

## Poisson Probability Examples

(10) Between two and five students?

$$2 \leq x \leq 5 \quad ; \quad \mu = 4$$

$$0.1465$$

$$0.1563$$

$$P(2 \leq x \leq 5) = P(2) + P(3) + P(4) + P(5)$$

$$0.1465$$

$$0.1465$$

↓

We don't  
have in  
notes.

$$= 0.1465 + 0.1465 + 0.1465$$

$$+ 0.1563$$

$$\approx \boxed{0.6936}$$

$\mu = 4$  arrivals in 60 minutes

What is  $x$  arrivals in 72 minutes?

$$\frac{4}{60} = \frac{x}{72} \quad ; \quad x = \frac{4 \cdot 72}{60}$$

$$\mu = \frac{4 \cdot 72}{60}$$

$\mu \approx 4.8$  arrivals  
in 72 min

(14) more than two students visit?

$$x > 2$$

$$P(x > 2) = P(3) + P(4) + P(5) + \dots$$

Def.

$$= 1 - P(0) - P(1) - P(2)$$

complement Rule!

$$\mu = 4.8$$

$$P(x) = \frac{\mu^x e^{-\mu}}{x!}$$

$$P(x) = \frac{4.8^x e^{-4.8}}{x!}$$

$$= 1 - e^{-4.8} - 4.8 e^{-4.8} - \frac{4.8^2 e^{-4.8}}{2!}$$

$$= 1 - 0.0082 - 0.0395 - 0.0948$$

$$= \boxed{0.8575}$$

(15) at least four students visit?

$$x \geq 4$$

$$P(x \geq 4) = P(4) + P(5) + P(6) + \dots$$

Def

$$= 1 - P(0) - P(1) - P(2) - P(3)$$

0.0082      0.0395      0.0948

0.1517  
e  
what is this?

$$P(X) = \frac{4.8^x e^{-4.8}}{x!}$$

$$P(3) = \frac{4.8^3 e^{-4.8}}{3!}$$

$$P(3) \approx 0.1517$$

$$P(X \leq 4) = 1 - 0.0082 - 0.0395 - 0.0948$$

$$- 0.1517$$

$$\approx \boxed{0.7058}$$