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.