

## Question #85

Key: C

Let  $N = \#$  of computers in department

Let  $X =$  cost of a maintenance call

Let  $S =$  aggregate cost

$$\text{Var}(X) = [\text{Standard Deviation}(X)]^2 = 200^2 = 40,000$$

$$\begin{aligned} E(X^2) &= \text{Var}(X) + [E(X)]^2 \\ &= 40,000 + 80^2 = 46,400 \end{aligned}$$

$$E(S) = N \times \lambda \times E(X) = N \times 3 \times 80 = 240N$$

$$\text{Var}(S) = N \times \lambda \times E(X^2) = N \times 3 \times 46,400 = 139,200N$$

We want  $0.1 \geq \Pr(S > 1.2E(S))$

$$\geq \Pr\left(\frac{S - E(S)}{\sqrt{139,200N}} > \frac{0.2E(S)}{\sqrt{139,200N}}\right) \Rightarrow \frac{0.2 \times 240N}{373.1\sqrt{N}} \geq 1.282 = \Phi(0.9)$$

$$N \geq \left(\frac{1.282 \times 373.1}{48}\right)^2 = 99.3$$