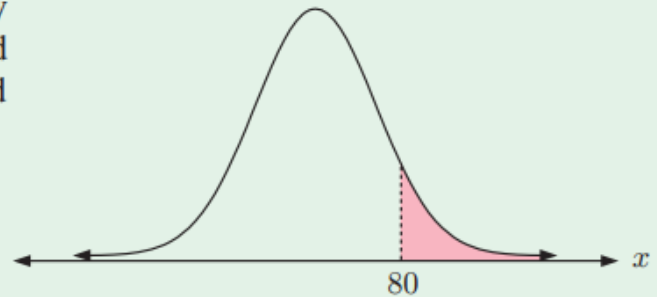


Z-Scores Part 2

- The middle 68% of a normal distribution lies between 16.2 and 21.4.
 - What is the mean and standard deviation of the distribution?
 - Over what range of values would you expect the middle 95% of the data to spread?
- A random variable X is normally distributed with mean 20.5 and standard deviation 4.3. Find:
 - $P(X \geq 22)$
 - $P(18 \leq X \leq 22)$
 - k such that $P(X \leq k) = 0.3$.
- X is a continuous random variable where $X \sim N(\mu, 2^2)$. Find $P(-0.524 < X - \mu < 0.524)$.
- The lengths of metal rods produced in a manufacturing process are normally distributed with mean μ cm and standard deviation 6 cm. 5.63% of the rods have length greater than 89.52 cm. Find the mean length of the metal rods.
- The curve shown is the probability density function for a normally distributed random variable X . Its mean is 50, and $P(X < 90) \approx 0.975$. Find the shaded area.



- The weight of an apple in an apple harvest is normally distributed with mean 300 grams and standard deviation 50 grams. Only apples with weights between 250 and 350 grams are considered fit for sale.
 - Find the proportion of apples fit for sale.
 - In a sample of 100 apples, what is the probability that at least 75 are fit for sale?



- A factory has a machine designed to fill bottles of drink with volume 375 mL of liquid. It is found that the average amount of drink in each bottle is 376 mL, and that 2.3% of the drink bottles have a volume smaller than 375 mL. Assuming that the amount of drink in each bottle is normally distributed, find the standard deviation.

Answers:

1 **a** mean is 18.8, standard deviation is 2.6 **b** 13.6 to 24.0

2 **a** 0.364 **b** 0.356 **c** $k \approx 18.2$

3 0.207 **4** $\mu \approx 80.0$ cm **5** 0.0708

6 **a** 68.3% **b** 0.0884 **7** $\sigma \approx 0.501$ mL **8** 0.403