Lesson 10 Practice Problems

Indefinite Integration & Area Under Curves MATH 2200-98

Indefinite Integration

1. Integrate the following

   (a) $\displaystyle\int \left(\frac{3}{x^4} + 2 - \frac{3}{x^2}\right) dx$

   (b) $\displaystyle\int \frac{12t^8 - t}{t^3}\, dt$

   (c) $\displaystyle\int 5m(12m^3 - 10m)\, dm$

Evaluating Riemann Sums

2. Speedometer readings for a motorcycle over a 4 second time period are given in the table below

$t(s)$	1	1.5	2	2.5	3	3.5	4	4.5	5
v (m/s)	50	50	60	60	55	65	50	60	70

   Find the indicated Riemann sum approximations to the displacement on $[1, 5]$ with $n = 4$ subintervals.

   (a) left Riemann sum.

   (b) right Riemann sum.

   (c) midpoint Riemann sum.

3. using a Riemann sum with $n = 4$ approximate the area of the region bounded by the graph of $f(x) = 2 - 2\sin(x)$ and the x-axis on the interval $\left[-\frac{\pi}{2}, \frac{\pi}{2}\right]$ with

   (a) left endpoints.

   (b) right endpoints.

   (c) midpoints.

Initial Value Problems

4. Given the acceleration function of an object moving along a line, find the position function with the given initial velocity and initial position.

$$a(t) = 2t + 1, \quad v(0) = -2, \quad s(0) = 3$$

5. Solve the initial value problem

$$g'(x) = \frac{x^4 - 1}{x^3}, \quad g(1) = 6$$