494 MSE 1 Solutions

1 a.
$$E(\overline{X}) = E(X_1 + \dots + X_N)$$
 $= \frac{1}{N} E(X_1 + \dots + X_N)$
 $= \frac{1}{N} P(X_1 + \dots + X_N)$
 $= \frac{1}{N^2} P(X_1 + \dots + X_N)$
 $= \frac{1}{N$

2a.
$$X \stackrel{g}{=} N(\mu, \frac{\pi^{2}}{n})$$

b. $P(\mu - \frac{\pi}{16} \frac{\pi}{16} \leq X \leq \mu + 1.96 \frac{\pi}{16}) = 0.95$
 $\Rightarrow P(X - \frac{196 \frac{\pi}{16}} \leq \mu \leq X + 1.96 \frac{\pi}{16}) = 0.95$

C. $15 \stackrel{d}{=} + \frac{1}{16} \frac{\pi}{16}$

d. $15 \stackrel{d}{=} + \frac{1}{16} \frac{\pi}{16} + 1$

3a. $L(0) = \frac{\pi}{15} \frac{\pi}{16} (x_{1} \cdot 0)$

The MLF is the value of O such that $L(0)$ is maximised.

b. Let $N_{0} = \frac{\pi}{16} \frac{1}{16} = \frac{\pi}{16} \frac{1}{16} = \frac{\pi}{16} = \frac{\pi}{16} \frac{1}{16} = \frac{\pi}{16} = \frac{\pi}{16} \frac{1}{16} = \frac{\pi}{16} = \frac{\pi}{$

$$2 \log_{10}(0) = 0$$

$$\Rightarrow 2 \log_{10}(1-0) - \log_{10}(1-2) = 0.$$

$$6(-2 \log_{10}(1-2 \log_{10})) = -2 \log_{10}(1-2 \log_{10})$$

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$$1 \log_{10}(1-$$

$\log(L_1) - \log(L_0) \simeq \frac{1}{2} \chi^2$	
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Use this as the fest statistic.	^
Alternatively we assymptotic normality of the NLE.	
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