English Spanish

4.4 Finding the Percent of a Number

Essential Question How can you use mental math to find the percent of a number?

"I have a secret way for finding 21% of 80." "10% is 8 and 1% is 0.8." "So 21% is 8 + 8 + 0.8 = 16.8."

1 EXAMPLE: Finding 10% of a Number

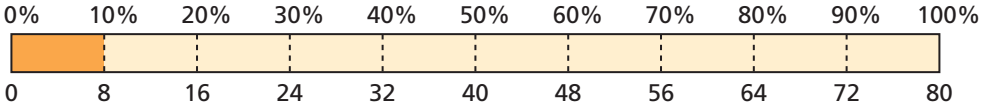
a. How did Newton know that 10% of 80 is 8?

Write 10% as a fraction.

$$10\% = \frac{10}{100} = \frac{1}{10}$$

10 — per — cent

Method 1: Using a Model



Method 2: Using Multiplication

$$10\% \text{ of } 80 = \frac{1}{10} \text{ of } 80 = \frac{1}{10} \times 80 = \frac{80}{10} = 8$$

b. How do you move the decimal point to find 10% of a number?

Move the decimal point one place to the left. **10% of 80. = 8.0**

2 ACTIVITY: Finding 1% of a Number

Work with a partner.

a. How did Newton know that 1% of 80 is 0.8?

b. How do you move the decimal point to find 1% of a number?

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3 EXAMPLE: Using Mental Math

Use mental math to find each percent of a number.

a. 12% of 40

Think: 12% = 10% + 1% + 1%

10% of 40 = 4 and 1% of 40 = 0.4

$4 + 0.4 + 0.4 = 4.8$

b. 19% of 50

Think: 19% = 10% + 10% − 1%

10% of 50 = 5 and 1% of 50 = 0.5

$5 + 5 - 0.5 = 9.5$

4 ACTIVITY: Using Mental Math

Work with a partner. Use mental math to find each percent of a number.

a. 20% tip for a \$30 meal

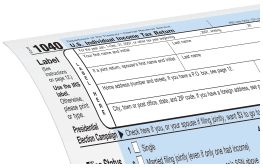
b. 18% tip for a \$30 meal

c. 6% sales tax on a \$20 shirt

d. 9% sales tax on a \$20 shirt

e. 6% commission on selling a \$200,000 house

f. 2% property tax on a \$200,000 house



g. 21% income tax on an income of \$40,000

h. 38% income tax on an income of \$80,000

What Is Your Answer?

5. **IN YOUR OWN WORDS** How can you use mental math to find the percent of a number?

6. Describe two real-life examples of finding a percent of a number.

Practice Use what you learned about finding the percent of a number to complete Exercises 3–10 on page 172.

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4.4 Lesson

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Key Idea

Finding the Percent of a Number

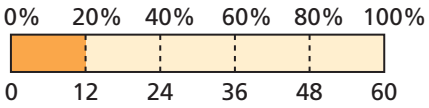
Words Write the percent as a fraction or decimal. Then multiply.

Numbers 20% of 60 is 12.

$\frac{1}{5} \times 60 = 12$

$0.2 \times 60 = 12$

Model



EXAMPLE 1 Finding the Percent of a Number

Use a fraction to find the percent of the number.

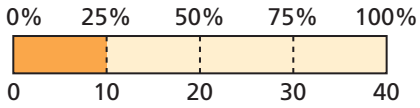
a. Find 25% of 40.

$25\% \text{ of } 40 = \frac{1}{4} \times 40$

$= \frac{1 \times \overset{10}{\cancel{40}}}{\underset{1}{\cancel{4}}}$

$= 10$

So, 25% of 40 is 10.



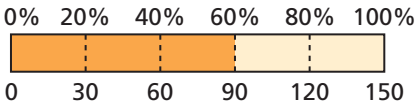
b. Find 60% of 150.

$60\% \text{ of } 150 = \frac{3}{5} \times 150$

$= \frac{3 \times \overset{30}{\cancel{150}}}{\underset{1}{\cancel{5}}}$

$= 90$

So, 60% of 150 is 90.

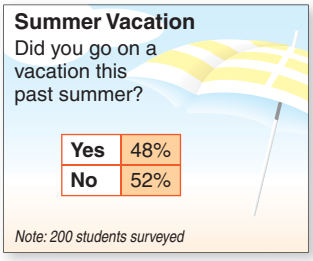


On Your Own

Use a fraction to find the percent of the number.

1. 90% of 20 **2.** 75% of 32 **3.** 10% of 110 **4.** 30% of 75

EXAMPLE 2 Standardized Test Practice



How many students went on vacation?

Ⓐ 48 Ⓑ 96 Ⓒ 100 Ⓓ 104

From the survey, you can see that 48% out of 200 students said yes.

$48\% \text{ of } 200 = 0.48 \times 200$ Write 48% as a decimal.

$= 96$ Multiply.

So, 96 students went on vacation. The correct answer is Ⓑ.

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On Your Own

Now You're Ready
Exercises 3–18

Use a decimal to find the percent of the number.

5. 15% of 40 **6.** 78% of 150 **7.** 35% of 16 **8.** 4% of 70

EXAMPLE 3 Using Mental Math

Your friend is bidding online for concert tickets. The current bid is shown. The winning bid is 150% of the current bid. How much is the winning bid?

Method 1: Write 150% as a decimal and multiply.

150% of $120 = 1.5 \times 120$

$= 180$

Method 2: Using mental math, think $150\% = 100\% + 50\%$.

100% of $120 = 1 \times 120 = 120$

50% of $120 = \frac{1}{2} \times 120 = 60$

Add: $120 + 60 = 180$

∴ So, the winning bid is \$180.

