

Math 401 HW 1 Fall 2024. Due Friday, Aug. 30.

Place your solutions on a separate sheet of paper. DO NOT place solutions side by side. You may use both the front and the back of each sheet.

YOU ARE BEING GRADED FOR WORK NOT JUST THE FINAL ANSWER. As a rule of thumb, you should have some idea of what you were doing, even without the book or notes. You are encouraged to form groups to discuss ideas and HW problems, but do not copy.

1) Suppose

$$F(t) = 1 - \exp\left(\frac{-t^2}{2\sigma^2}\right)$$

where  $\sigma > 0$  and  $t > 0$ . Find the  $f(t)$  for  $t > 0$ .

2) Suppose  $X \sim U(0, 110 - y)$  for some known  $y$  where  $0 < y < 110$ .

a) Find  $E(X)$ .

b) Find  $V(X)$ .

3) Suppose  $X$  is an exponential random variable with  $V(X) = 400$ . What is  $\beta$ ?

4) Suppose

$$F(t) = 1 - \exp\left[\frac{-(e^t - 1)}{\lambda}\right]$$

for  $t > 0$  where  $\lambda > 0$ . Find  $f(t)$  for  $t > 0$ .

5) Suppose  $X \sim \text{Poisson}(1)$ . Find  $P(X = 0)$ .

6) Suppose  $X \sim \text{Poisson}(1.44)$ .

a) Find  $E(X)$ .

b) Find  $V(X)$ .

From my webpage, use Some Links for SIU Students:

(<http://parker.ad.siu.edu/Olive/students.htm>).

One link describes the SIU actuarial program: (Here is information about useful math courses for students who want to become actuaries)

(<http://parker.ad.siu.edu/Olive/sactuarial.pdf>).

Another link is for useful texts and links to online texts and notes. (Here is a list of math and statistics texts)

(<http://parker.ad.siu.edu/Olive/sref.pdf>).