

Precalculus - Exponential and Logarithmic Equations - Worksheet

Common Core F-LE.A.4, F-BF.B.5, A-REI.D.11 · maths-pdf.fr/en/

Name: _____ Class: _____ Date: ____/____/____

These 20 problems practice exponential and logarithmic equations (Common Core F-LE.A.4, F-BF.B.5 and A-REI.D.11). You will match bases, use logarithms, solve log equations, check for extraneous solutions and solve growth and decay applications.

Precalculus · Common Core State Standards: **F-LE.A.4, F-BF.B.5, A-REI.D.11**

Exercise 1 - Same base

Solve $2^x = 64$.

Exercise 2 - Same base with a shift

Solve $5^{x-1} = 125$.

Exercise 3 - Rewrite the base

Solve $9^x = 27$.

Exercise 4 - Take a log

Solve $3^x = 20$ to three decimal places.

Exercise 5 - Isolate first

Solve $4 \cdot 3^x = 100$ to three decimal places.

Exercise 6 - Base e

Solve $e^{2x} = 15$ to three decimal places.

Exercise 7 - Base e with isolation

Solve $2e^{3x-1} = 9$ to three decimal places.

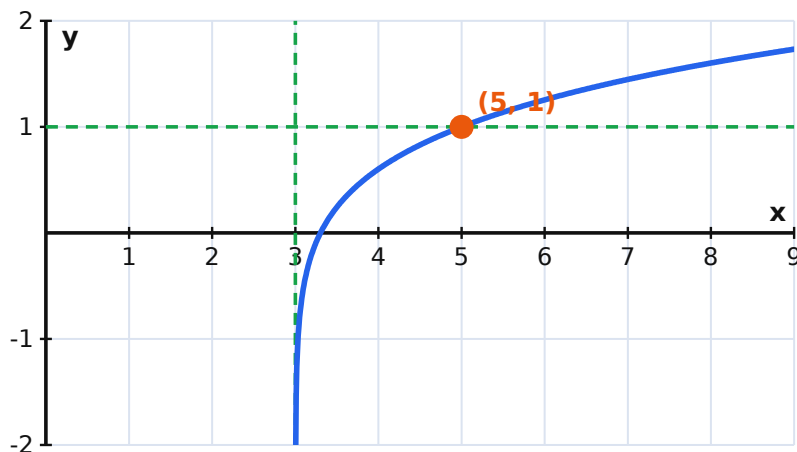
Exercise 8 - Simple log equation

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

Exercise 9 - Natural log equation

Solve $\ln(x-1)=3$ to the nearest hundredth.

Exercise 10 - Combine logs



Graph of $y = \log x + \log(x - 3)$.

Solve $\log x + \log(x-3) = 1$. Check for extraneous solutions.

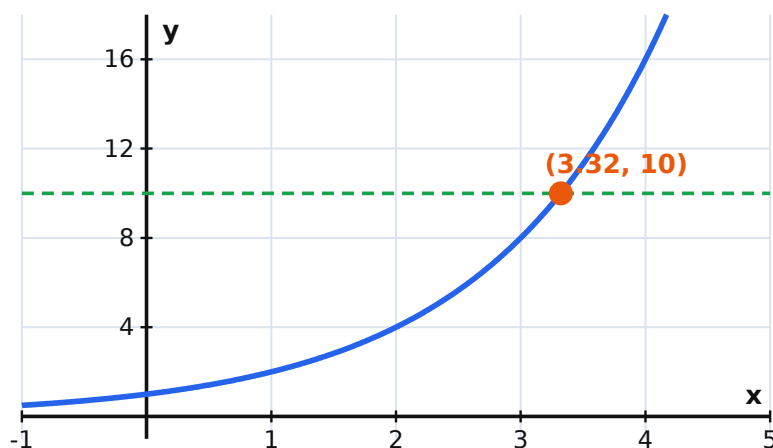
Exercise 11 - Combine base-2 logs

Solve $\log_2 x + \log_2(x-2) = 3$.

Exercise 12 - Difference of logs

Solve $\log_2(x+6) - \log_2(x-1) = 3$.

