

Name: _____

IB MATHEMATICS HL Exponential and Logarithmic Functions Test

Paper 1 Technology Free

Time: 50 minutes

Marks: 42

Question 1 [2 + 3 + 3 = 8 marks]

Solve for x :

a) $3^{2x} \times 27^{2x-1} = \frac{1}{9}$

b) $4^{x-1} = 2^x + 8$

c) $e^x - e^{-x} = 4$

Question 2 [3 marks]

Solve $\log_2(x) + \log_2(x+5) = \log_2(3x+4) + \log_2(3)$.

Question 3 [4 marks]

Solve the equation $\log_2 x + \log_4 x + \log_{16} x = 7$

Question 4 [3 marks]

Given that $\log_8 5 = k$, find $\log_2 20$ in terms of k .

Question 5 [5 marks]

Solve the following simultaneous equations:

$$\ln \frac{x}{y} = 1$$

$$\ln x^3 + \ln y^2 = 5$$

Question 6 [4 marks]

Sketch the graph of $y = \log_2(1-x) + 1$. Mark both axes intercepts and the equation of the asymptote.

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Question 7 [3 + 2 + 3 = 8 marks]

Consider $f(x) = 2\log_3(x-1)$, $x > 1$.

a) find the inverse function $f^{-1}(x)$.

b) State domain and range of $f^{-1}(x)$.

c) Sketch the graphs of $f(x)$ and $f^{-1}(x)$ on one set of axes.

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Question 8 [3 marks]

Find the value of x in the following:

$$\log_4(\log_3(\log_2(x))) = \frac{1}{2}.$$

Question 9 [4 marks]

Solve the equation $8^{x-1} = 6^{3x}$. Express your answer in terms of $\ln 2$ and $\ln 3$.

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END OF PAPER 1