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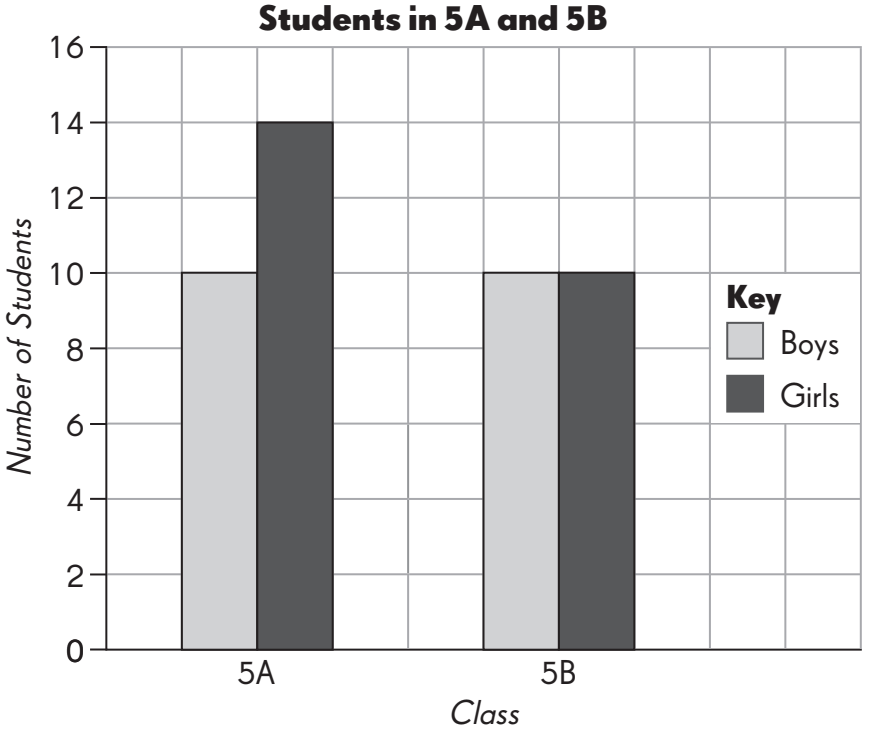
Chapter 11

# Graphs and Probability

## Practice 1 Making and Interpreting Double Bar Graphs

**Complete. Use the data in the graph.**

The double bar graph shows the number of boys and girls in two classes, 5A and 5B.




**1.** There are _____ students in 5A and _____ students in 5B.

**2.** There are _____ more girls than boys in 5A.

**3.** Class _____ has an equal number of boys and girls.

**4.** There are _____ girls altogether in 5A and 5B.

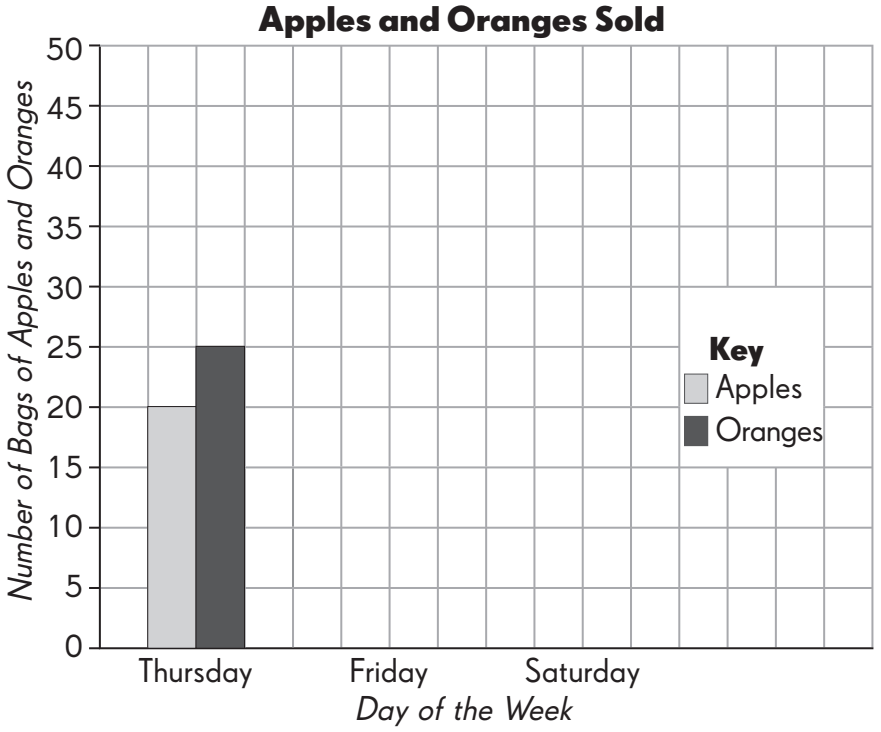
**5.** There are _____ boys altogether in 5A and 5B.

