

*Women and their shoes*

Let  $W$  be the number of women who believe that they will acquire 30 pairs of shoes long before they save \$30,000 for retirement. The distribution for this number is the Binomial distribution, and based on the description of the problem, we have that  $W \sim \text{Bin}(350, .501)$ . This immediately gives us the mean number,

$$\mu = E(W) = np = (350)(.501) = 175.35,$$

and the standard deviation

$$\sigma = SD(W) = \sqrt{np(1-p)} = \sqrt{(350)(.501)(.499)} = 9.354.$$

We can approximate the probability we want using the normal approximation to the binomial, being sure not to forget to use the continuity correction:

$$\begin{aligned} P(W > 150) &= P(W \geq 150.5) \\ &\approx P\left(Z \geq \frac{150.5 - 175.35}{9.354}\right) \\ &= P(Z \geq -2.66) \\ &= .9961. \end{aligned}$$