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MATH255 – Autumn 2023 Computer Lab – Week 12

1. (b)

The mean of a U[0, 1] variable is calculated as follows:

$$\mu = \frac{b - a}{2} = \frac{1 - 0}{2} = 0.5$$

where a is the lower endpoint (minimum) of the variable

b is the upper endpoint (maximum) of the variable

The variance and standard deviation of the variable can be calculated as follows:

$$\sigma^2 = \frac{(b - a)^2}{12} = \frac{(1 - 0)^2}{12} = \frac{1}{12}$$

$$\sigma = \sqrt{\sigma^2} = \sqrt{\frac{1}{12}} \approx 0.29$$

The expected value for a sample of size 25 is:

$$E(X) = \frac{b - a}{2} = \frac{1 - 0}{2} = \frac{1}{2}$$

The standard error of a sample of size 25 is:

$$SE = \frac{\sigma}{\sqrt{n}} = \frac{0.29}{\sqrt{25}} = \frac{0.29}{5} = 0.058$$

with n as the sample size

σ as the standard deviation