

Quiz 4 Review

This quiz will be very similar to Quiz 1, 2 & 3 in the types and length of questions. You should be able to answer all of the questions below. The material will focus primarily on what has been covered since the Quiz 3. As usual I will provide equations to you within reason but not all of them. You are expected to know slope, quadratic formula, area of a square, area of a circle, and interest compounded continuously.

1. Be able to find a difference quotient. If $f(x) = 5x^2 - 4x + 7$, then find $\frac{f(x+h)-f(x)}{h}$.

2. Be able to **quickly sketch** all of the functions from the library of functions as well as various transformations. You should be able to determine the domains and ranges of all of these. This will include horizontal and vertical shifts, vertical/horizontal stretches and compressions, and reflections over both the x and y axis. For logarithmic and exponential functions, be able to identify the vertical and horizontal asymptotes respectively. For example graph the following and state their domains:

a. $y = 3\left(\frac{1}{2}\right)^x + 2$

b. $y = \log(x + 5)$

c. $y = -e^{x-1} + 2$

3. Find the inverse for the following functions. State the domain and range of both $f(x)$, $f^{-1}(x)$.

a. $f(x) = \log_3(x + 1)$

b. $f(x) = 2e^{x-3} + 7$

c. $f(x) = 3 \log(4x - 7) - 8$

4. For a rational function be able to identify the domain, x & y intercepts, vertical asymptotes, horizontal/oblique asymptotes. Be able to determine if the graph will cross the horizontal/oblique asymptote.

a. $R(x) = \frac{2x^2+5}{x^2+25}$

b. $R(x) = \frac{x^3-x^2-6x}{x^2-1}$

c. $R(x) = \frac{x-3}{x^2+5x+4}$

5. Be able to answer a basic interest questions. I will provide the formula for discretely compounded interest (i.e. $P = P_0 \left(1 + \frac{r}{n}\right)^{nt}$). For example- you have \$2000 dollars to invest and it will return an annual 6% interest compounded monthly, how long will it take to double your money?

6. Know your rational, exponential and logarithmic properties. Be able to expand logarithms and write expanded logarithms as one.

a. Write the following as one logarithm $2 \log_3 x - \frac{1}{2} \log_3 y + 2$

b. Expand the following logarithm $\log_2 \left(\frac{3xy^2}{4\sqrt[3]{z}} \right)$

c. Find the approximate value of $\log_7(10)$. Round to 3 decimal places.

7. Be able to answer a basic application problems in relation to cell growth, radioactive growth, population logistic growth model, probability, etc. (we did an example of each of these in class- see section 4.8 for some practice problems). You should be able to tell me about long term behavior and why the equation behaves the way that it does.

If you need any more problems to help practice, check out any of the even problems from sections we have had homework from, chapter reviews, or you can email me with other questions. Good luck studying!