

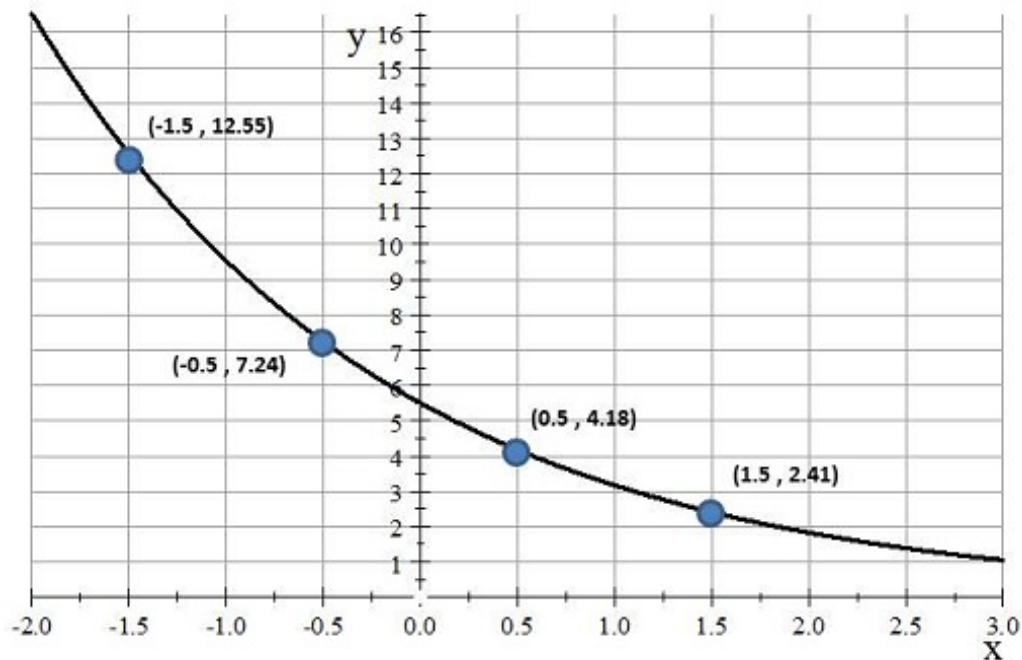
REVIEW FOR EXAM III

Lorraine and Millwood are convinced that musical shoes are the wave of the future and have started making them. Unfortunately, Lorraine and Millwood cannot stand each other and have started rival corporations ShoeTunes and SoleMusic in 2012 to pursue their dream of filling the world with musical footwear.

1. ShoeTunes' yearly profit in 2012 was \$80,000, and Lorraine projects that annual profit will increase by an annual rate of 4.2%, compounded monthly, since the company was founded. Let P represent the annual profit in dollars for ShoeTunes, and let x represent *the number of years passed* since the company was founded.
 - (a) What is the per-month percent change and the per-month growth rate?
 - (b) What is the annual growth rate and the true annual percent change (APY)?
 - (c) Let f be the function that gives P in terms of x . Write down the output formula for f using proper function notation.
 - (d) What will ShoeTune's profit be three and one-half years after it was founded?
 - (e) How many years will it take for the company's profit to reach \$200,000?
2. SoleMusic's annual profit in 2012 was also \$80,000. However its profit is expected to increase *continuously* by an annual rate of 4.2%. Let P represent the annual profit in dollars for SoleMusic, and let x represent *the number of years passed* since the company was founded.
 - (a) What is the annual growth factor and the true annual percent change (APY)?
 - (b) Let g be the function that gives P in terms of x . Write down the output formula for g using proper function notation.
 - (c) What will SoleMusic's profit be three and one-half years after it was founded?

(d) How many years will it take for the company's profit to reach \$200,000?

The graph below presents an exponential relationship between the quantities x and y . Let h be the name of the function that gives the values of y in terms of the values of x . Use this graph to answer Questions 3 - 9.



3. According to the graph, what is the approximate value of $h(2.5)$?
4. According to the graph, what is the approximate solution to the equation $10 = h(x)$?
5. To the nearest thousandth, what is the decay factor for the function h ? What is the percent change?
6. What is the initial value for the function h ?
7. Construct the output formula for the function h . Write your answer using proper function notation.

8. Use your formula to determine the approximate value of $h(2.5)$ and compare your answer to the one you obtained in Problem 3.

9. Use your formula to determine the approximate solution to the equation $10 = h(x)$ and compare your answer to the one you obtained in Problem 4.

10. Rewrite each of the following logarithmic expressions as a single logarithm.

(a) $\log_5(x) + 3\log_5(1-x)$ (b) $\frac{1}{2}\ln(x) - 2\ln(5)$ (c) $\log(x-3) + \log(x+3) - \log(4)$

11. Solve the equation $\ln(x) + \ln(3x) - \ln(4) = 1$ for the unknown x .

12. Solve the equation $\log_2(y^2 + 3y - 6) = 2$ for the unknown y .