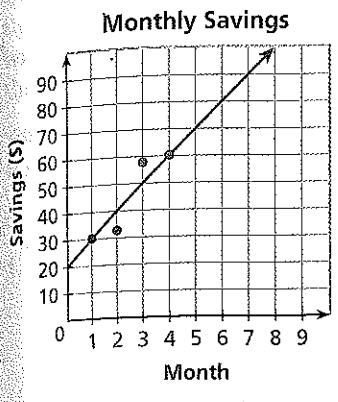
4-5 Scatter Plots and Trend Lines *(pp. 263–270)*

EXAMPLE

■ **The graph shows the amount of money in a savings account. Based on this relationship, predict how much money will be in the account in month 7.**



Draw a line that has about the same number of points above and below it. Your line may or may not go through data points.

Find the point on the line whose x-value is 7.

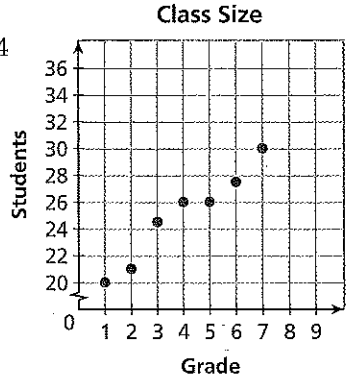
Based on the data, \$90 is a reasonable prediction.

EXERCISES

34. The table shows the value of a car for the given years. Graph a scatter plot using the given data. Describe the correlation illustrated by the scatter plot.

Year	2000	2001	2002	2003
Value (thousand $)	28	25	23	20

35. The graph shows the results of a 2003–2004 survey on class size at the given grade levels. Based on this relationship, predict the class size for the 9th grade.



4-6 Arithmetic Sequences *(pp. 272–277)*

EXAMPLES

■ **Determine whether the sequence appears to be arithmetic. If so, find the common difference and the next three terms.**

$-8, -5, -2, 1, \ldots$

Step 1 Find the difference between successive terms.

$-8,\ -5,\ -2,\ 1,\ldots$ *The common difference is 3.*

$+3\ +3\ +3$

Step 2 Use the common difference to find the next 3 terms.

$-8, -5, -2, 1,\ \mathbf{4},\ \mathbf{7},\ \mathbf{10}$

$+3\ +3\ +3$

■ **Find the indicated term of the arithmetic sequence. 18th term: $a_1 = -4$; $d = 6$**

$a_n = a_1 + (n-1)d$ *Write the rule.*

$a_{18} = -4 + (18-1)6$ *Substitute.*

$= -4 + (17)6$ *Simplify.*

$= -4 + 102$ *Simplify.*

$= 98$

The 18th term is 98.

EXERCISES

Determine whether each sequence appears to be arithmetic. If so, find the common difference and the next three terms.

36. 20, 14, 8, 2,...

37. $-15, -12, -9, -4, \ldots$

38. 5, 4, 2, $-1, \ldots$

39. $-8, -5.5, -3, -0.5, \ldots$

Find the indicated term of each arithmetic sequence.

40. 31st term: $-15, -11, -7, -3, \ldots$

41. 24th term: $a_1 = 7$; $d = -3$

42. 17th term: $a_1 = -20$; $d = 2.5$

43. Marie has \$180 in a savings account. She plans to deposit \$12 per week. Assuming that she does not withdraw any money from her account, what will her balance be in 20 weeks?

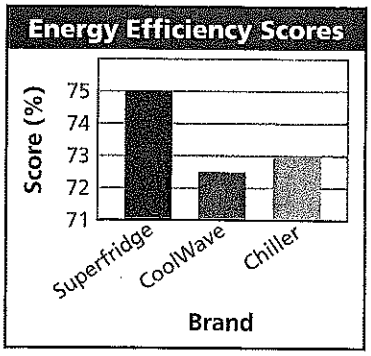
44. The table shows the temperature at the given heights above sea level. Find the temperature at 8000 feet above sea level.

Height Above Sea Level (thousand feet)	1	2	3	4
Temperature (°C)	30	23.5	17	10.5

10-4 Misleading Graphs and Statistics *(pp. 702–709)*

EXAMPLE

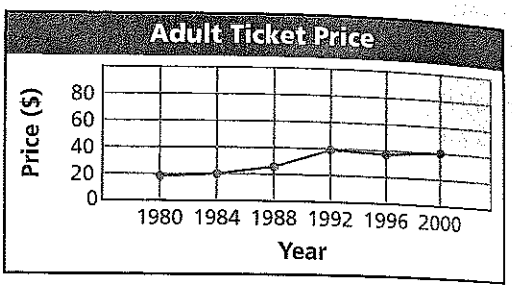
■ **Explain why the graph is misleading.**



The vertical axis begins at 71. This exaggerates the difference in the heights of the bars.

EXERCISES

The graph shows the cost of admission to an amusement park over 20 years.



13. Explain why the graph is misleading.
14. What might someone believe because of the graph?

10-5 Experimental Probability *(pp. 713–718)*

EXAMPLES

The manager of a photo processing lab inspects 500 photos and finds that 4 have flaws.

