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Please answer the following questions:

1. If X has density $f(x)=\theta e^{-\theta x}, x>0$, what is E(X)?

$X \sim \mathcal{E}(\theta) \quad x>0.$

$E(X) = \frac{1}{\theta}$

2. What does it mean to say that (-0.25, 0.25) is a 95% confidence interval for a parameter θ?

That means we are 95% confident that the true population mean is captured in the interval $(-0.25, 0.25)$.

In other words, 95% of the time, when we calculate the confidence interval in this way, true mean will be within $(-0.25, 0.25)$.

3. What is the difference between drawing a sample with and without replacement?

Let M be number of success within a total number of N

$P = \frac{N}{M}$ if draw with replacement, i.e. p is constant.

If draw without replace, M decreases by 1 after each draw and N decreases by 1 after each successful draw. P is quite different between each drawing.

4. Consider the times of large earthquakes in the Puget Sound region. What distribution would you suggest the time between earthquakes should have?

I think the span of time between two earthquake T is an exponential distribution, since poisson distribution is often used to describe events like earthquake that occur rarely.