Exercise Solution

Julie's matchmaker is at it again. What's the probability that a man will be at least 5 inches taller than a woman?

In Statsville, the height of men in inches is distributed as N(71, 20.25), and the height of women in inches is distributed as N(64, 16).

Let's use X to represent the height of the men and Y to represent the height of the women. This means that X ~ N(71, 20.25) and Y ~ N(64, 16).

We need to find the probability that a man is at least 5 inshes taller than a woman. This means we need to find

P(X > Y + 5)

or

P(X – Y > 5)

To find the mean and variance of X – Y, we take the mean of Y from the mean of X, and add the variances together. This gives us

X – Y ~ N(7, 36.25)

We need to find the standard score of 5 inches

$$z = \frac{(x - y) - \mu}{\sigma}$$

$$= \frac{5 - 7}{6.02}$$

$$= -0.33 \text{ (to 2 decimal places)}$$

We can use this to find P(X – Y > 5).

P(X – Y > 5) = 1 – P(X – Y < 5)

= 1 – 0.3707

= 0.6293