

Question 1

a)

							Σ
x	38.3	38.9	39.2	39.2	39.6	41.0	236.2
x^2	1466.89	1513.21	1536.64	1536.64	1568.16	1681.00	9302.54

$$\bar{x} = \frac{\sum x}{n} = \frac{236.2}{6} = 39.366667.$$

$$s^2 = \frac{\sum x^2 - n \bar{x}^2}{n - 1} = \frac{9302.54 - 6(39.366667^2)}{5} = 0.8266.$$

$$s = \sqrt{0.8266} = 0.9092.$$

b) 99% $\Rightarrow \alpha = 0.01$ remaining $\Rightarrow \alpha/2 = 0.005$ in each tail.

Small sample $\Rightarrow t_{\nu, \alpha/2}$ required where $\nu = n - 1 = 6 - 1 = 5$.

$$\bar{x} \pm t_{5, 0.005} \frac{s}{\sqrt{n}}$$

$$39.3667 \pm 4.032 \frac{0.9092}{\sqrt{6}}$$

$$39.3667 \pm 4.032(0.3712)$$

$$39.3667 \pm 1.4967$$

$$[37.87, 40.86]$$

We are 99% confident that the true temperature for this type of CPU is between 37.87°C and 40.86°C when performing this particular intensive task.