Example Suppose $X_1, X_2, \ldots, X_{150}$ each have expected value 3.5 and variance 1.2. Find a threshhold "a" so that

$$P(X_1 + X_2 + \ldots + X_{150} \leq a) = .90$$

i.e. want a value "a" so that we are 90% sure the sum of the X_j's is less than or equal to "a".

$$.90 = P(X_1 + \ldots + X_{150} \leq a) = P\left(\frac{X_1 + \ldots + X_{150} - (150)(3.5)}{\sqrt{150(1.2)}} \leq \frac{a - (150)(3.5)}{\sqrt{150(1.2)}}\right)$$

$$= P\left(Z \leq \frac{a - (150)(3.5)}{\sqrt{150(1.2)}}\right)$$

$$= F_Z\left(\frac{a - (150)(3.5)}{\sqrt{150(1.2)}}\right)$$

↑ know this input to the CDF should be about 1.28
$$F_Z(1.28) = 0.8997$$

Need "a" to satisfy $\quad \dfrac{a - (150)(3.5)}{\sqrt{150(1.2)}} = 1.28$

$$\alpha = 1.28\sqrt{150(1.2)} + (150)(3.5) = 542.17$$

So we are 90% sure that $X_1 + \ldots + X_{150}$ is less than 542.17.