■ What is the experimental probability that a photo is flawed?

$$\frac{\text{number of times the event occurs}}{\text{number of trials}} = \frac{4}{500} = 0.8\%$$

■ In one month, the lab processes 13,000 photos. Predict the number that are likely to be flawed.

$0.008 \cdot 13{,}000 = 104$ *Find 0.8% of 13,000*

104 photos are likely to be flawed.

EXERCISES

A manufacturer inspects 800 batteries and finds that 796 have no defects.

15. What is the experimental probability that a battery chosen at random has no defects?
16. There are 25,000 batteries in storage. How many batteries are likely to have no defects?
17. Another storage area holds 50,000 batteries. How many batteries are likely to have a defect?

10-6 Theoretical Probability *(pp. 720–725)*

EXAMPLE

■ **A jar contains red, green, brown, and blue marbles. The probability of choosing red is 0.30, of choosing green is 0.20, and of choosing brown is 0.25. Find the probability of choosing blue.**

$$P(\text{blue}) + P(\text{not blue}) = 1$$
$$P(\text{blue}) + P(\text{red, green, or brown}) = 1$$
$$P(\text{blue}) + (0.30 + 0.20 + 0.25) = 1$$
$$P(\text{blue}) + 0.75 = 1$$
$$P(\text{blue}) = 0.25$$

EXERCISES

Find the theoretical probability.

18. Rolling a number less than 4 on a standard number cube
19. Randomly selecting a month that starts with "J" from all month names
20. Randomly selecting a vowel from the letters in EQUATION

10-7 Independent and Dependent Events *(pp. 726–733)*

EXAMPLES

A hardware store shelf holds 12 cans of red paint, 4 cans of yellow paint, and 6 cans of black paint.

- Syd selects one can at random and replaces it. Then she selects another can at random. What is the probability that Syd selects a red can and then a yellow can?

$$P(\text{red, yellow}) = P(\text{red}) \cdot P(\text{yellow})$$
$$= \frac{12}{22} \cdot \frac{4}{22} \quad \textit{Independent events}$$
$$= \frac{48}{484} = \frac{12}{121}$$

- Gene selects one can at random and then selects another can at random from the remaining cans. What is the probability that Gene selects two cans of black paint?

$$P(\text{black, black}) = P(\text{black}) \cdot P(\text{black after black})$$
$$= \frac{6}{22} \cdot \frac{5}{21} \quad \textit{Dependent events}$$
$$= \frac{30}{462} = \frac{5}{77}$$

EXERCISES

Tell whether each set of events is independent or dependent. Explain your answers.

21. A computer generates a random number and then generates another random number.

22. You roll two number cubes. One is a 6 and the other is a 1.

23. Two audience members are called to the stage.

A lottery machine contains different-colored balls. There are 64 green, 128 yellow, 1 golden, and 3 silver balls. Find the probability of each event.

24. A yellow ball is drawn and set aside. Then a green ball is drawn.

25. A golden ball is drawn and set aside. Then another golden ball is drawn.

26. A green ball is drawn and replaced. Then another green ball is drawn.

10-8 Combinations and Permutations *(pp. 736–743)*

EXAMPLES

A sporting goods store carries sweatshirts for 8 local high school football teams.

- How many different packages of 4 different high school sweatshirts are possible?

Use a combination. The order does not matter.

$${}_8C_4 = \frac{8!}{4!(8-4)!} = \frac{8!}{4!(4)!}$$
$$= \frac{8 \cdot 7 \cdot 6 \cdot 5 \cdot \cancel{4} \cdot \cancel{3} \cdot \cancel{2} \cdot \cancel{1}}{(4 \cdot 3 \cdot 2 \cdot 1)(\cancel{4} \cdot \cancel{3} \cdot \cancel{2} \cdot \cancel{1})} = \frac{1680}{24} = 70$$

Seventy different packages are possible.

- Three different high school sweatshirts will be hung in a row. How many displays are possible?

Use a permutation. The order matters.

$${}_8P_3 = \frac{8!}{(8-3)!} = \frac{8!}{5!} =$$
$$\frac{8 \cdot 7 \cdot 6 \cdot \cancel{5} \cdot \cancel{4} \cdot \cancel{3} \cdot \cancel{2} \cdot \cancel{1}}{\cancel{5} \cdot \cancel{4} \cdot \cancel{3} \cdot \cancel{2} \cdot \cancel{1}} = 336$$

There are 336 different possible displays.

EXERCISES

27. A catering hall offers 4 different plates, 3 different silverware patterns, and 5 different types of glassware. How many place settings of one plate, one silverware pattern, and one type of glassware are possible?

Tell whether each situation involves combinations or permutations. Then give the number of possible outcomes.

28. Shelly is making up a 7-digit phone number to use in a play. She can choose any digit from 0–9 but does not want to repeat a number. How many different phone numbers are possible?

29. A restaurant offers 12 different appetizers. How many ways can a group of friends share 3 different appetizers?

30. A group of 15 friends is at an amusement park. In how many ways can a group be chosen to ride in a four-person gondola?