Find Percent of a Number Mentally

e Essential Question

How can you use proportional relationships to solve real-world percent problems?

CCSS Common Core State Standards

Content Standards
7.RP.3, 7.EE.3

Mathematical Practices
1, 3, 4, 5

What You'll Learn
• Compute mentally with percents.
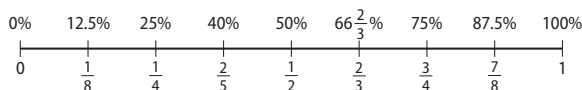• Estimate with percents.

🌎 Real-World Link

Thrill Rides Do you enjoy thrill rides? Percents can be used to describe the experience, whether you are traveling seventy miles per hour through twists, turns, and loops, or being blasted up and down 300-foot tall towers.

Find Percent of a Number Mentally

The number line shows some common percent-fraction equivalents.

Concept Summary	Percent-Fraction Equivalents			
$25\% = \frac{1}{4}$	$20\% = \frac{1}{5}$	$10\% = \frac{1}{10}$	$12\frac{1}{2}\% = \frac{1}{8}$	$16\frac{2}{3}\% = \frac{1}{6}$
$50\% = \frac{1}{2}$	$40\% = \frac{2}{5}$	$30\% = \frac{3}{10}$	$37\frac{1}{2}\% = \frac{3}{8}$	$33\frac{1}{3}\% = \frac{1}{3}$
$75\% = \frac{3}{4}$	$60\% = \frac{3}{5}$	$70\% = \frac{7}{10}$	$62\frac{1}{2}\% = \frac{5}{8}$	$66\frac{2}{3}\% = \frac{2}{3}$
$100\% = \frac{1}{1}$	$80\% = \frac{4}{5}$	$90\% = \frac{9}{10}$	$87\frac{1}{2}\% = \frac{7}{8}$	$83\frac{1}{3}\% = \frac{5}{6}$

When you compute with common percents like 40% or 50%, it may be easier to use the fraction form of the percent.

Example 1

Tutor

Find the percent of each number mentally.

a. 75% of 24

$75\% \text{ of } 24 = \frac{3}{4} \text{ of } 24$ Think: $75\% = \frac{3}{4}$

$= 18$ Think: $\frac{3}{4}$ of 24 is 18.

b. 80% of 60

$80\% \text{ of } 60 = \frac{4}{5} \text{ of } 60$ Think: $80\% = \frac{4}{5}$

$= 48$ Think: $\frac{4}{5}$ of 60 is 48.

Got It? Do these problems to find out.

1a. 40% of 50 **20**

1b. 30% of 70 **21**

Example 2

Compute mentally.

a. 10% of 76

10% of 76 = 0.1 · 76 or 7.6

b. 1% of 122

1% of 122 = 0.01 · 122 or 1.22

Got It? Do these problems to find out.

2a. 10% of 42 **4.2**

2b. 1% of 264 **2.64**

Example 3

Hannah has a coupon for 20% off her entire clothing purchase. If the items she buys cost $110 originally, how much will she save with her coupon?

You need to find 20% of the total cost. First, find 10% of 110.

10% of 110 = 0.1 · 110   *Move the decimal point one place to the left.*

$= 11$

20% is the same as 2 · 10%.

2 · 10% of 110 = 2 · 11 = 22   *Replace 10% of 110 with 11.*

So, Hannah will save $22 on her purchase.

Got It? Do this problem to find out.

3. A $750 television is on sale for 15% off. What is the total discount? **$112.50**

Estimate With Percents

You can estimate when an exact answer is not needed.

Determine Reasonable Answers
Deciding whether an answer is reasonable is useful when an exact answer is not necessary.

4a–b. Sample answers are given.

4a. ≈ 45; $\frac{9}{10} \times 50$ or 45

4b. ≈ 126; 1% of 205 is about 2, 63% of 205 is about 63×2 or 126

4c. ≈ 63; $\frac{3}{4} \times 84$ or 63

4d. ≈ 117; 100% of 90 = 90; 30% of 90 is 27, 90 + 27 = 117

Example 4

Estimate.

a. 26% of 64

26% is about 25% or $\frac{1}{4}$.

$\frac{1}{4}$ of 64 is 16.

So, 26% of 64 is about 16.

b. $\frac{2}{3}$% of 891

$\frac{2}{3}$% = $\frac{2}{3} \times$ 1%. 1% of 900 is 9.

891 is almost 900.

So, $\frac{2}{3}$% of 891 is about $\frac{2}{3} \times 9$ or 6.

c. 39% of 81

39% is about 40% or $\frac{2}{5}$.

81 is about 80. $\frac{2}{5}$ of 80 is 32.

So, 39% of 81 is about 32.

d. 120% of 51

100% of 50 is 50. 20% of 50 is 10.

So, 120% of 51 is about 50 + 10 or 60.

Got It? Do these problems to find out.

4a. 92% of 50   **4b.** 63% of 205   **4c.** 75% of 84   **4d.** 130% of 91

Example 5

Real World

Mr. Williams ordered 4 pizzas for a birthday party. The cost of the pizzas was $57.96. He wants to tip the delivery person about 15%. What is a reasonable amount for the tip?

Estimate the price of the pizzas. Then find 15% of the estimated price.

$57.96 is about $60, and 15% = 10% + 5%.

10% of $60 is $6.00.   *Move the decimal point 1 place to the left.*

5% of $60 is $3.00   *5% is one half of 10%.*

So, 15% is about $6.00 + $3.00 or $9.00.

A reasonable amount for the tip is $9.

Check for Reasonableness

10% of $58 is $5.80 and 20% of $58 is $11.60.
Since $5.80 < $9 < $11.60, the answer is reasonable. ✔

Got It? Do this problem to find out.

5. Haley went to dinner with her friends. Their bill was $48.61. They want to leave their server a 15% tip. What would be a reasonable amount for the tip? Explain your reasoning. **$7.50; Sample answer: $48.61 ≈ $50.00, 10% • 50 = 5 and 5% • 50 = 2.50; 5 + 2.50 = 7.50**

Guided Practice

Find the percent of each number mentally. (Examples 1 and 2)

1. 75% of 16 **12**

2. 25% of 32 **8**

3. 10% of 37 **3.7**

4. 10% of 115 **11.5**

5. 1% of 72 **0.72**

6. 1% of 231 **2.31**

7. 80% of 200 **160**

8. $33\frac{1}{3}$% of 15 **5**

9. $62\frac{1}{2}$% of 40 **25**

10. Jasmine has finished 30% of the exercises on her homework. If there are 40 exercises in all, how many has Jasmine completed? (Example 3) **12 exercises**

Estimate. (Example 4) **11–19. See Answer Appendix.**

11. 11% of 70

12. 53% of 20

13. 40% of 19

14. 87% of 42

15. $\frac{1}{3}$% of 598

16. 110% of 39

17. 24% of 359

18. 91% of 1989

19. $37\frac{1}{2}$% of 81

20. Last basketball season, Carlos made 38% of the baskets he attempted. At this rate, about how many baskets will he make if he attempts 30 baskets? (Example 5) **12 baskets**

21. **STEM** Lea bought a package of seeds to grow flowers. There were 72 seeds in the package. Approximately 60% of the seeds will germinate. About how many of the seeds that Lea plants will germinate? (Example 5) **43 seeds**