Exercise 13 - Solve by graphing



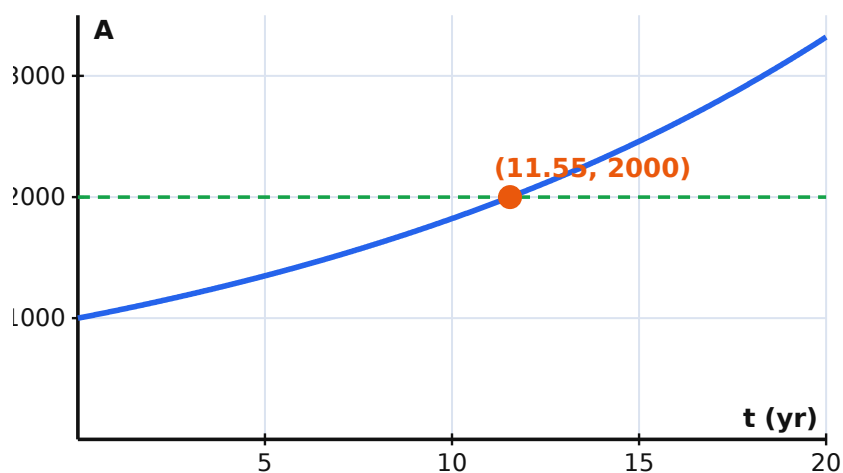
Graph of $y = 2^x$ and $y = 10$.

Use the graph to estimate the solution of $2^x = 10$, then compute it exactly with logarithms.

Exercise 14 - Savings goal

Mei invests \$4,000 at 5% compounded yearly. How long until it reaches \$6,000? Give the answer to the nearest hundredth of a year.

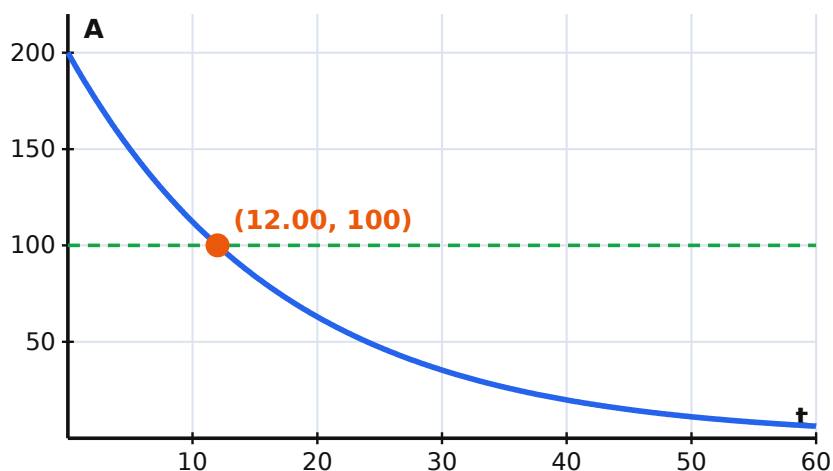
Exercise 15 - Doubling time



Balance of a continuously compounded account.

Money grows by $A = Pe^{0.06t}$. Find the doubling time to the nearest hundredth of a year.

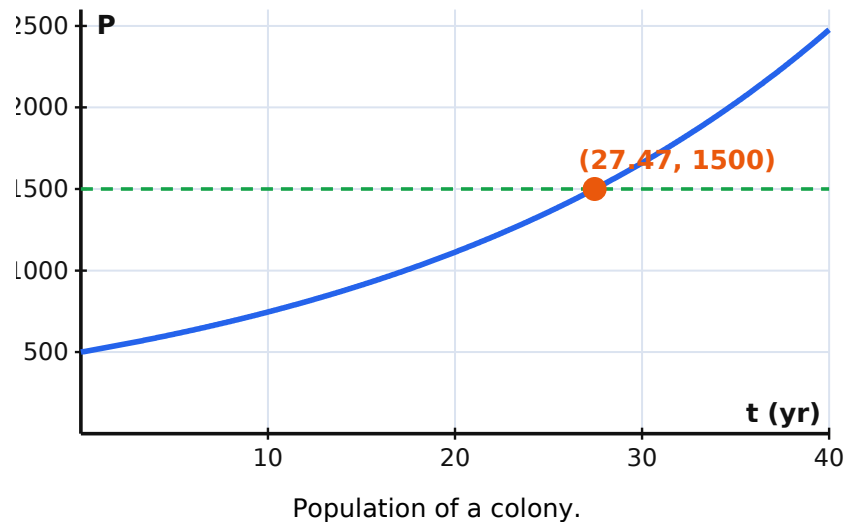
Exercise 16 - Half-life



Decay of a 200 g sample.

A 200 g sample decays by $A(t) = 200\left(\frac{1}{2}\right)^{t/12}$ with t in days. Find when 50 g remain and when 30 g remain (to the nearest hundredth).

Exercise 17 - Population growth



A colony has $P(t) = 500e^{0.04t}$ members after t years. When does it reach 1,500?

Exercise 18 - Hydrogen concentration

Find $[H^+]$ for a solution with pH 5.3, using $\text{pH} = -\log[H^+]$.

Exercise 19 - Sound intensity

A sound has level 85 dB, where $L = 10\log\frac{I}{I_0}$. Find $\frac{I}{I_0}$ to three significant figures.

Exercise 20 - Different bases

Solve $2^{x+1} = 3^x$ to three decimal places.