



Exercise Solution

Let's solve Dexter's Love Train dilemma. What's the probability that the combined weight of 4 adults will be less than 800 pounds? Assume the weight of an adult is distributed as $N(180, 625)$.

If we represent the weight of an adult as X , then $X \sim N(180, 625)$. We need to start by finding how the weight of 4 adults is distributed. To find the mean and variance of this new distribution, we multiply the mean and variance of X by 4. This gives us

$$X_1 + X_2 + X_3 + X_4 \sim N(720, 2500)$$

To find $P(X_1 + X_2 + X_3 + X_4 < 800)$, we start by finding the standard score.

$$\begin{aligned} z &= \frac{x - \mu}{\sigma} \\ &= \frac{800 - 720}{50} \\ &= \frac{80}{50} \\ &= 1.6 \end{aligned}$$

Looking this value up in standard normal probability tables gives us a value of 0.9452. This means that

$$P(X_1 + X_2 + X_3 + X_4 < 800) = 0.9452$$