Calculus I Exam Four

Name: _____

Please show all work on these problems. Use of a calculator is permitted.

1. Find $\int 3x^4 - 7\sqrt{x} + \frac{1}{x} - 4\sec^2(x) + 8 \, dx$.

2. Find $\int_0^{\pi} 5\sin(x) \, dx$.

3. Find $\int e^x \cos(7e^x + 6)\, dx$.

4. Calculate $\int_2^3 x^2\sqrt{x^3 - 7}\, dx$.

5. The initial position of a particle is $s(0) = 200$, and its velocity is $v(t) = 3 + 6t$. Find $s(t)$, the position of the particle at time t.

6. At time $t = 0$, 100 people are infected with a disease. Suppose new individuals are infected at a rate of $r(t) = 3t^2$. How many people are infected at time $t = 4$?

7. The graph of $f(x) = \sqrt{x}$ is given below. Find the area of the shaded region.