Question 20

1)

$$\text{Var}(\log(\hat{\mu}))$$

$$\log(\hat{\mu}) = \log(\mu) + (\hat{\mu}-\mu)\frac{1}{\mu}$$

$$\text{Var}(\log(\hat{\mu})) = \frac{1}{\mu^2}\text{Var}(\hat{\mu})$$

$$= \frac{1}{\mu^2}\cdot\frac{1}{n}\cdot\text{Var}(Y) = \frac{1}{\mu^2}\cdot\frac{1}{n}\cdot\mu$$

$$= \frac{1}{n\mu}$$

$$\widehat{\text{Var}}(\log(\hat{\mu})) = \frac{1}{n\hat{\mu}} = \frac{1}{\sum Y_i}$$

2) $$\log(\hat{\mu}) \pm 1.96\sqrt{\frac{1}{\sum Y_i}}$$

$$\log(\hat{\mu}) = \log(\bar{Y}) = \log(10)$$

$$\log(10) \pm 1.96\sqrt{\frac{1}{40}}$$

$$(1.992682,\ 2.612488)$$