

3i) Calls per 5 minute interval $X \sim \text{Poisson}(3.2)$

$$A) P(X=1) = e^{-3.2} \times 3.2 = 0.1304$$

$$B) P(X \geq 6) = 1 - P(X \leq 5) \\ = 1 - 0.8946 \\ = 0.1054$$

3ii) For 1 minute interval $X \sim \text{Poisson}\left(\frac{3.2}{5}\right)$

$X \sim \text{Poisson}(0.64)$

$$A) P(X=1) = e^{-0.64} \times 0.64 \\ = 0.3375$$

$$B) P(X=1) \text{ for 5 consecutive 1 minute intervals} \\ = 0.3375^5 \\ = 0.0044$$

3iii) For 1 hour $X \sim \text{Poisson}(3.2 \times 12)$

$X \sim \text{Poisson}(38.4)$

Approximate with

$X \sim N\left(38.4, \sqrt{38.4}^2\right)$

$$P(X \leq 45.5)$$

$$Z = \frac{x - \mu}{\sigma}$$

$$Z = \frac{45.5 - 38.4}{\sqrt{38.4}} = 1.146$$

3iii)
cont)

$$P(X \leq 45.5) = P(Z < 1.146) \\ = 0.8741$$

3iv)

A) The enquiry department of a bank

Suitable arguments for/against each assumption E1, E1

B) A police emergency control room

Suitable arguments for/against each assumption E1, E1

Remember the assumptions are

- at a uniform average rate
- independently of each other

To obtain full marks a comment will be required
for/against each assumption for each situation.

4 comments in total.
