1 Question 1

To compute the confidence intervals, we need to compute the sample mean and variance first: $\overline{x} = 399.26, s_n^2 = 4.896$. a) The confidence interval for the mean mass of the cookie packages is computed through the critic values of the t-Student distribution with $\alpha = 0.95, d.f. = 9$. Confidence interval for the mean:

$$-t_{\alpha/2,9} < \frac{\overline{x} - \mu}{s_n/\sqrt{n}} < t_{\alpha/2,9} \rightarrow \overline{x} - t_{\alpha/2,9}\frac{s_n}{\sqrt{n}} < \mu < \overline{x} + t_{\alpha/2,9}\frac{s_n}{\sqrt{n}}$$

Which results in:

$$\mu \in (397.68, 400.84)$$

b) The confidence interval for the variance of the mass of the cookie packages is computed through the critic value of the chi-square distribution with $\alpha = 0.95, d.f. = 9$. Confidence interval for the variance:

$$\chi^2_{1-\frac{\alpha}{2}} < \frac{(n-1)s_n^2}{\sigma^2} < \chi^2_{\frac{\alpha}{2}} \rightarrow \frac{(n-1)s_n^2}{\chi^2_{0.975}} < \sigma^2 < \frac{(n-1)s_n^2}{\chi^2_{0.025}}$$

Which results in:

$$\sigma^2 \in (2.317, 16.32)$$