

84. Solution: B

Observe that

$$E[X + Y] = E[X] + E[Y] = 50 + 20 = 70$$

$$\text{Var}[X + Y] = \text{Var}[X] + \text{Var}[Y] + 2 \text{Cov}[X, Y] = 50 + 30 + 20 = 100$$

for a randomly selected person. It then follows from the Central Limit Theorem that T is approximately normal with mean

$$E[T] = 100(70) = 7000$$

and variance

$$\text{Var}[T] = 100(100) = 100^2$$

Therefore,

$$\begin{aligned} \Pr[T < 7100] &= \Pr\left[\frac{T - 7000}{100} < \frac{7100 - 7000}{100}\right] \\ &= \Pr[Z < 1] = 0.8413 \end{aligned}$$

where Z is a standard normal random variable.