Problem 2
$$[x_i \sim e^{\lambda}] \text{ for } \lambda \text{ rate}$$
Part a. $P(x_i \mid \lambda) = 0$

$$x_i \sim e^{\int tor \lambda rate}$$

Part a. $p(x_i | \lambda) =$

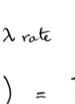
Part a.
$$p(x_i | \lambda) = \prod_{i=1}^{n} \lambda e^{-\lambda x_i}$$

$$= (\lambda)^n \cdot e^{\sum_{i=1}^{n} -\lambda x_i}$$

Part a.
$$p(x_i | \lambda) = \prod_{i=1}^{n} \lambda e^{\lambda x_i}, x>0$$

 $P(x|\alpha,\beta) = \frac{\beta^{\alpha}}{(\alpha-1)!} \cdot x^{\alpha-1} \cdot e^{-\beta x}$ Exponential $P(x|\lambda) = \lambda \cdot e^{-\lambda x}$

$$\lambda$$
 λ $=$



Posterior $p(\lambda \mid 0.1, 1) \propto p(\lambda) p(x; |\lambda)$

= $(\lambda)^n \cdot e^{-\lambda \cdot \sum_{i=1}^{n} x_i}$ | ikelihood

 $\propto \frac{1}{\sqrt{2\pi}} \cdot e^{\left\{-\frac{(\lambda-0.1)^2}{2}\right\}} \cdot (\lambda)^n \cdot e^{\left\{-\lambda \cdot \sum_{i=1}^{n} x_i\right\}}$

 $\propto (\lambda)^n \cdot e^{\left\{-\frac{(\lambda-0.1)^2}{2} - \lambda \cdot \sum_{i=1}^n x_i\right\}}$

Port. b. $\lambda \sim N\left(\frac{1}{10}, 1\right) = \frac{1}{\sqrt{2\pi \cdot 1^2}} \cdot e^{\left\{-\frac{\left(\lambda - 0.1\right)^2}{2 \cdot 1^2}\right\}} = \frac{e^{\left\{-\frac{\left(\lambda - a.1\right)^2}{2}\right\}}}{\sqrt{2\pi}}$