Exam P

Problem 81 (Multivariate Probability Dist'n)

$X_i \sim \text{Normal}(\mu = 19{,}400,\ \sigma^2 = 5{,}000^2)$

$\Pr(\bar{X} > 20{,}000) \quad n = 25$

$\bar{X} \sim \text{Normal}(\mu = 19{,}400,\ \sigma^2 = 1{,}000{,}000)$

$$E(\bar{X}) = E\left(\frac{\sum X_i}{n}\right) = E(X_i) = 19{,}400$$

$$\text{Var}(\bar{X}) = \sigma^2/n = (5{,}000)^2/25 = 1{,}000{,}000.$$

$$\Pr(\bar{X} > 20{,}000) = \Pr\left(\frac{\bar{X} - E(\bar{X})}{\sqrt{\text{Var}(\bar{X})}} > \frac{20{,}000 - 19{,}400}{\sqrt{1{,}000{,}000}}\right)$$

$$= \Pr(Z > 0.6)$$

$$= 1 - \Phi(0.6)$$

$$= 1 - 0.7257$$

$$= 0.2743.$$

Choose C