**Example** Suppose $X_1, \ldots, X_{50}$ each have mean 1.6, variance 2.2 ← 3
and $Y_1, \ldots, Y_{150}$ each have mean 3, variance 2.7. ← 2.2

Also suppose all two hundred random variables are Normal and independent. Find the probability that the sum of the 200 random variables does not exceed 400.

$$P(X_1 + \ldots + X_{50} + Y_1 + \ldots + Y_{150} < 400) = P\left( \frac{X_1 + \ldots + X_{50} + Y_1 + \ldots + Y_{150} - (50)(1.6) - (150)(3)}{\sqrt{50(2.2) + 150(2.7)}} < \frac{400 - (50)(1.6) - (150)(3)}{\sqrt{50(2.2) + 150(2.7)}} \right)$$

2.2 3 2.2 3

$$= P(Z < -0.42)$$
$$= P(Z > 0.42) \quad \text{by symmetry}$$
$$= 1 - P(Z \leq 0.42)$$
$$= 1 - F_Z(0.42)$$
$$= 1 - 0.6628$$
$$= 0.3372$$