

# Logarithmic Functions: math test, Grade 11 – download the PDF

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

## 1 Conversions and values

/ 4 pts

- a. Write  $5^3 = 125$  in logarithmic form.
- b. Write  $\log_2 \frac{1}{16} = -4$  in exponential form.
- c. Evaluate  $\log_9 3$ .
- d. Evaluate  $\ln e^7 + \log 1000$ .

## 2 Properties of logarithms

/ 3 pts

- a. Expand  $\log_3 \frac{27x^2}{y}$ .
- b. Write  $3 \ln 2 + \ln 5 - \ln 10$  as a single logarithm and simplify.

### 3 Exponential equations

/ 3 pts

Calculator allowed for part (b).

- Solve  $6^{x-2} = 216$ .
- Solve  $3 \cdot 5^x = 60$ . Round to three decimal places.

### 4 Logarithmic equations

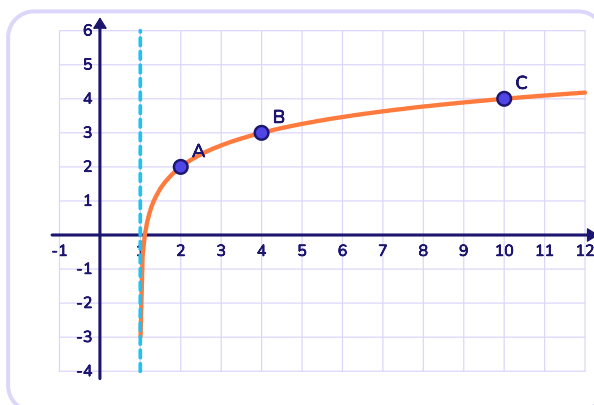
/ 4 pts

- Solve  $\log_4(3x - 2) = 3$ .
- Solve  $\log_2 x + \log_2(x + 6) = 4$  and check your answers.

### 5 Reading a graph

/ 3 pts

The graph of a function  $f$  is shown. Its equation is  $f(x) = \log_3(x - 1) + 2$ .



- Give the domain of  $f$  and the equation of its asymptote.
- Read the coordinates of the points A, B and C on the graph.
- Compute  $f(28)$ .

6

**Acidity of solutions**

/ 3 pts

The pH of a solution is  $\text{pH} = -\log[\text{H}^+]$ , where  $[\text{H}^+]$  is the hydrogen ion concentration in moles per liter. Calculator allowed.

- Lemon juice has  $[\text{H}^+] = 2.5 \times 10^{-3}$ . Find its pH to the nearest hundredth.
- A solution has pH 8.3. Find  $[\text{H}^+]$  in scientific notation with two significant digits.

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