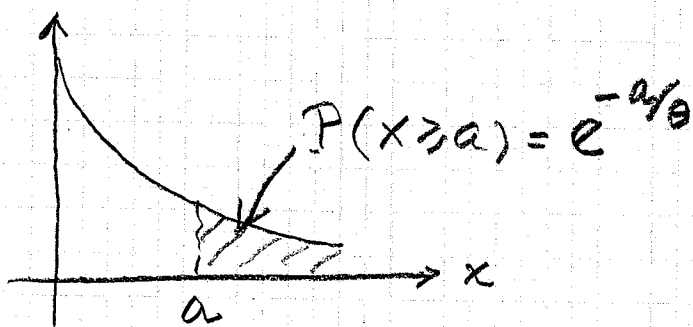


THE EXPONENTIAL DISTRIBUTION (continuous)

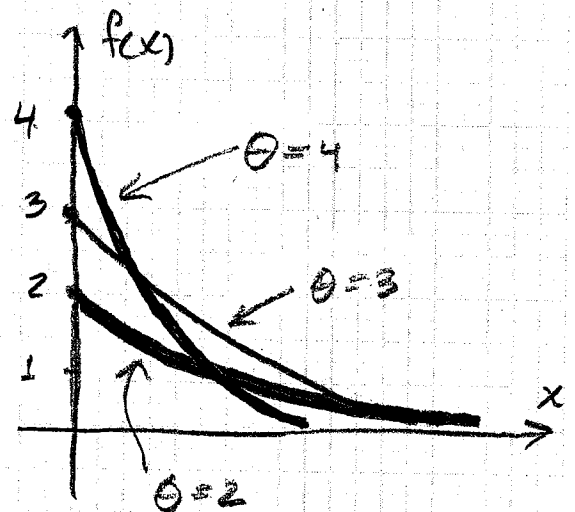
The waiting time distribution

- the length of time between train derailments
- " " " " computer crashes
- " " " " earthquakes
- the distance traveled between car breakdowns

$$f(x) = \frac{1}{\theta} e^{-x/\theta}$$



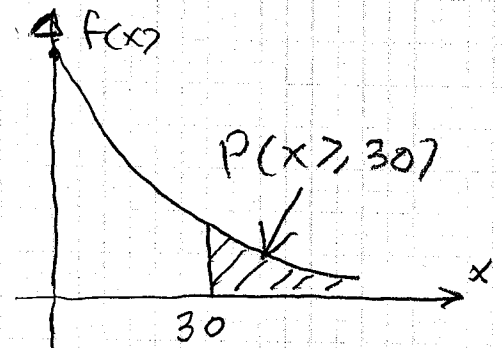
$$\mu = \theta \quad \sigma = \theta$$



Example: Suppose the length of time between car crashes at a certain intersection has a mean of 20 days. What is the probability that more than 30 days will pass without a car crash at that intersection?

$$P(x > 30) = e^{-30/20} \quad \mu = 20$$

$$= .223$$



$$b) \quad \mathbb{P}(20 \leq X \leq 30)$$

$$\mathbb{P}(X \geq a) = e^{-a/\theta}$$

$$\begin{aligned} \mathbb{P}(X \geq 20) &= e^{-20/20} \\ &= e^{-1} \approx .368 \end{aligned}$$

$$\begin{aligned} \mathbb{P}(20 \leq X \leq 30) &= .368 - .223 \\ &= .145 \end{aligned}$$

