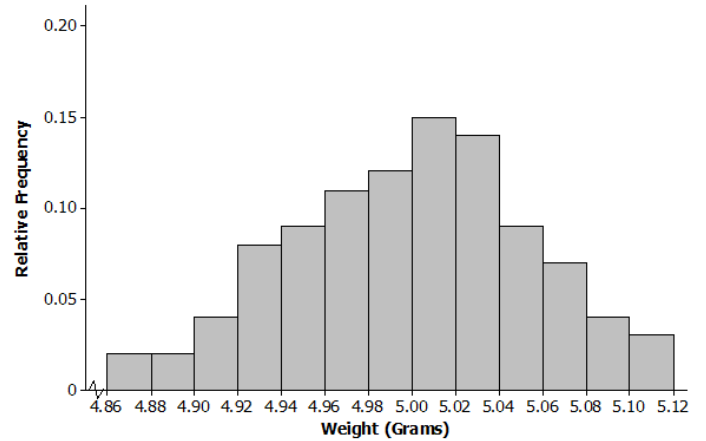


HW 9.9

1. Periodically the U.S. Mint checks the weight of newly minted nickels. Below is a histogram of the weights (in grams) of a random sample of 100 new nickels.

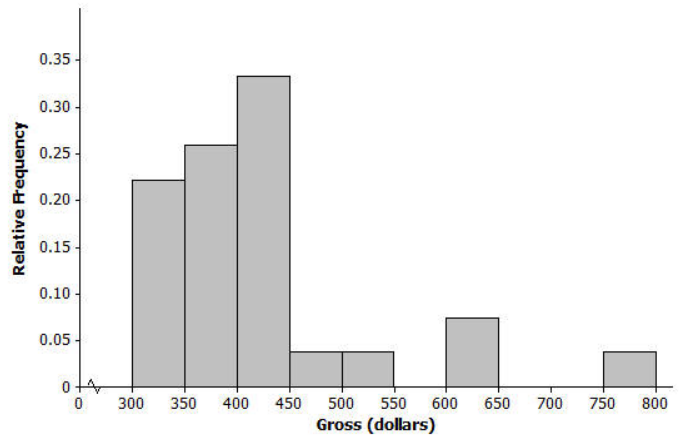


a. The mean and standard deviation of the distribution of nickel weights are 5.00 grams and 0.06 gram, respectively. Mark the mean on the histogram. Mark one standard deviation above the mean and one standard deviation below the mean.

b. Describe the shape of the distribution. Draw a smooth curve that comes reasonably close to passing through the midpoints of the tops of the bars in the histogram. Is this approximately a normal curve?

c. Shade the area of the histogram that represents the proportion of weights that are within one standard deviation of the mean. Find the proportion of the data within one standard deviation of the mean.

2. Below is a relative frequency histogram of the gross (in millions of dollars) for the all-time top-grossing American movies (as of the end of 2012). Gross is the total amount of money made before subtracting out expenses, like advertising costs and actors' salaries.



a. Describe the shape of the distribution of all-time top-grossing movies. Would a normal curve be the best curve to model this distribution? Explain your answer.

b. Which of the following is a reasonable estimate for the mean of the distribution? Explain your choice.

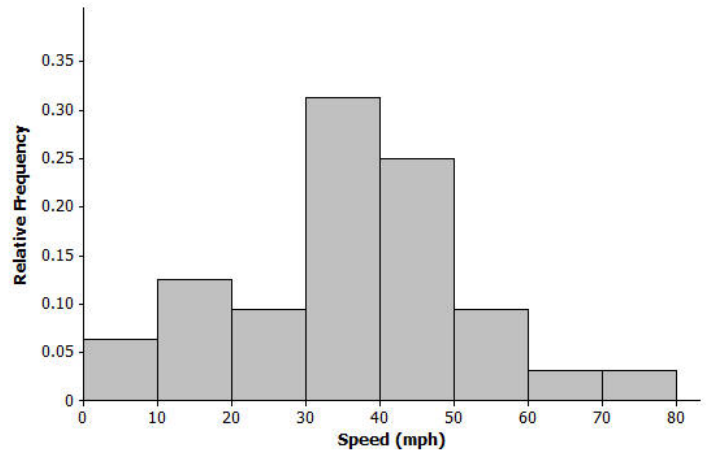
- i. 325 million
- ii. 375 million
- iii. 425 million

c. Which of the following is a reasonable estimate for the sample standard deviation? Explain your choice.

