Problem 1

Find all the antiderivatives of the following functions:

$$f(x) = 2x^2 + 3x + 2$$

$$f(x) = \sqrt[4]{x} + \frac{3}{x^2} + \frac{2}{\sqrt{x}}$$

$$f(x) = \sin(5x)$$

$$f(x) = \sec^2(2x)$$

Problem 2

Suppose that $f''(x) = x + 1$, $f'(4) = 2$, $f(2) = 0$. Find $f(x)$.

Problem 3

Suppose the velocity of a particle is given by $v(t) = t^2$. If we know the position of the particle to be 3 when $t = 0$ (said another way, $p(0) = 3$), find the position of the particle when $t = 1$ (that is, find $p(1)$).