

MATH 134
First Hour Exam Sample
February 20, 2011

You may use your calculator and integral table as indicated.

1. (20 pts.) The graph of $f(x) = \frac{2}{1+\sqrt{x}}$ is to the right.

(a) On the graph sketch the rectangles for R_6 , the Riemann sum approximation with six subintervals using right endpoints.

(b) Write the formula for R_6 for $f(x) = \frac{2}{1+\sqrt{x}}$ using summation notation.

(c) Compute the value of R_6 .

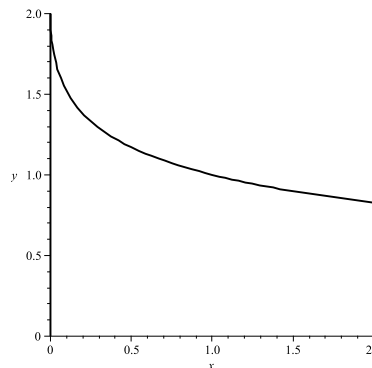


Figure 1:

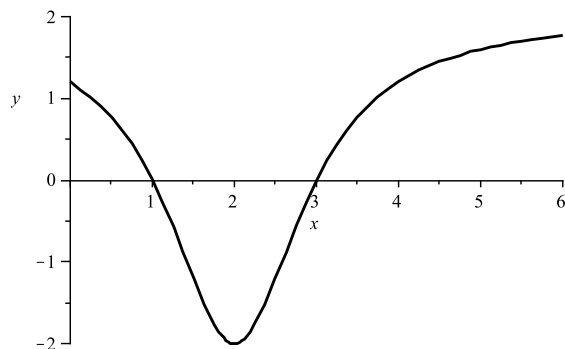


Figure 2:

2. (20 pts.) Above is the graph of a function $y = f(x)$. Define a new function by

$$F(b) = \int_0^b f(x) dx$$

Based on the graph of f answer the following questions about F .

- (a) Is $F(x)$ increasing, decreasing, or neither when $b = 2$? Explain your answer.
- (b) Where are the critical points of F in the interval $[0, 6]$?
- (c) Are the critical points from (b) maxima, minima or neither?
- (d) Where are the inflection points of F in the interval $[0, 4]$?

3. (24 pts.) Evaluate the following integrals by hand (without the tables). Show your work.

(a)

$$\int \sec^2(5x) + 5^x dx$$

(b)

$$\int_1^2 \frac{(\ln(x))^7}{x} dx$$

4. (12 pts.) Use the method of partial fractions to evaluate the following integral. After applying partial fractions, you may use the table of integrals to complete the problem.

$$\int \frac{4-x}{(x+1)(x^2+4)} dx$$

5. (24 pts.) Evaluate the following integrals. Indicate which method you use, or which formula from the tables. If you use the tables, specify any substitutions that you use and the values of the constants that appear in the integral formula.

(a)

$$\int (x^2 + 4)e^{4x} dx$$

(b)

$$\int \sin^3(11x) \cos^3(11x) dx$$