- i. 50 million
- ii. 100 million
- iii. 200 million

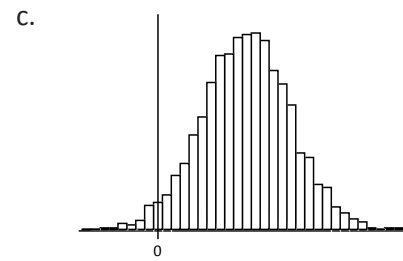
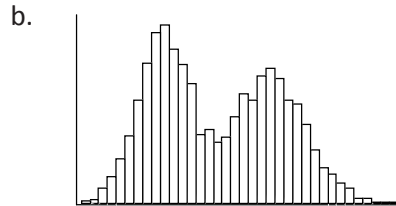
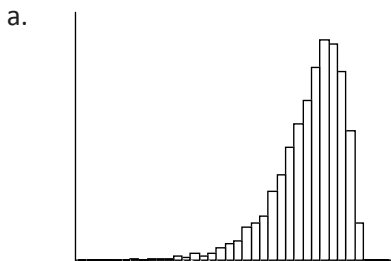
3. Below is a histogram of the top speed of different types of animals.

- Describe the shape of the top speed distribution.
- Estimate the mean and standard deviation of this distribution. Describe how you made your estimate.



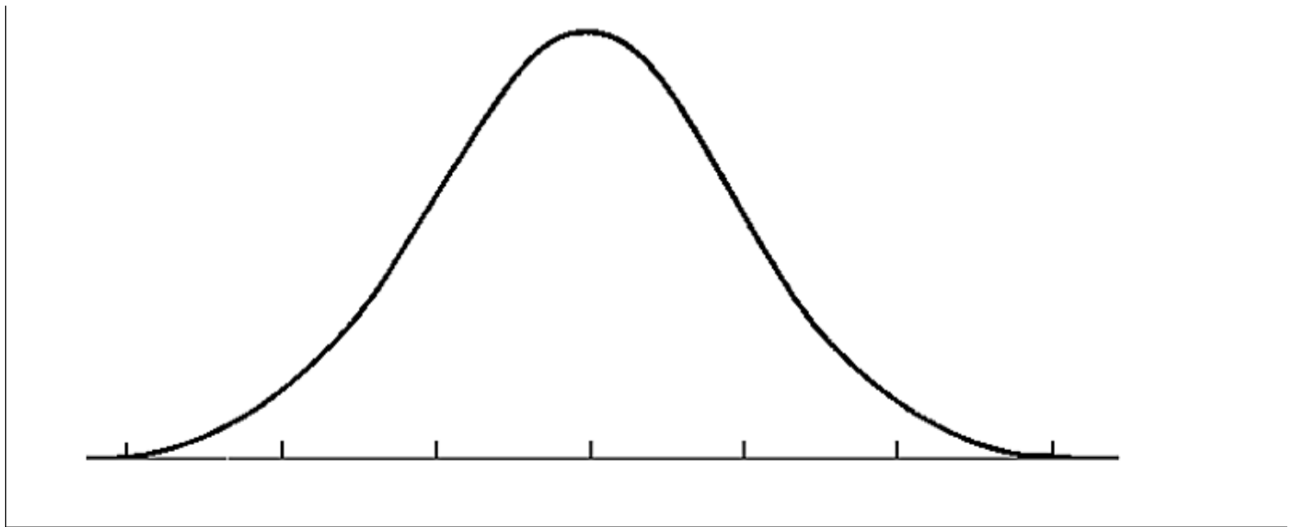
- Draw a smooth curve that is approximately a normal curve. The actual mean and standard deviation of this data set are 34.1 mph and 15.3 mph, respectively. Shade the area of the histogram that represents the proportion of speeds that are within one standard deviation of the mean. Approximately what proportion of speeds are within that shaded area?

4. Which of the following histograms show distributions that are approximately normal?



5. In a normal distribution, approximately what percent of the observation are above the mean? What percent are below the mean?