**6.** The average number of students in the two classes is _____.

**Complete the bar graph using the data in the table. Then answer the questions.**

**7.** The table shows the number of bags of apples and oranges sold by a grocer on three days.

| | Thursday | Friday | Saturday |
|---|---|---|---|
| **Number of Bags of Apples** | 20 | 25 | 30 |
| **Number of Bags of Oranges** | 25 | 35 | 45 |




**8.** On Friday, _____ more bags of oranges than apples were sold.

**9.** On Saturday, _____ fewer bags of apples than oranges were sold.

**10.** The total number of bags of apples and oranges sold was the greatest on _____.

**11.** The difference between the number of bags of apples and oranges sold was the least on _____.

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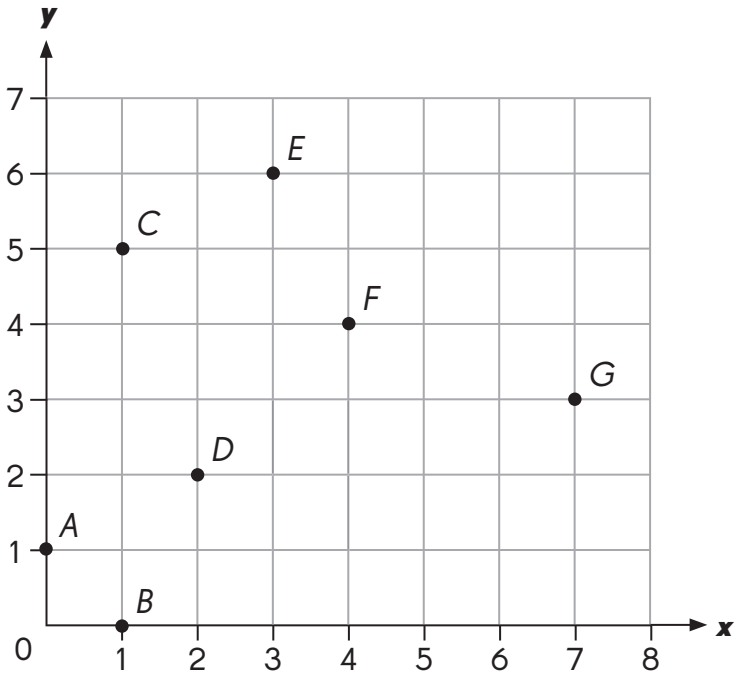
# Practice 2 Graphing an Equation

**Write the ordered pair for each point.**




*Example*

*A* (*O*, 1)

