

Math142 Week In Review # 3

The Most Important Problems to Understand - This Week

- Describe each of the functions below, as related to the graph of $y = 3^x$.
 - $f(x) = 3^{-x}$
 - $g(x) = -3^x$
 - $h(x) = -3^{-x}$
 - $F(x) = 3^x + 2$
 - $G(x) = 3^{x+2}$
 - $H(x) = 3^{-(x-2)}$

- Solve the following equations:

- $5^{4x-x^2} = 5^{-5}$
- $(2x + 1)^3 = (1 - x^2)^3$
- $3xe^{-x} + 6x^2e^{-x} = 0$

- How much should Shane invest in a CD which pays 6.75% compounded weekly, if he is wanting a balance of \$32,000 in six years to buy a new car?

- Let t represent the number of months since Mandy began studying Spanish. V represents the number of vocabulary words (in hundreds) that Mandy has learned. According to the model, $V(t) = 50(1 - 2e^{-0.1t}) + 50$, what is the approximate upper limit of words she can learn in Spanish?

- The chart below lists the Yankees annual payroll salary. Define t as the number of years since 1980, and S as the payroll salary for the team in million of dollars.

Year	Salary in Millions of \$'s
1984	15
2000	95
2004	187
2008	209

Find the best fitting linear regression, quadratic regression, and exponential regression.

- Which model is best for predicting the annual payroll salary for 2009?
 - What payroll salary does answer "a" predict for 2009?
- Classify each of the following as exponential *growth*, or exponential *decay*.

- $A(t) = \left(\frac{4}{5}\right)^t$
- $A(t) = 2^{4-2t}$
- $A(t) = e^{-(5-t)}$

- A model for the number of bacteria in a culture t hours after exposure is given by:

$$N(t) = 240e^{0.25t}$$

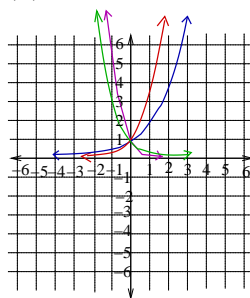
- What was the initial population?
- What was the population 8 hrs later?

- Simplify:

- $\frac{(-2e^{2x})^3}{e^x + 3e^x}$
- $4^{x+5} \cdot 32^{2x}$
- $2^x + 2^{2x}$

- Match each graph below with it's most likely function.

- $f(x) = 2^x$
- $g(x) = \left(\frac{1}{8}\right)^x$
- $h(x) = 4^x$
- $k(x) = 3^{-x}$



- Which of the following functions are 1-1?

- $y_1 = |x^2 - 3|$
- $y_2 = (x + 4)^2 - 1, \quad x \geq -4$
- $y_3 = \sqrt{4x + 1}$
- $y_4 = 2$

- Rewrite in exponential form:

- $\log_2(x) = -1$
- $\log(x + 1) = 0$
- $\ln(2x) = 3$

- Find the domain of:

- $f(x) = \log_2(x - 1)$
- $g(x) = \ln(x^2 - 4)$
- $h(x) = \frac{\log(10 - x)}{\ln(x - 2)}$

- Find the inverse of each of the following if possible:

- $y = \log x$
- $y = x^2$
- $y = e^{2x}$

- If $\log_a 2 = 1.5$, $\log_a 3 = 2.75$, and $\log_a 5 = d$, evaluate each of the following:

- $\log_a 2250$
- $\log_a 6d^3$

- Solve for x : $\log_b(x + 2) + \log_b x = \log_b 24$