

HW 4-1 (Due Sep. 20, 2016)

Name:

Print then work on it directly. Staple HW 4-1 and 4-2 together.

Problem 1

3.155 Let $m(t) = (1/6)e^t + (2/6)e^{2t} + (3/6)e^{3t}$. Find the following:

- a $E(Y)$
- b $V(Y)$
- c The distribution of Y

Problem 2

3.156 Suppose that Y is a random variable with moment-generating function $m(t)$.

- a** What is $m(0)$?
- b** If $W = 3Y$, show that the moment-generating function of W is $m(3t)$.
- c** If $X = Y - 2$, show that the moment-generating function of X is $e^{-2t}m(t)$.

Problem 3

3.157 Refer to Exercise 3.156.

- a** If $W = 3Y$, use the moment-generating function of W to show that $E(W) = 3E(Y)$ and $V(W) = 9V(Y)$.
- b** If $X = Y - 2$, use the moment-generating function of X to show that $E(X) = E(Y) - 2$ and $V(X) = V(Y)$.

Problem 4

3.158 If Y is a random variable with moment-generating function $m(t)$ and if W is given by $W = aY + b$, show that the moment-generating function of W is $e^{tb}m(at)$.

Problem 5

3.159 Use the result in Exercise 3.158 to prove that, if $W = aY + b$, then $E(W) = aE(Y) + b$ and $V(W) = a^2V(Y)$.