

Using Logs to Solve Exponent Equations

Grade 11 – Algebra 2 math · Test · Standards: F-LE.A.4, A-SSE.B.3c

Name: _____ Date: _____ Class: _____

This 45-minute test covers exponential equations, logarithmic equations with extraneous solutions, and applications to interest and decay. A scientific calculator is allowed. Show each step for full credit.

Standards: F-LE.A.4, A-SSE.B.3c · **Level:** Grade 11 Algebra 2

Time: 45 minutes · 9 questions · Total: 20 points · Calculator: as allowed by your teacher

Question 1 Same-base equation (2 points)

Solve $3^{x-2} = 81$.

Question 2 Exponential equation (2 points)

Solve $6^x = 50$. Round to the nearest hundredth.

Question 3 Isolate and solve with e (2 points)

Solve $4e^{0.5x} = 30$. Round to the nearest hundredth.

Question 4 Logarithmic equation (2 points)

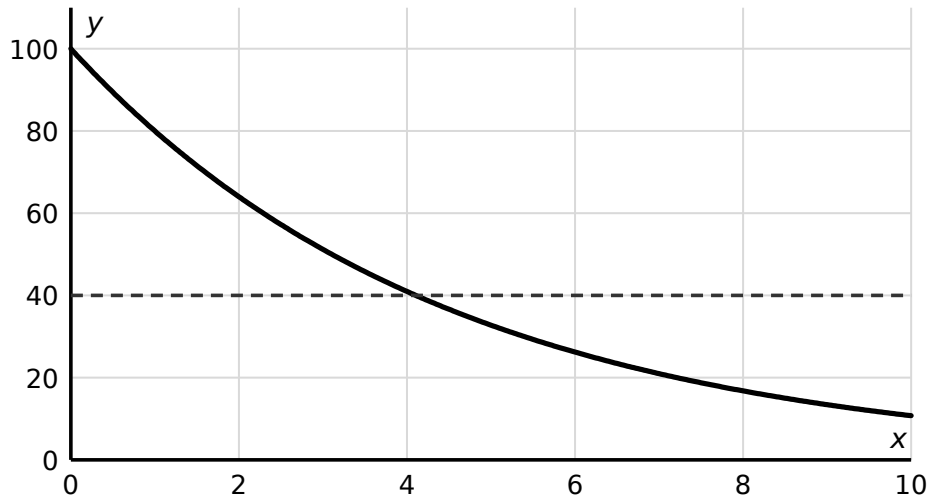
Solve $\log_7(2x + 3) = 2$.

Question 5 Equation with two logarithms (3 points)

Solve $\log_5 x + \log_5(x + 4) = 1$. Check for extraneous solutions.

Question 6 Decay model (3 points)

The graph shows $y = 100(0.8)^x$, the percent of a charge left after x hours.



Graph for Question 6.

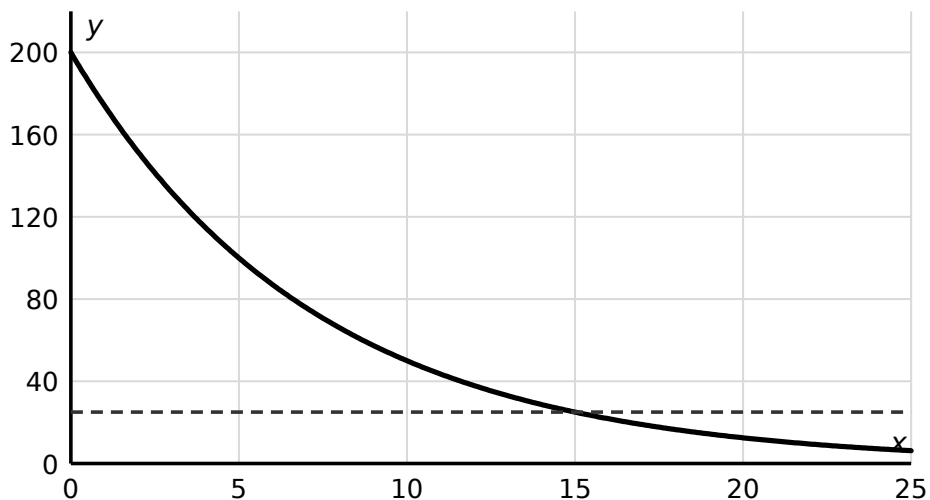
- Estimate from the graph when 40 percent remains. (1 point)
- Find the exact time using logarithms. (2 points)

Question 7 Compound interest (2 points)

Dara invests \$2,500 at 3.8% interest compounded monthly. How many years until the account holds \$4,000? Round to the nearest tenth.

Question 8 Half-life (2 points)

A medicine has a half-life of 5 hours and the initial dose is 200 mg. After how many hours is 25 mg left?



Graph for Question 8.

Question 9 Extraneous solution (2 points)

Solve $\log x + \log(x + 9) = 1$ and explain why one of the two algebraic solutions is rejected.