

**Math 1314 – ONLINE**  
**Alternate Assignment 8**

Record your answers to these questions on the Alternate Assignment 8 answer sheet and upload your answers to the Alternate 8 slot on the “Assignments” tab at casa.uh.edu. This assignment is due on Saturday, March 9, 2013, at 11:59 p.m. All work must be submitted electronically. Late work will not be accepted.

1. Suppose  $Q(t) = 85 - 43e^{-0.61t}$  represents the number of items that an employee is able to produce daily on an assembly line, where  $Q(t)$  represents the number the employee can produce and  $t$  represents the number of weeks since the employee started working. At what rate is the employee's productivity changing after five weeks on the job?

2. Suppose  $Q(t) = 85 - 43e^{-0.61t}$  represents the number of items that an employee is able to produce daily on an assembly line, where  $Q(t)$  represents the number the employee can produce and  $t$  represents the number of weeks since the employee started working. How many items should an experienced worker be able to produce each day?

3. Suppose  $Q(t) = \frac{56.8}{1 + 17.5e^{-0.28t}}$ . Find the initial value.

4. Suppose  $Q(t) = \frac{56.8}{1 + 17.5e^{-0.28t}}$ . Find the rate at which the function is changing when  $t = 30$ .

5. Suppose  $Q(t) = \frac{56.8}{1 + 17.5e^{-0.28t}}$ . Find the value of  $t$  for which  $Q(t) = 50$ .

6. Suppose an exponential function passes through the points  $(0, 100)$  and  $(5, 45)$ . How can you tell from that information that the function is a decay function?

7. Find an exponential model that passes through  $(0, 100)$  and  $(5, 45)$ .

8. Suppose the half-life of a drug is 8 hours. You take a dose of 350 mg. Write two ordered pairs that will be on the graph of the function that represents the amount of the drug that is in your bloodstream at two different times.

9. The half-life of Carbon 14 is 5770 years. Bones found from an archeological dig were found to have 54% of the C-14 that living bones have. Find the approximate age of the bones.

10. Suppose  $f(x) = -0.001x^3 + 0.68x^2 - 2.5x + 12.6$ . State the domain.
11. Suppose  $f(x) = -0.001x^3 + 0.68x^2 - 2.5x + 12.6$ . Find any critical numbers.
12. Suppose  $f(x) = -0.001x^3 + 0.68x^2 - 2.5x + 12.6$ . Draw and label a number line that is subdivided at the critical numbers of the function. Indicate the sign of the first derivative in each interval.
13. Suppose  $f(x) = -0.001x^3 + 0.68x^2 - 2.5x + 12.6$ . State the intervals on which the function is increasing and the intervals on which the function is decreasing.
14. Suppose  $f(x) = -0.001x^3 + 0.68x^2 - 2.5x + 12.6$ . Find the x and y coordinates of any relative extrema.
15. Suppose  $f(x) = -0.001x^3 + 0.68x^2 - 2.5x + 12.6$ . Find any values for which  $f''(x) = 0$ .
16. Suppose  $f(x) = -0.001x^3 + 0.68x^2 - 2.5x + 12.6$ . Draw and label a number line that is subdivided at the numbers for which  $f''(x) = 0$ . Indicate the sign of the second derivative in each interval.
17. Suppose  $f(x) = -0.001x^3 + 0.68x^2 - 2.5x + 12.6$ . State the intervals on which the function is concave upward and the intervals on which the function is concave downward.
18. Suppose  $f(x) = -0.001x^3 + 0.68x^2 - 2.5x + 12.6$ . Find the x and y coordinates of any inflection points.
19. D
20. B