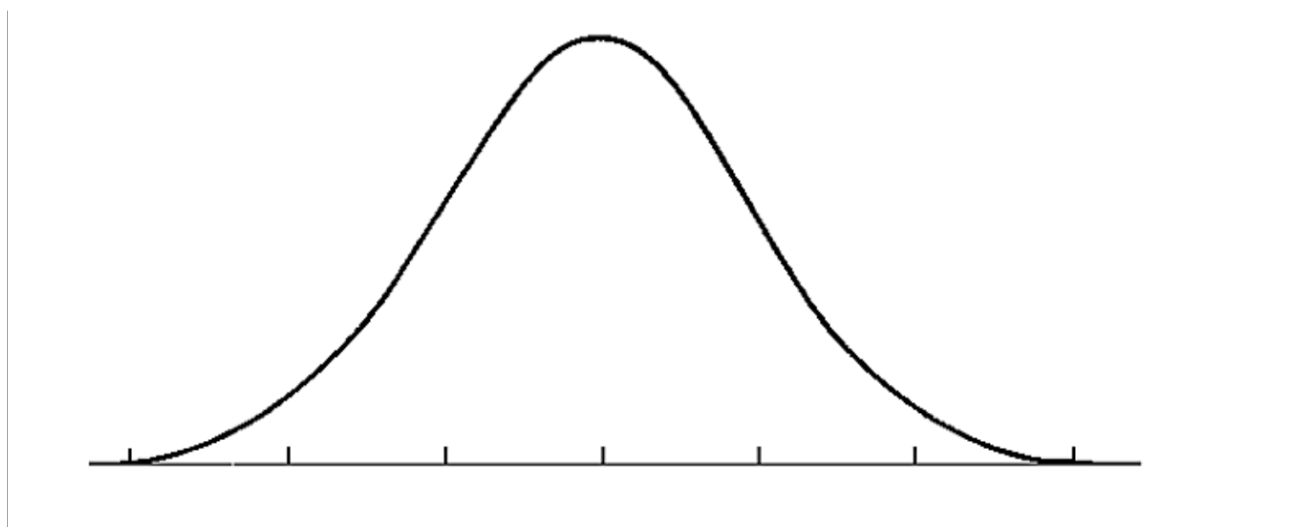
6. 2000 freshmen at State University took a biology test. The scores were distributed normally with a mean of 70 and a standard deviation of 5. Label the mean and three standard deviations from the mean.



Answer the following questions based on the data:

- a) What percentage of scores are between scores 65 and 75?
- b) What percentage of scores are between scores 60 and 70?
- c) What percentage of scores are between scores 60 and 85?
- d) What percentage of scores is less than a score of 55?
- e) What percentage of scores is greater than a score of 80?
- f) Approximately how many biology students scored between 60 and 70?
- g) Approximately how many biology students scored between 55 and 60?

7. 500 juniors at Central High School took the ACT last year. The scores were distributed normally with a mean of 24 and a standard deviation of 4. Label the mean and three standard deviations from the mean.



**Answer the following questions based on the data:**

- a) What percentage of scores are between scores 20 and 28?
- b) What percentage of scores are between scores 16 and 32?
- c) What percentage of scores are between scores 16 and 28?
- d) What percentage of scores is less than a score of 12?
- e) What percentage of scores is greater than a score of 24?
- f) Approximately how many juniors scored between 24 and 28?
- g) Approximately how many juniors scored between 20 and 28?
- h) Approximately how many juniors scored between 24 and 32?
- i) Approximately how many juniors scored between 16 and 20?
- j) Approximately how many juniors scored higher than 32?

**Answers**

- 1) a) See Teacher            b) It is approximately normal            c) 0.70
- 2) a) The distribution is skewed right so a normal curve is not appropriate.    b) iii            c) ii
- 3) a) Approximately normal            b) Mean is about 40. SD is about 15            c) About 0.73
- 4) C
- 5) a) 50%    b) 50%
- 6) a) 68    b) 47.5            c) 97.35            d) 0.15            e) 2.5    f) 950
- 7) a) 68    b) 95            c) 81.5            d) 0.15            e) 50    f) 170            g) 340
- h) 237.5            i) 67.5            j) 12.5