Written Homework 10

For problems 1 through 5 evaluate the given indefinite integrals.

1. $\int \left(\frac{6}{\sqrt{x}} + 6\sqrt{x} \right) \, dx$

2. $\int \left(\frac{3}{s^2} - 4s^8 \right) \, ds$

3. $\int (9x + 4)^2 \, dx$

4. $\displaystyle\int \frac{3x^3 + 6x^2}{x}\, dx$

5. $\displaystyle\int (\sec^2 t - 6)\, dt$

6. Solve the initial value problem $f'(x) = x^2 - 2x$ with $f(1) = \frac{1}{3}$.

7. Given the velocity function $v(t) = 2\cos t$ and the initial position $s(0) = 0$ find the position function.

8. Given the acceleration function of an object moving along a line, find the position function with the given initial velocity and initial position. $a(t) = 4, \quad v(0) = -3, \quad s(0) = 2$

9. The velocities (in m/s) of an automobile moving along a straight freeway over a 4 second period are given in the following table.

$t(s)$	0	0.5	1	1.5	2	2.5	3	3.5	4
v (m/s)	20	25	30	35	30	30	35	40	40

Find the indicated Riemann sum approximations to the displacement on $[0, 4]$ with $n = 4$ subintervals.

(a) Left Riemann sum.

(b) Right Riemann sum.

(c) Midpoint Riemann sum.

10. Consider the function $f(x) = x^2 + 2$ on the interval $[0, 2]$. Find the area of the region with the indicated Riemann sum and state whether the sum is an over-estimate or underestimate. Divide the interval into $n = 4$ subintervals.

    (a) Left Riemann sum.

    (b) Right Riemann sum.

    (c) Midpoint Riemann sum.