

Exponential and Logarithmic Functions: math test, Grade 12 – download the PDF

Suggested time: 45 minutes. Out of 20 points. Calculator allowed only when the problem says so.

1 Evaluating logarithms

/ 4 pts

Evaluate without a calculator: (a) $\log_2 64$ (b) $\log_5 \frac{1}{125}$ (c) $\ln e^{-2}$ (d) $10^{\log 4.5}$.

2 Properties of logarithms

/ 3 pts

(a) Expand $\log_3 \frac{27x^2}{\sqrt{y}}$ for $x, y > 0$. (b) Write $2 \ln 3 + \ln 5 - \ln 15$ as a single logarithm and simplify.

3 Exponential equations (calculator allowed for part b)

/ 4 pts

Solve: (a) $5^{x-2} = 125$ (b) $3 \cdot 4^x = 51$, rounded to four decimals (c) $e^{2x} - 5e^x + 6 = 0$.

4 Logarithmic equations

/ 3 pts

Solve: (a) $\log_3(2x - 5) = 2$ (b) $\ln x + \ln(x + 4) = \ln 12$.

5

Compound interest (calculator allowed)

/ 4 pts

You deposit \$6,000 at an annual rate of 5.2%. (a) Find the balance after 7 years if interest is compounded quarterly. (b) Find the balance after 7 years with continuous compounding. (c) With continuous compounding, how many years until the balance reaches \$9,000?

6

Radioactive decay (calculator allowed)

/ 2 pts

A 640 mg sample of an isotope has a half-life of 12 days. (a) How many mg remain after 30 days? (b) After how many days will 40 mg remain?

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