University of Connecticut
Department of Mathematics

Math 1060Q   Practice for Exam 2   Spring 2020

Name: _____

Instructor Name: _____ Section: _____

Read This First!

- This set of questions is provided to help you practice for exam 2. It is meant to give you an idea of the type of questions and topics covered on the exam. You should NOT expect the questions on the actual exam to be exactly the same or small variations on these.

- You will be provided with numerical solutions to each problem, as well as a reference to examples in the book to look at if you are stuck. You may ask about these questions during office hours.

1. Sketch a graph of the parent function $f(x) = 4^x$ and the transformed function $f(x) = 4^{x-1} + 3$. Describe the transformations in words. What are the asymptotes of the parent function and the transformed graph?

2. Evaluate the following logarithmic expressions.

   (a) $\log(100)$

   (b) $\log_4(16^3)$

   (c) $\ln(e^3)$

   (d) $e^{2\ln(x)}$

3. Use the change of base formula to rewrite $\log_3(316)$ in terms of ln.

4. Expand the logarithmic expression

$$\ln\left(\frac{\sqrt{2x+1}}{2x}\right).$$

5. Simplify the following expression into a single logarithm.

$$2\log_5(x) + \log_5(x^3 + 1) + 1$$

6. In each of the following, solve for x. Give an exact answer.

   (a) $7 - 2e^x = 5$

   (b) $2(3^x) = 16$

   (c) $2^{x^2} = 4^x$

   (d) $\log_6(3x + 1) - \log_6(3) = \log_6(2x)$.

7. A laptop that costs $1000 new is worth $600 after 8 months. If its value is modeled by $y = ae^{-kt}$ where t is in months, find a and k, then find the value ter 18 months.

8. Initially, there are 500 bacteria. After 3 hours, there are 1400. Assuming their growth is modeled by $y = ae^{kt}$, find an expression for the number of bacteria after t hours. How many are there after 9 hours?

9. Convert the angle measures below from degrees to radians or radians to degrees.

   (a) $45°$

   (b) $\pi/18$ radians

   (c) 3 radians

10. Find several angles which are coterminal to $\pi/5$.

11. Let $\theta =$ (any standard angle on the unit circle, or coterminal to any angle on the unit circle). Find $\sin, \cos, \sec, \csc, \tan, \cot$ of θ.

12. If $\cos(t) = 1/5$, what is $\cos(-t + 2\pi)$? Explain your reasoning.

13. Evaluate each of the following:

    (a) $\cos(\frac{\pi}{3})$

    (b) $\tan(\frac{5\pi}{4})$

14. If $\sin(\theta) = 1/5$ and θ is in quadrant II, find the other 5 trig functions of θ.

15. If the angle of elevation of a hill is $10°$ and you cover 150ft of distance on the trail that goes up the hill (the hypotenuse), how much is your change in elevation?

16. Show that $(1 + \cos(\theta))(1 - \cos(\theta)) = \sin^2(\theta)$