**1.** *B* _____

**2.** *C* _____

**3.** *D* _____

**4.** *E* _____

**5.** *F* _____

**6.** *G* _____

**Plot each point on the coordinate grid.**

**7.** $P$ (0, 5)

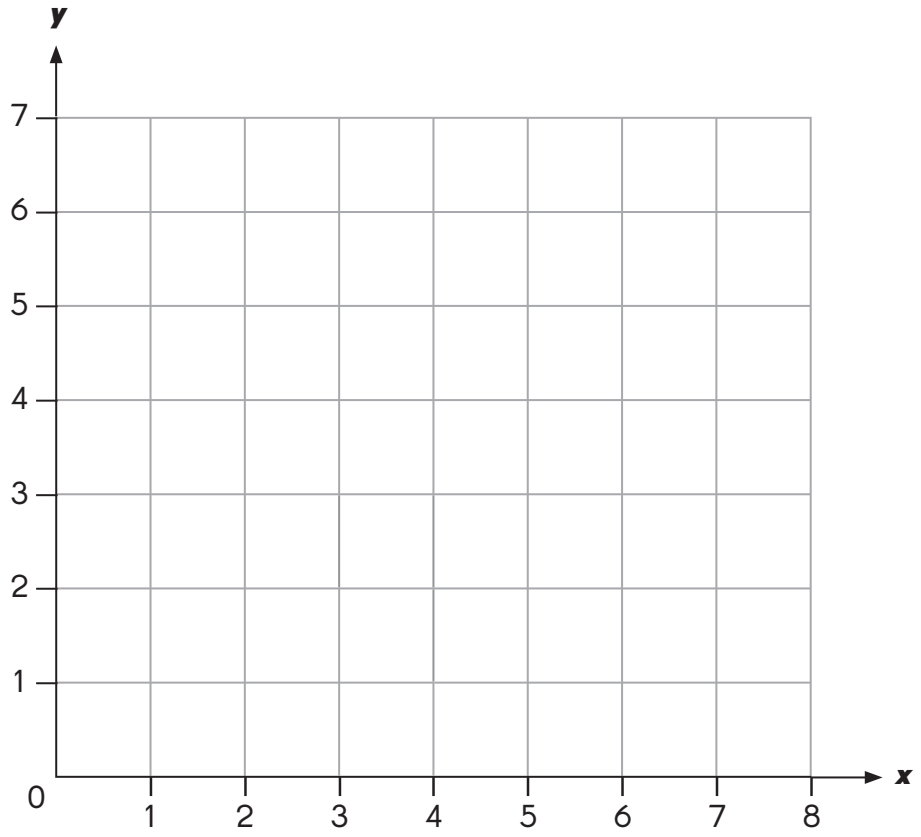
**8.** $Q$ (4, 0)

**9.** $R$ (3, 6)

**10.** $S$ (5, 1)

**11.** $T$ (2, 5)

**12.** $U$ (0, 0)



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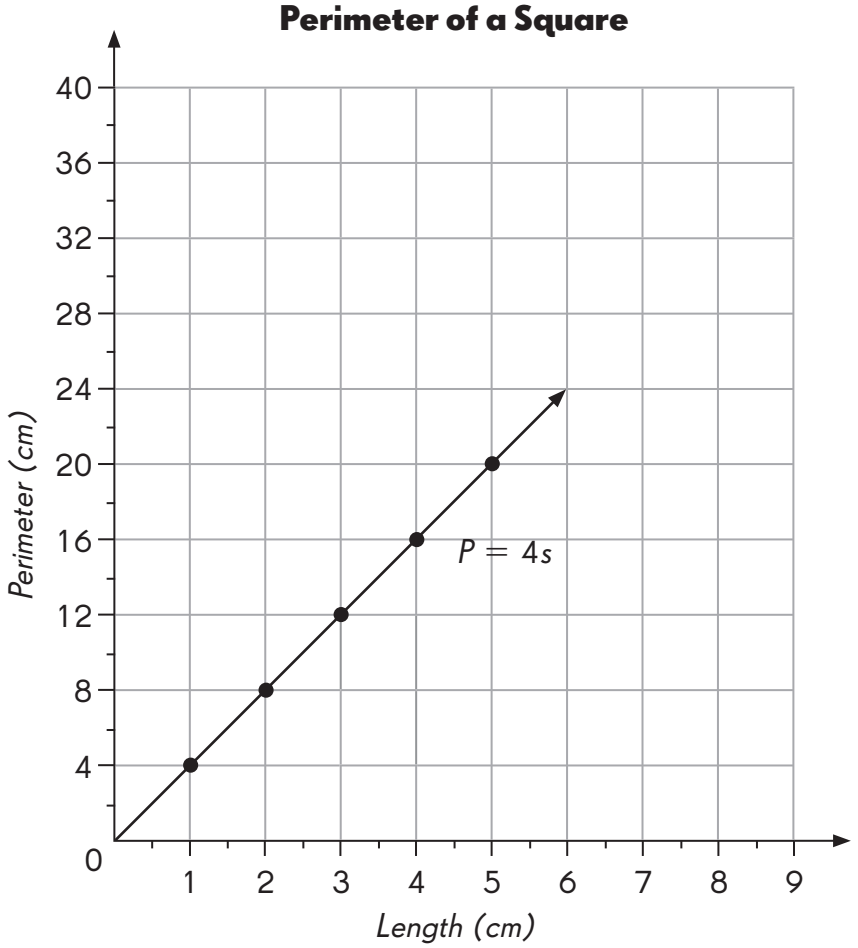
**Use the graph to answer the questions.**

