

Problem 57

$$M_x(t) = (1 - 2500 \cdot t)^{-4}$$

$$M_x'(t) = -4(1 - 2500 \cdot t)^{-5} \cdot (-2500) \\ = 10,000(1 - 2500 \cdot t)^{-5}$$

$$E(x) = M_x'(0) = 10,000$$

$$M_x''(t) = 10,000(-5)(1 - 2500 \cdot t)^{-6}(-2500) \\ = 125,000,000(1 - 2500 \cdot t)^{-6}$$

$$E(x^2) = M_x''(0) = 125,000,000$$

$$V(x) = 125,000,000 - (10,000)^2 \\ = 25,000,000$$

$$\sigma_x = \sqrt{25,000,000} = \underline{\underline{5000}}$$

B

$$V(x) = E(x^2) - [E(x)]^2$$