ASSIGNMENT-2

B22054

1) $P(x) = \theta \rightarrow A$

$P(x) = 3\theta \rightarrow B$

$P(x) = \frac{1}{2} \rightarrow C$

$P(x) = \frac{1}{2} - 4\theta \rightarrow F$

A	B	C	F
2 students	10 students	60 students	40 students

$\theta = ?$

$$\mathcal{L} = \prod_{i=0}^{4} \left(P\left(\frac{x}{c}\right) \right) = \theta^2 (3\theta)^{10} \left(\frac{1}{2}\right)^{60} \left(\frac{1}{2} - 4\theta\right)^{40}$$

$$\ln(\mathcal{L}) = 2\ln\theta + 10\ln(3\theta) + 60\ln\left(\frac{1}{2}\right) + 40\ln\left(\frac{1}{2} - 4\theta\right)$$

Maximizing $(\ln(\mathcal{L}))$

$$\frac{\partial(\ln\mathcal{L})}{\partial\theta} = \frac{2}{\theta} + \frac{10}{\theta} + \frac{40(-4)}{\left(\frac{1}{2} - 4\theta\right)} = 0$$

$$\Rightarrow \frac{12}{\theta} = \frac{160}{\frac{1}{2} - 4\theta}$$

$$\Rightarrow 1600 = 6 - 480$$

$$\Rightarrow \theta = \frac{.6}{208} = \frac{.3}{104} = 0.0288$$

2)

A	B	C	D	E
1	1	1	1	1
2	3	1	3	4) yrs

$$f(x) = \gamma e^{-\gamma x}$$

$$-\log(P(\tfrac{x}{\gamma})) = -\Sigma(\log(\gamma e^{-\gamma x}))$$

$$\cdot\alpha = -\Sigma(\log(\gamma e^{-\gamma x}))$$

$$\frac{\partial \alpha}{\partial \gamma} = 0$$

$$\Sigma\left(\frac{1}{\gamma} - x\right) = 0$$

$$\boxed{\gamma = \frac{n}{\Sigma x}}$$

$$\gamma = \frac{5}{2+3+1+3+4} = \frac{5}{13} \simeq 0.3846$$