The perimeter of a square is $P$ centimeters and the length of each side is $s$ centimeters. A graph of $P = 4s$ is drawn.




**13.** What is the perimeter of a square of side 2 centimeters? _____

**14.** What is the perimeter of a square of side 4.5 centimeters? _____

**15.** What is the length of a side of a square if its perimeter is 4 centimeters? _____

**16.** What is the length of a side of a square if its perimeter is 10 centimeters? _____

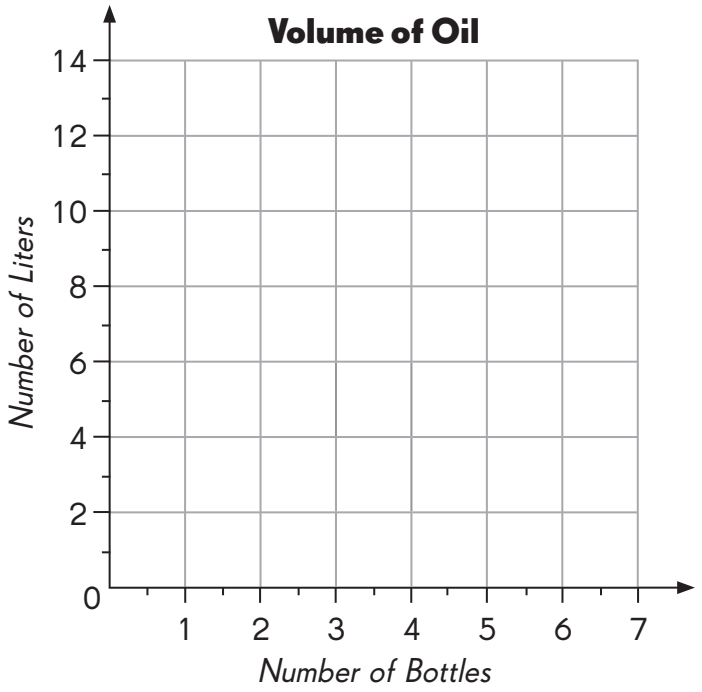
**17.** If the point (7, $M$) is on the graph what is the value of $M$? _____

**Complete the table.**

**18.** Each bottle contains 2 liters of cooking oil.

| **Number of Bottles ($x$)** | 1 | 2 | 3 | | 5 | 6 |
|---|---|---|---|---|---|---|
| **Number of Liters ($y$)** | 2 | | 6 | 8 | | 12 |

**Complete the graph using the data in the table. Then answer the questions.**




**19.** How many liters of oil are in 3 bottles? _____

**20.** How many liters of oil are in 2.5 bottles? _____

**21.** How many bottles contain 8 liters of oil? _____

**22.** How many bottles contain 7 liters of oil? _____

**23.** How many bottles contain 11 liters of oil? _____

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# Practice 3 Combinations

**Complete.**

A bag has 1 red, 1 blue, and 1 green marble. Another bag has 1 red and 1 blue cube.

