Sharpen your pencil
Solution

Find the probability that the combined weight of the bride and groom is less than 380 pounds using the following three steps.

1. X is the weight of the bride and Y is the weight of the groom, where X ~ N(150, 400) and Y ~ N(190, 500). With this information, find the probability distribution for the combined weight of the bride and groom.

We need to find the probability distribution of X + Y. To find the mean and variance of X + Y, we add the means and variances of the X and Y distributions together. This gives us

$$X + Y \sim N(340, 900)$$

2. Then, using this distribution, find the standard score of 380 pounds.

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

Remember how before we used $z = \dfrac{x - \mu}{\sigma}$?

$= \dfrac{380 - 340}{30}$

This time around we're using the distribution of X + Y, so we use $z = \dfrac{(x + y) - \mu}{\sigma}$

$= \dfrac{40}{30}$

$= 1.33$ (to 2 decimal places)

3. Finally, use the standard score to find P(X + Y < 380)

If we look 1.33 up in standard normal probability tables, we get a probability of 0.9082. This means that

$$P(X + Y < 380) = 0.9082$$