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Machine Learning
HW 2

Q1 $f(x) = \dfrac{\theta^4 x^3 \exp(-\theta x)}{6}$

a) By the maximum log likelihood, show that the MLE est θ is

$$\theta_{ML} = \dfrac{4n}{\sum_{i=1}^{n} x_i}$$

$$\mathcal{L}(\theta|x) = \log \mathcal{L}(\theta|x) = \sum_{i=1}^{n} \log P(x=x|\theta)$$

$$\dfrac{\partial}{\partial \theta} \mathcal{L}(\theta|x) \qquad \dfrac{\theta^4 x^3 \exp(-\theta x)}{6}$$

$$\log\left(\dfrac{\theta^4 x^3 \exp(-\theta x)}{6}\right)$$

$$\sum_{i=1}^{n} \left[\log\left(\dfrac{1}{6}\right) \cdot \log(\theta^4 x^3) \cdot \log\left(e^{\wedge -\theta x}\right) \right]$$

$$\sum_{i=1}^{n} \left[\log\left(\dfrac{1}{6}\right) \cdot \log(\theta^4 x^3) \cdot \log(-\theta x) \right]$$

$$\dfrac{\partial}{\partial \theta} \qquad 0 \qquad 4\theta^3 x^3 \cdot x$$

$$? \qquad 4\theta^3 x^4$$