**1.** List all the possible combinations of choosing 1 marble and 1 cube.

| Color of Marble | Color of Cube |
|---|---|
| | |
| | |
| | |
| | |
| | |
| | |
| | |

**2.** There are _____ combinations.

**Complete.**

In a soccer tournament, there are two groups. Each group has three teams. Teams A, B, and C are in Group 1. Teams X, Y, and Z are in Group 2. Each team in Group 1 plays against every team in Group 2.

**3.** Complete the table for the games played.

| | | Group 1 | | |
|---|---|---|---|---|
| | | A | B | C |
| Group 2 | X | | | |
| | Y | | | |
| | Z | | | |

**4.** The number of combinations of games for the six teams is _____.

**Draw a tree diagram to find the number of combinations.**

**5.** Ms. Li has 4 different books and 1 red pen, 1 blue pen, and 1 black pen.
She is wrapping one book and one pen to give as a gift.
Draw a tree diagram to find the number of combinations of wrapping the gift.



There are _____ combinations.

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## Find the number of combinations.

**6.** Rina has 1 black, 1 red, and 1 yellow skirt.
She has 1 white, 1 floral, and 1 striped shirt.

**a.** Draw a tree diagram to show the possible outfits Rina can wear.



**b.** Find the number of outfits by multiplication.

The number of outfits is _____.

**Complete.**

**7.** There are 4 colors on a spinner. There are 6 faces on a number cube, numbered 1 to 6. The spinner is spun and the number cube is tossed.

There are _____ combinations of color and number.

**8.** A bookshelf has 10 mathematics books, 8 science books, and 12 history books.

**a.** There are _____ combinations of choosing a mathematics book and a science book.

**b.** There are _____ combinations of choosing a science book and a history book.

**c.** There are _____ combinations of choosing a mathematics book and a history book.

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# Practice 4 Theoretical Probability and Experimental Probability

**Use the table to answer the questions.**
**Express each probability as a decimal.**

A spinner has four equal sections in four different colors, red, blue, green, and yellow. The spinner is spun 100 times. The table shows the number of times it lands on each color.

| Outcome | Number of Times |
|---|---|
| lands on red | 28 |
| lands on blue | 25 |
| lands on green | 24 |
| lands on yellow | 23 |



**1.** What is the experimental probability of landing on red?

_____

**2.** What is the experimental probability of landing on blue?

_____

**3.** What is the experimental probability of landing on green?

_____

**4.** What is the experimental probability of landing on yellow?

_____

**5.** What is the theoretical probability of landing on each of the four colors?

_____

**Use the table to answer the questions.**
**Express each probability as a fraction is simplest form.**

A number cube has 1 face numbered 1, 2 faces numbered 2, and 3 faces numbered 3. The cube is tossed 100 times. The table shows the number of times each number is shown.

| Outcome | Number of Times |
|---|---|
| cube shows 1 | 14 |
| cube shows 2 | 34 |
| cube shows 3 | 52 |

**6.** What is the experimental probability of the cube showing 1?

_____

**7.** What is the theoretical probability of the cube showing 1?

_____

**8.** What is the experimental probability of the cube showing 2?

_____

**9.** What is the theoretical probability of the cube showing 2?

_____

**10.** What is the experimental probability of the cube showing 3?

_____

**11.** What is the theoretical probability of the cube showing 3?

_____

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**Use the table to answer the questions.**
**Express each probability as a decimal.**

A bag contains 2 blue marbles, 3 red marbles, and 5 green marbles.
A marble is drawn from the bag, its color is noted and the marble is returned to the bag. The table shows the results of drawing a marble 200 times.

| Outcome | Number of Times |
|---|---|
| blue marble | 36 |
| red marble | 56 |
| green marble | 108 |

