Written Homework 8, Due November 16

When uploading your written homework, it is EXTREMELY important that you have your pages for each problem in the correct order and rotated properly! Otherwise, it will receive a score of 0. You should always check your submission using a computer. Be sure that separate questions are on separate pages.

Question 1 *(5 points) A stone was dropped off a cliff and hit the ground with a speed of* 120 *ft/s. You may assume that the acceleration due to gravity is* -32 *ft/s*^{2}*.*
(a) (2 points) Use antiderivatives to find a formula for the velocity at time t*. Hint: Since the stone is dropped, what is the initial velocity?*

(b) (2 points) Use antiderivatives to find a formula for the height of the stone at time t*. Your formula may contain a constant* C*.*

(c) (1 point) What is the height of the cliff?

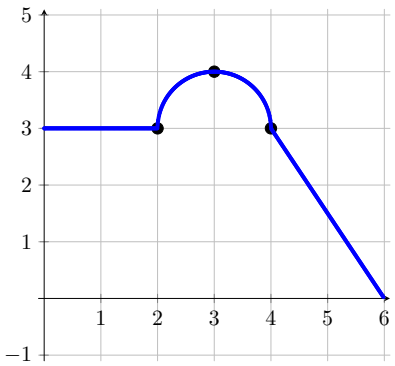
Question 2 *(4 points) A car is braking with a constant decelaration of 16 ft/s^2, producing skid marks measuring* 200 *ft before coming to a stop. (Use antiderivatives to solve this problem!)*
(a) (3 points) How fast was the car traveling when brakes were first applied?

(b) (1 point) The speed limit was 55*mph, was the car speeding?*

Question 3 *(4 points)*
Let $f(x) = \dfrac{1}{x}$ *on* $[1, 5]$*;* $n = 4$.
(a) Illustrate the left and right Riemann sums for f *on the given interval and for the given value of* n. *Determine which Riemann sum underestimates and which sum overestimates the area under the curve.*

(b) Calculate the left and right Riemann sums.

Question 4 *(6 points)*
The graph of the function $y = f(x)$ is shown below.



In order to estimate the integral $\int_0^6 f(x)dx$ *find the following Riemann sums.*

(a) The left Riemann sum using 6 intervals.

(b) The right Riemann sum using 6 intervals.

(c) The midpoint Riemann sum using 3 intervals.

Question 5 *(3 points) Using the graph of $f(x)$ from the previous question find the exact value for the integral* $\int_0^6 f(x)dx$.