

PRACTICE EXAM 4 - MATH 111

DATE: Friday, December 2

INSTRUCTOR: George Voutsadakis

Read each problem very carefully before starting to solve it. Each question is worth 3 points. It is necessary to show your work. Correct answers without explanations are worth 0 points.

GOOD LUCK!!

- Using the values at the points $x = -1, x = 0$ and $x = 1$, make a rough sketch of the graph of the function $f(x) = (\frac{1}{3})^x$.
 - Use the graph of f together with transformations to obtain the graph of $g(x) = 2(\frac{1}{3})^{x-1} - 2$.
- The peak of the amount of a painkiller in the bloodstream is 500mg 30 minutes after the painkiller is taken and it is decaying exponentially with half-life 2 hours.
 - Find an equation expressing the amount $y(t)$ of the painkiller in the bloodstream t hours after its peak.
 - Find how much painkiller is in the bloodstream 5 hours after the peak time.
- Solve the following exponential equations:
 - $5x^2(\frac{1}{25})^{20} = 5^{-x}(\frac{1}{125})^{\frac{2x}{3}}$
 - $3^{2x-1} = 5^{2-x}$
- Roughly sketch the graph of $f(x) = \log_2 x$.
 - Using the graph of f and transformations sketch the graph of the function $g(x) = 3\log_2 x + 1$.
- Find the domain of the function $f(x) = \log_{2005} \frac{x^2-3x-4}{x+2}$.
- Solve the following logarithmic equations:
 - $2\ln(x-3) = \ln(x+5) + \ln 4$
 - $\log_2(\log_2(\log_2 x)) = 1$