

Objective Use mental math to estimate with percents.

Learn About It

Camila and her brother Emilio just finished lunch at a café in the mall. Their bill comes to \$18.96. They want to leave a **tip** of no less than 15% for their waitress. How can they use estimation and mental math to estimate 15% of \$18.96?



The term tip stands for "to insure promptness."

Estimate 15% of \$18.96.

STEP 1 Use compatible numbers.

1

\$18.96 is about \$20.

STEP 2 Find 15% of \$20.

2

$$10\% \text{ of } \$20 = 0.1 \times \$20 = \$2$$

$$5\% \text{ of } \$20 = \frac{1}{2} \times \$2 = \$1$$

$$15\% \text{ of } \$20 = \$2 + \$1 = \$3$$

5% is $\frac{1}{2}$ of 10%

Solution: Fifteen percent of \$20.00 is \$3, so \$3 is slightly more than 15% of \$18.96.

Other Examples

A. Percent Only

Estimate 48% of \$90.

48% is about 50%.

$$50\% \text{ of } \$90 = \frac{1}{2} \times \$90 = \$45$$

B. Percent and Number

Estimate 11% of 147.

11% is about 10%.

147 is about 150.

$$10\% \text{ of } 150 = 0.1 \times 150 = 15$$

C. Fraction Form

Estimate 78% of 40.

78% \approx 75%.

$$75\% \text{ of } 40 = \frac{3}{4} \times 40 = 30$$

Guided Practice

Estimate. Tell whether the exact percent would be greater than, less than, or about the same as your estimate.

- | | | |
|----------------|--------------|--------------|
| 1. 120% of 400 | 2. 25% of 41 | 3. 9% of 106 |
| 4. 33% of 91 | 5. 23% of 99 | 6. 54% of 78 |

Ask Yourself

- Did I use compatible numbers?
- Is my answer reasonable?

Explain Your Thinking ► How do you decide which estimation method to use?

Practice and Problem Solving

Estimate. Tell whether the exact percent would be greater than, less than, or about the same as your estimate.

7. 50% of 120 8. 110% of 86 9. 120% of 32 10. 20% of 77

Estimate a 15% tip and a 20% tip for each amount.

11. \$59.43 12. \$16.40 13. \$32.14 14. \$74.13



Data Use the restaurant bill for Problems 15–17.

15. **Estimate** Lauren, Jason, and their Aunt Anne are having lunch in the mall. Lauren wants to leave a 15% tip. Use mental math to estimate a 15% tip for their meal, excluding tax.

16. **Analyze** To the nearest whole percent, what tax rate was applied to the bill?



17. **Write About It** Suppose Aunt Anne decides to leave a 20% tip. Explain how she can use mental math to estimate 20% of the whole bill.

The Lunch Line	
Guest Receipt	
Persons 3	
1 chef's salad	\$6.50
1 tuna platter	7.95
1 vegetarian sandwich	5.95
2 iced teas	3.60
1 apple juice	1.95
subtotal	\$25.95
tax	1.30
Total	\$27.25
THANK YOU	

Check your understanding of Lessons 1–4.

Write each as a percent. (Lessons 1 and 2)

1. 1 out of 5 2. 0.6 3. 1.4

Write as a ratio in decimal and fraction form. (Lesson 2)

4. 30% 5. 75% 6. 9%

Order each set of ratios from greatest to least. (Lesson 3)

7. 20% 1.2 0.15 8. 0.45 0.8% $\frac{1}{4}$ 40%

Solve. (Lesson 4)

9. Use mental math to estimate a 15% and a 20% tip on a bill of \$16.29.

Quick Check

Estimation With Percents

Estimate. Tell whether the exact percent would be greater than or less than your estimate.

1. 19% of 99

2. 33% of 36

3. 72% of 80

4. 9% of 148

5. 124% of 20

6. 18% of 121

7. 49% of 180

8. 23% of 60

9. 10% of 68

10. 21% of 103

11. 76% of 200

12. 61% of 80

Estimate a 15% tip and a 20% tip for each amount.

13. \$19.95

14. \$21.56

15. \$120.42

16. \$38.21

17. \$32.74

18. \$44.69

Test Prep

19. Estimate a 15% tip on \$67.95.

A \$1.05

C \$13.00

B \$10.50

D \$26.00

20. Find a good estimate for 24% of 151.
Explain how you found your answer.

Estimation With Percents

Different Ways to Estimate 28% of \$77.50

Way 1: Estimate percent and the number.

28% is about 25%. $25\% = \frac{1}{4}$.

\$77.50 is about \$80.

$$25\% \text{ of } \$80 = \frac{1}{4} \times \$80 = \$20$$

Way 2: Compatible numbers

28% is about 30%. \$77.50 is about \$80.

$$10\% \text{ of } \$80 = 0.1 \times \$80 = \$8$$

$$30\% \text{ of } \$80 = 3 \times \$8 = \$24$$

Estimate. Tell whether the exact percent would be greater than, less than, or about the same as your estimate.

1. 200% of 56 2. 25% of 47 3. 51% of 49 4. 99% of 146

5. 75% of 106 6. 150% of 40 7. 300% of 87 8. 33% of 120

Estimate a 15% tip and a 20% tip for each amount.

9. \$45.00 10. \$7.95 11. \$19.90 12. \$15.20

Problem Solving

Show Your Work

13. Pablo is buying dinner for his friends. The bill is \$19.60. Pablo wants to leave a 20% tip for the waiter. Estimate how much Pablo will spend for dinner and the tip.
