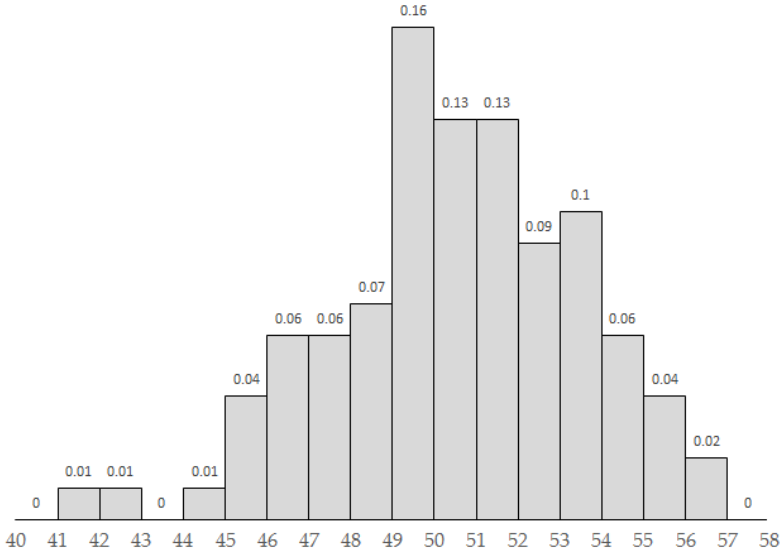
Part 2.7: Mixed Questions

1. The marks in an exam were normally distributed with a mean of 50 and a standard deviation of 13.
    a. What is the probability that a student scored more than 70%?
    b. What is the probability that a student scored between 40% and 60%?
    c. In order to be in the top 10% of students, what mark did you need to score?
2. The height of desks in a classroom is normally distributed with a standard deviation of 2 cm.
    a. If the mean is 70 cm, what is the probability that the height is more than 73 cm?
    b. If the mean is 68 cm, what is the probability that the height is between 67 cm and 68 cm?
    c. If the tallest 20% of desks are more than 72 cm, what was the mean height of the desks?
3. Bumble bees' weights are normally distributed with a mean of 220mg and a standard deviation of 40mg.
    a. What is the probability that a bumble bee weighs less than 150 mg?
    b. What is the probability that a bumble bee weighs between 180 mg and 200 mg?
    c. Over what weight are the heaviest 20% of bumble bees?
4. The time spent on the computer in a certain household is normally distributed.
    a. In one house the mean time is 4 hours with a standard deviation of 1 hour. What is the probability that in a given day the amount of time spent is less than 2.5 hours?
    b. In another house the mean time is 8 hours with a standard deviation of 2.4 hours. What is the probability that in a given day the amount of time spent is between 4 and 5 hours?
    c. In another house in the 10% of days when they use the computer least they spend less than 2 hours on the computer, and the mean amount of time that they spend on the computer is 3 hours. What is the standard deviation for the amount of time that they spend on the computer?
5. The gestation period for dogs are normally distributed.
    a. For one breed the mean time is 62 days with a standard deviation of 1.2 days. What is the probability that the gestation period is less than 60 days?
    b. For another breed the mean time is 61 days with a standard deviation of 0.8 days. What is the probability that the gestation period is between 59 and 63 days?
    c. Another breed the longest 15% of pregnancies are more than 63 days, and the shortest 12% of pregnancies are less than 59 days. Calculate the mean and the standard deviation for this breed.
6. The distance that a jogger runs when doing his training is normally distributed with a mean of 5.3 km.
    a. If the standard deviation is 1.2 km what is the probability that the jogger runs more than 3.5 km?
    b. If the standard deviation is 0.8 km what is the probability that the jogger runs more than 3.5 km?
    c. What is the standard deviation if 10% of the time the jogger runs more than 8 km?
7. The gaps between the draws in a particular brand (Alpha) of desk where a chair is designed to go are normally distributed with a mean of 46 cm and a standard deviation of 1 cm. The gaps between the draws in another brand (Beta) are also normally distributed with a mean of 47 cm. The Beta brand desks are expected to have a gap under 45 cm 13% of the time.
    a. How often would you expect Alpha brand desks to have a gap under 45 cm?
    b. How often would you expect Alpha brand desks to have a gap between 47 cm and 48 cm?
    c. Explain how the standard deviation for the gap between the draws for Beta brand desks compares with the Alpha brand desks.

8. The popliteal length (the length from the ground to the back of the knee when standing) was recorded for a large number of boys. The mean for this data was 50.0 cm and the standard deviation was 2.9 cm. This is shown in the histogram below.



Explain whether a normal distribution would be an appropriate model for the distribution of popliteal length for boys. As part of your explanation, describe the features of the distribution and include at least one calculation.