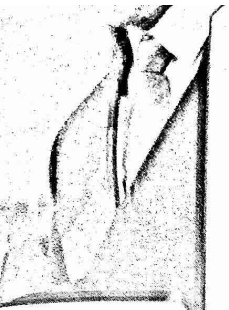

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s Statistical Yearbook

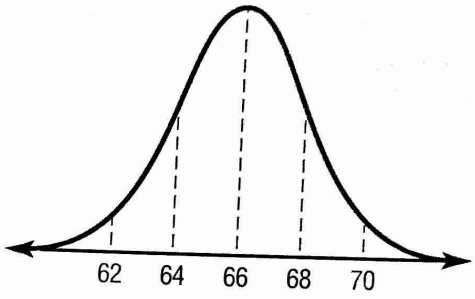
The heights of 1800 teenagers are normally distributed with a mean of 66 inches and a standard deviation of 2 inches.

a. About how many teens are between 62 and 70 inches?

Draw a normal curve.

62 and 70 are 2σ away from the mean. Therefore, about 95% of the data are between 62 and 70.

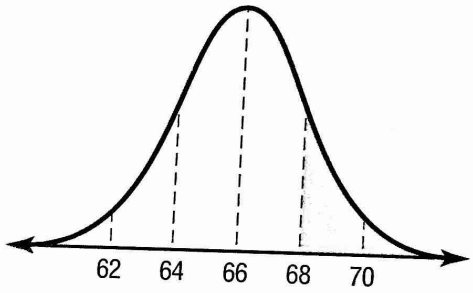
Since $1800 \times 95\% = 1710$, we know that about 1710 of the teenagers are between 62 and 70 inches tall.



b. What is the probability that a teenager selected at random has a height greater than 68 inches?

From the curve, values greater than 68 are more than 1σ from the mean. 13.5% are between 1σ and 2σ, 2% are between 2σ and 3σ, and 0.5% are greater than 3σ.

So, the probability that a teenager selected at random has a height greater than 68 inches is 13.5 + 2 + 0.5 or 16%.



Guided Practice

GRADES The grade-point averages of 1200 students at East High School are normally distributed with a mean of 2.6 and a standard deviation of 0.6.

3A. About how many students have a grade-point average between 2.0 and 3.2?

3B. What is the probability that a randomly selected student has an average less than 3.8?

Your Understanding

Step-by-Step Solutions begin on page R20.

1. ACT The table at the right shows recent composite ACT scores. Determine whether the data appear to be *positively skewed*, *negatively skewed*, or *normally distributed*.

Score	% of Students
33–36	1
28–32	9
24–27	19
20–23	29
16–19	27
13–15	12

Source: ACT, Inc.

2. A normal distribution of data has a mean of 161 and standard deviation of 12. Find the probability that random value x is less than 149, that is $P(x < 149)$.

3 SCHOOL Mr. Bash gave a quiz in his social studies class. The scores were normally distributed with a mean of 21 and a standard deviation of 2.

a. What percent would you expect to score between 19 and 23?

b. What percent would you expect to score between 23 and 25?

c. What is the probability that a student scored between 17 and 25?

Example 1 Determine whether the data appear to be *positively skewed, negatively skewed,* or *normally distributed.*

4.

20 Most Visited National Parks	
Visitors (millions)	Number of Parks
3–4	10
4–5	2
5–6	2
6–7	1
7–8	1
8+	4

5.

Tallest Buildings in the World	
Stories	Number of Buildings
0–39	1
40–59	11
60–79	35
80–99	9
100+	6

Example 2 **A normal distribution of data has each mean and standard deviation. Find each probability.**

6. $\mu = 74, \sigma = 6, P(x > 86)$

7 $\mu = 13, \sigma = 0.4, P(x < 12.6)$

8. $\mu = 63, \sigma = 4, P(59 < x < 71)$

9. $\mu = 91, \sigma = 6, P(73 < x < 103)$

Example 3

10. CAR BATTERIES The useful life of a certain car battery is normally distributed with a mean of 100,000 miles and a standard deviation of 10,000 miles. The company makes 20,000 batteries a month.

a. About how many batteries will last between 90,000 and 110,000 miles?

b. About how many batteries will last more than 120,000 miles?

c. About how many batteries will last less than 90,000 miles?

d. What is the probability that if you buy a car battery at random, it will last between 80,000 and 110,000 miles?

11. HEALTH The cholesterol level for adult males of a specific racial group is normally distributed with a mean of 158.3 and a standard deviation of 6.6.

a. About what percent of the males have cholesterol below 151.7?

b. How many of the 900 men in a study have cholesterol between 145.1 and 171.5?

12. FOOD The shelf life of a particular snack chip is normally distributed with a mean of 180 days and a standard deviation of 30 days.

a. About what percent of the product lasts between 150 and 210 days?

b. About what percent of the product lasts between 180 and 210 days?

c. About what percent of the product lasts less than 90 days?

d. About what percent of the product lasts more than 210 days?

13. VENDING A vending machine dispenses about 8 ounces of coffee. The amount varies and is normally distributed with a standard deviation of 0.3 ounce.

a. What percent of the time will you get more than 8 ounces of coffee?

b. What percent of the time will you get less than 8 ounces of coffee?

c. What percent of the time will you get between 7.4 and 8.6 ounces of coffee?