Module 2 Types of Data

1. Normal distribution

The normal distribution for womens height in North America has $\mu = 65$ inches, $\sigma = 3.5$ inches. Most major airlines have height requirements for flight attendants. Although exceptions are made, the minimum height requirement is 62 inches. What proportion of adult females in North America are not tall enough to be a flight attendant?

Solution: Let X be the women's height in North America, thus $X \sim N(65, 3.5^2)$.

$$P(X \leq 62) = P(\frac{X-65}{3.5} \leq \frac{62-65}{3.5}) = P(Z \leq -\frac{3}{3.5}) = 1 - \phi(0.86) = 0.1949$$

2. Normal distribution

The width of a slot of a duralumin in forging is (in inches) normally distributed with $\mu = 0.9000$ and $\sigma = 0.0030$. The specification limits were given as 0.9000 ± 0.0050. What percentage of forgings will be defective?

Solution: Let X be the width of our normally distributed slot. The probability that a forging is acceptable is given by

$$\begin{aligned} P(0.8950 \leq X \leq 0.9050) &= P(\frac{0.8950 - 0.9000}{0.003} \leq Z \leq \frac{0.9050 - 0.9000}{0.003}) \\ &= P(-1.67 \leq Z \leq 1.67) = P(Z \leq 1.67) - P(Z < -1.67) \\ &= 0.905 \end{aligned}$$

So that the probability that a forging is defective is 1 $0.905 = 0.095$. Thus 9.5 percent of forgings are defective.