

**Math 1314 – ONLINE**  
**Alternate Assignment 13**

Record your answers to these questions on the Alternate Assignment 13 answer sheet and upload your answers to the Alternate 13 slot on the “Assignments” tab at casa.uh.edu. This assignment is due on Saturday, April 20, 2013, at 11:59 p.m. All work must be submitted electronically. Late work will not be accepted.

1. Evaluate:  $\int_{2.1}^{4.3} (2.8x^2 - 7.3x + 11.4) dx$
2. What is the general “formula” for finding the area between two curves?
3. What are the steps for finding the area between two curves?
4. For problems with a completely bounded region, an additional step is required. What is the additional step?
5. Find the area between  $f(x) = 2x^2 + 5$  and  $g(x) = 2 - 3x$  for  $-3 \leq x \leq 2$ .
6. Find the area that is completely enclosed by  $f(x) = 2x^2 - 5$  and  $g(x) = 2 - 3x$ . Round limits of integration to two decimal places before finding the area. Round your final answer to two decimal places.
7. Suppose the current rate of oil production from an oil well is given by  $P(t) = 100e^{0.05t}$ , where  $t$  is measured in years and  $P(t)$  is measured in millions of barrels per year. Using a new production technique, a company predicts that the rate oil production from the well can be modeled by  $Q(t) = 100e^{0.08t}$  for the next ten years ( $t$  is measured in years and  $Q(t)$  is measured in millions of barrels per year). How much additional oil will be produced using the new technique?
8. What does producers’ surplus measure?
9. What is the formula for consumers’ surplus?
10. You are willing to pay \$200 for an item but find that the exact item you want is for sale for \$165. Is this an example of producers’ surplus or consumers’ surplus? What is the surplus?
11. Suppose demand is given by  $p = -0.2x^2 + 80$ , where  $x$  is given in units of a hundred and  $p$  is given in dollars and supply is given by  $p = 0.1x^2 + x + 40$ , where  $x$  is given in units of a hundred and  $p$  is given in dollars. Find the equilibrium point.
12. See problem 11. Find the consumers’ surplus.

13. See problem 11. Find the producers' surplus.
14. There are three requirements for a probability density function. What are they?
15. The lifespan (in days) of a plant is given by the probability density function  $P(t) = \frac{1}{100}e^{-t/100}$  where  $t \geq 0$ . What is the probability that a plant of this type will live for 80 days or less?
16. Using the function in problem 15, what is the probability that a plant of this type lives more than 50 days but fewer than 120 days?
17. Suppose  $f(x, y) = 2x^2y^3 - 5xy^2 - 8x^2 + 10y^2 + 5x + 1$ . Find  $f(-1, 3)$ .
18. Use the function in problem 17 and find  $f_x$ ,  $f_{xx}$ , and  $f_{xy}$ .
19. Use the function in problem 18 and find  $f_y$ ,  $f_{yy}$ , and  $f_{yx}$ .
20. Suppose  $f(x, y) = \frac{6x - 3y}{2x + 5y}$ . What is the domain of the function.