTMENT

Course: Mathematics Methods Year 12

Assessment Task: Test 4 – Logarithms

Student Name: _____

Date: 26th June 2017

Assessment Score: _____ / 43

Year Score: _____

Comments: _____

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Teacher signature: _____

Parent/ Guardian signature: _____

Comments: _____

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METHODS YEAR 12   **Test 4 2017**

Logarithms

Resource Free   **Time: 35 mins**   **Marks:**   **/ 40**

No notes or calculators allowed for this section.

Question 1   **(5 marks)**

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

¿¿

Question 2   **(9 marks)**

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

(a) $2^{x-3} = 5^{2x+1}$ (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)
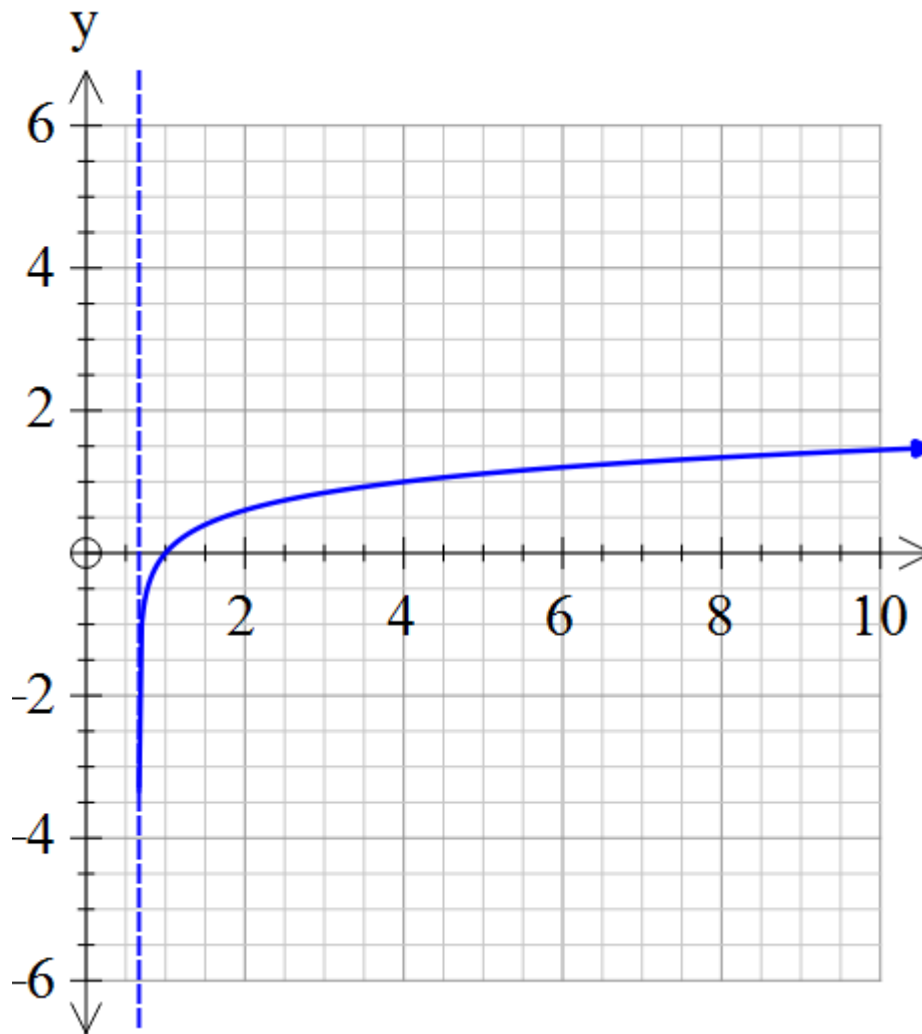
Question 4   **(3 marks)**

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

(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 $x = \dfrac{1}{\sqrt{3}}$, 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) $\quad y = \sqrt{x}\,\ln\left(\dfrac{x}{3}\right)$ $\hfill$ (3 marks)

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

(c) $\quad y = \dfrac{\cos^2 x}{\ln x}$ *(do not simplify)* $\hfill$ (3 marks)

Question 8 **(3 marks)**

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

Question 9 **(2 marks)**

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

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

EXTRA WORKING