

Math 220 Take-home 1 Integration

You may use your books and as well as your notes, but work independently, no study partners or tutors. *Any illegible or dashed off work will not be marked.*

Reference the Hoffman text, Chapter 5.3 for these problems, as well as our text, *Course Notes for Math 220*, which concern the definite integral.

1. a) Graph the curve of $f(x) = 6 - x^2$ and shade in the region below it on $[0, 2]$.

b) *Redraw* the function and NEATLY fit 5 rectangles under this curve so the sum of their areas *overestimates* actual area.

c) Write the sigma notation equation of this area, both the general formula for Riemann sum of rectangles and the one for this function. Reference class notes or the books

d) Find this sum. You may use your calculator.

e) Find the actual area, according to the fundamental theorem of calculus (the definite integral).

f) What would you do with the Riemann sum to improve the estimation?

2. The output of a factory is changing at the rate of

$$Q'(t) = 2t^3 - 3t^2 + 10t + 3,$$

where t is the number of hours after the morning shift begins at 8 A.M. How many units are produced between 10 A.M. and noon?