**12.** What is the experimental probability of drawing a blue marble?

_____

**13.** What is the theoretical probability of drawing a blue marble?

_____

**14.** What is the experimental probability of drawing a red marble?

_____

**15.** What is the theoretical probability of drawing a red marble?

_____

**16.** What is the experimental probability of drawing a green marble?

_____

**17.** What is the theoretical probability of drawing a green marble?

_____

**Complete.**

A spinner is divided into 16 equal parts. Each part is colored green, yellow, or blue. The spinner is spun 25 times. The tally chart shows the number of times it lands on each color.

| Color | Tally | Number |
|---|---|---|
| green | 𝍸 | 4 |
| yellow | 𝍸 \|\|\|\| | 9 |
| blue | 𝍸 𝍸 \|\| | 12 |

**18.** Which is the likely set of colors on the spinner, Set A, Set B, or Set C?

Set _____

| | Green | Yellow | Blue |
|---|---|---|---|
| **Set A** | 3 | 10 | 3 |
| **Set B** | 6 | 5 | 5 |
| **Set C** | 2 | 6 | 8 |

**19.** What is the experimental probability of landing on green?

_____

**20.** What is the experimental probability of landing on yellow?

_____

**21.** What is the experimental probability of landing on blue?

_____

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# Put On Your Thinking Cap!

## Challenging Practice

**Complete.**

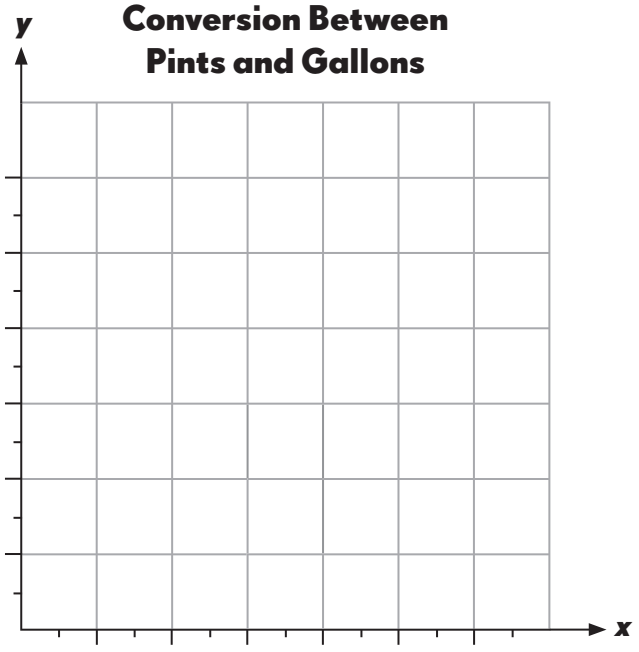
**1.** The table shows the conversion from gallons to pints. Complete the table.

| Number of Gallons ($x$) | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| Number of Pints ($y$) | | 16 | | | 40 | |

**2.** Write the equation relating the number of pints ($y$) to the number of gallons ($x$).

_____

**3.** Draw the graph of the equation. Label the axes and the equation.



**Use the graph to answer the questions.**

**4.** How many pints are in $3\frac{1}{2}$ gallons?

**5.** How many pints are in $4\frac{1}{2}$ gallons?

**6.** How many gallons are in 20 pints?

**7.** How many gallons are in 44 pints?

**Complete.**

**8.** The table shows the conversion from quarts to cups. Complete the table.

| **Number of Quarts ($x$)** | 1 | 2 | 3 | | | 6 |
|---|---|---|---|---|---|---|
| **Number of Cups ($y$)** | | 8 | | 16 | 20 | 24 |

**9.** Write the equation relating the number of cups ($y$) to the number of quarts ($x$).

_____

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# Put On Your Thinking Cap!

## Problem Solving

**Solve.**

**1.** Jim has a dime, a nickel and a quarter. How many different amounts of money can he form using one or more of these coins?

**2.** There are an equal number of red, blue, and green beads in a bag. One bead is picked, its color is noted and the bead is replaced. Then a second bead is picked.

**a.** Draw a tree diagram to show the outcomes.



**b.** What is the probability of picking two red beads?

**c.** What is the probability of picking one red and one green bead?

**d.** What is the probability of picking no red beads?