Test - Exponentials and logarithms

Year: Year 12 · Duration: 60 minutes · /20

Name:	Date:	**Mark: /20**

Question	1	2	3	4	5	Total
marks	4	4	4	4	4	**20**
Mark						

Show your working.

Question 1 (4 marks)

Question 1 – Laws of logarithms

Write as a single logarithm and simplify: $2\log_5 3 + \log_5 50 - \log_5 18$. (3 marks)

Hence evaluate it. (1 mark)

Question 2 (4 marks)

Question 2 – Exponential equation

Solve $4^x = 7 \times 2^x - 12$.

Question 3 (4 marks)

Question 3 – Logarithmic equation

Solve $\log_3(2x+1) + \log_3(x-1) = 2$.

Question 4 (4 marks)

Question 4 – Straight-line graph

The data satisfy $y = ab^x$. A graph of $\log_{10} y$ against x has gradient 0.2 and passes through $(0, 1.3)$. Find a and b to 3 significant figures.

Question 5 (4 marks)

Question 5 – Problem: decay of a medicine

The mass of a drug in the blood is $M = 80e^{-0.15t}$ mg after t hours.

a. Find the mass after 4 hours. (1 mark)
b. Find the half-life to 3 significant figures. (2 marks)
c. When does the mass fall below 5 mg? (1 mark)