On Your Own

Now You're Ready
Exercises 23–30

9. WHAT IF? In Example 3, the winning bid is 225% of the current bid. How much is the winning bid?

EXAMPLE 4 Real-Life Application

The width of a rectangular room is 80% of its length. What is the area of the room?

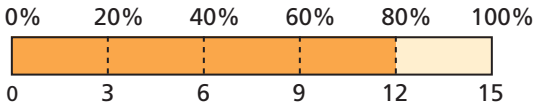
Find 80% of 15 feet.


15 ft

$$80\% \text{ of } 15 = \frac{4}{5} \times 15$$

$$= \frac{4 \times \overset{3}{\cancel{15}}}{\underset{1}{\cancel{5}}}$$

$$= 12$$



The width is 12 feet.

Use the formula for the area A of a rectangle.

$A = 15 \times 12 = 180$

∴ So, the area of the room is 180 square feet.

On Your Own

10. The width of a rectangular stage is 55% of its length. The stage is 120 feet long. What is the area?

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4.4 Exercises

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Vocabulary and Concept Check

1. **DIFFERENT WORDS, SAME QUESTION** Which is different? Find "both" answers.

What is twenty percent of 30?	What is one-fifth of 30?
What is 20 multiplied by 30?	What is 0.2 times 30?

2. **REASONING** If 52 is 130% of a number, is the number greater or less than 52? Explain.

Practice and Problem Solving

Find the percent of the number.

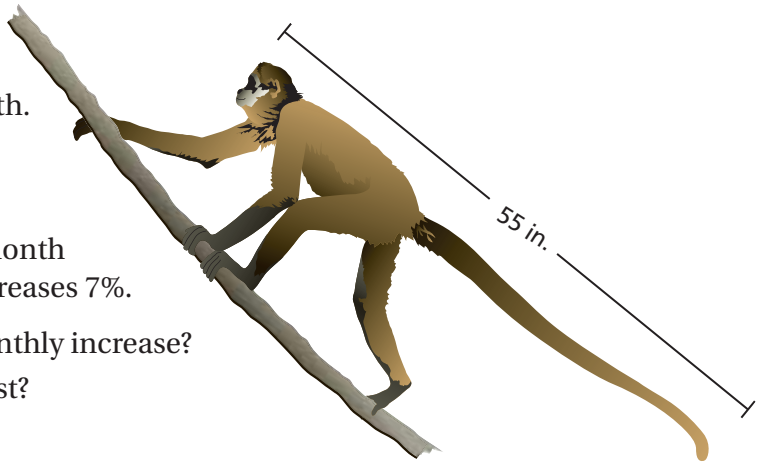
3. 20% of 60	4. 10% of 40	5. 18% of 70	6. 32% of 30
7. 8% of 90	8. 14% of 20	9. 26% of 50	10. 3% of 60
11. 30% of 70	12. 75% of 48	13. 45% of 45	14. 92% of 19
15. 40% of 60	16. 38% of 22	17. 70% of 20	18. 87% of 55

19. **ERROR ANALYSIS** Describe and correct the error in finding 40% of 75.

✗ 40% of 75 = 40% × 75 = 3000

20. **MANGROVES** Lake Worth, near West Palm Beach, had about 2120 acres of mangrove trees 40 years ago. Only about 13% of the mangrove trees remain. How many acres of mangrove trees remain?

21. **SPIDER MONKEY** The tail of the spider monkey is 64% of its length. What is the length of its tail?



22. **CABLE** A family pays $45 each month for cable television. The cost increases 7%.
   a. How many dollars is the monthly increase?
   b. What is the new monthly cost?

Find the percent of the number.

23. 140% of 60	24. 120% of 33	25. 175% of 54	26. 250% of 146
27. 4.5% of 50	28. 0.7% of 40	29. 2.8% of 150	30. 7.2% of 235

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Copy and complete the statement using <, >, or =.

31. 80% of 60 ☐ 60% of 80

32. 20% of 30 ☐ 30% of 40

33. 120% of 5 ☐ 0.8% of 250

34. 85% of 40 ☐ 25% of 136

35. TIME How many minutes is 40% of 2 hours?

36. LENGTH How many inches is 78% of 3 feet?

37. GEOMETRY The width of the rectangle is 75% of its length.

a. What is the area of the rectangle?

b. The length of the rectangle is doubled. What percent of the length is the width now? Explain your reasoning.

38. BASKETBALL To pass inspection, a new basketball should bounce back to between 68% and 75% of the starting height. A new ball is dropped from 6 feet and bounces back 4 feet 1 inch. Does the ball pass inspection? Explain.

39. REASONING You know that 15% of a number n is 12. How can you use this to find 30% of n? 45% of n? Explain.

40. SURFBOARD You have a coupon for 10% off the sale price of a surfboard.

a. What is the sale price of the surfboard?

b. What is the price of the surfboard after using the coupon?

c. Is taking 40% off the regular price the same as taking 30% off the regular price and then 10% off the sale price? Explain your reasoning.

41. Number Sense On three geography tests, you earned grades of 88%, 94%, and 90%. Each test was worth 150 points.

a. The final exam is worth 250 points. How many points do you need on the final exam to earn 93% of the total points on tests?

b. What *percent* do you need on the final?

Fair Game Review What you learned in previous grades & lessons

Multiply. Write the answer in simplest form. SECTION 2.2

42. $\frac{2}{3} \times 4$ **43.** $\frac{3}{8} \times 4$ **44.** $6 \times \frac{3}{5}$ **45.** $12 \times \frac{5}{6}$

46. MULTIPLE CHOICE What is the quotient of 7.5 and 2.4? SECTION 3.5

(A) 0.0032 (B) 0.03125 (C) 0.32 (D) 3.125