HW 99 - Resubmission

This is an example of a homework submission where the initial response to Q2 was wrong. Note that the original answers for all problems are part of the resubmission. The new work for Q2 follows the previous work for Q2.

Q1

Let $X \sim N(\mu, \sigma)$. What is the mean of X?

Solution. μ

Q2

Let $X \sim Exp(\theta)$. Find the mean of the exponential distribution.

$$\begin{aligned} E[X] &= \int_0^\infty xe^{-x}\,dx \\ &= uv - \int vu' \\ &= -xe^{-x} - \int -e^{-x}\,dx \\ &= -xe^{-x} - e^{-x}|_0^\infty \\ &= -0 - 0 + 0 + 1 \\ &= 1 \end{aligned}$$

Resubmission

Note $\theta > 0$.

$$\begin{aligned} E[X] &= \int_0^\infty x\theta e^{-\theta x}\,dx \\ &= uv - \int vu' \\ &= -xe^{-\theta x} - \int -e^{-\theta x}\,dx \\ &= -xe^{-\theta x} - \frac{e^{-\theta x}}{\theta}\Big|_0^\infty \\ &= -0 - 0 + 0 + \frac{1}{\theta} \\ &= \frac{1}{\theta} \end{aligned}$$

Q3

Let $X \sim GAMMA(5, 12)$. What is the mean of X?

Solution. $5 \times 12 = 60$