

$$(4) \int_0^2 x - 2x^2 dx$$

$$\left[\frac{x^2}{2} - \frac{2x^3}{3} \right]_0^2 = \left[\frac{2^2}{2} - \frac{2(2)^3}{3} \right] - \left[\frac{0^2}{2} - \frac{2(0)^3}{3} \right]$$

$$\left[2 - \frac{16}{3} \right] - [0] = \frac{6}{3} - \frac{16}{3} = \frac{-10}{3}$$

Solve the differential equation

$$(5) f''(x) = 6 \quad f'(1) = 2 \quad \text{and} \quad f(1) = 0$$

$$f'(x) = \int 6 dx$$

$$f(x) = \int 6x - 4 dx$$

$$f'(x) = 6x + c$$

$$f(x) = 3x^2 - 4x + c$$

$$2 = 6(1) + c$$

$$0 = 3(1)^2 - 4(1) + c$$

$$c = -4$$

$$c = 1$$

$$f'(x) = 6x - 4$$

$$f(x) = 3x^2 - 4x + 1$$

$$(6) v(t) = 8t - 2 \quad \text{initial position is 4 units}$$

$$a) s(2) =$$

$$b) a(3) =$$

$$a) \int 8t - 2 dt$$

$$b) a(3) = 8$$

$$s(t) = \frac{8t^2}{2} - 2t + c$$

$$4 = 4(0)^2 - 2(0) + c$$

$$c = 4$$

$$s(t) = 4t^2 - 2t + 4$$

$$s(2) = 4(4) - 2(2) + 4$$

$$s(2) = 16 - 4 + 4 = 16$$