

PERCENTS

Strategies

EXAMPLE | What is 15% of 44?

15% of 44 is the sum of 10% of 44 and 5% of 44.

We can use fractions to see why this is true:

$$\frac{15}{100} \cdot 44 = \left(\frac{10}{100} + \frac{5}{100} \right) \cdot 44 = \left(\frac{10}{100} \cdot 44 \right) + \left(\frac{5}{100} \cdot 44 \right).$$

10% of 44 is 4.4.

5% of 44 is half of 10% of 44. So, 5% of 44 is $4.4 \div 2 = 2.2$.

Therefore, 15% of 44 is $4.4 + 2.2 = \mathbf{6.6}$.

Percents like 1%, 10%, 20%, 25%, and 50% are often easy to compute in your head.

Combining percents like these can help us mentally compute other percents!



PRACTICE | Write each amount below as a whole number or decimal.

85. Find the following percents of 18.

$50\% \text{ of } 18 = \underline{\quad}$

$10\% \text{ of } 18 = \underline{\quad}$

$1\% \text{ of } 18 = \underline{\quad}$

$20\% \text{ of } 18 = \underline{\quad}$

$51\% \text{ of } 18 = \underline{\quad}$

$99\% \text{ of } 18 = \underline{\quad}$

86. Find the following percents of 196.

$50\% \text{ of } 196 = \underline{\quad}$

$10\% \text{ of } 196 = \underline{\quad}$

$25\% \text{ of } 196 = \underline{\quad}$

$5\% \text{ of } 196 = \underline{\quad}$

$35\% \text{ of } 196 = \underline{\quad}$

$250\% \text{ of } 196 = \underline{\quad}$

87. Find the following percents of 3.2.

$50\% \text{ of } 3.2 = \underline{\quad}$

$10\% \text{ of } 3.2 = \underline{\quad}$

$200\% \text{ of } 3.2 = \underline{\quad}$

$60\% \text{ of } 3.2 = \underline{\quad}$

$210\% \text{ of } 3.2 = \underline{\quad}$

$21\% \text{ of } 3.2 = \underline{\quad}$

PRACTICE

Solve each of the problems below to help you find more strategies for computing with percents.

- 88.** Write each of the following amounts as a whole number or decimal.

9% of 100 = _____ 9% of 50 = _____ 9% of 150 = _____

- 89.** Write each of the following amounts as a whole number or decimal.

75% of 1,000 = _____ 75% of 60 = _____ 75% of 1,060 = _____

- 90.** Circle every expression below that is equal to 60% of 75.

6% of 750 30% of 150 300% of 15 600% of 750

- 91.** 12.5% of 24 is equal to 25% of what number? **91.** _____

- 92.** 20% of 412 is equal to 10% of what number? **92.** _____

- 93.** 7% of 11 is equal to 1% of what number? **93.** _____

- 94.** 48% of 75 is equal to 75% of what number? **94.** _____

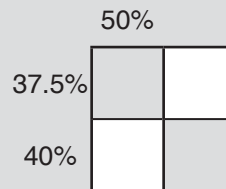


PERCENT SQUARES

In a **Percent Square** puzzle, the goal is to fill every empty square in the grid according to the following rules:

- Each square must contain a single positive digit.
- The percent next to a row or above a column gives the percent of the row's or column's sum that is in its shaded square(s).

EXAMPLE | Solve the Percent Square on the right.



Each percent can be written as a fraction in which the numerator is the sum of the shaded square(s) in the row or column, and the denominator is the sum of the whole row or column.

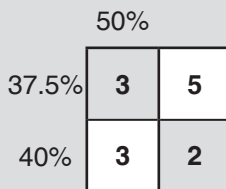
The fraction of the top row that is shaded is $37.5\% = \frac{3}{8} = \frac{6}{16} = \frac{9}{24} = \frac{12}{32} = \frac{15}{40} = \dots$

Since each square contains a digit, we can ignore any fraction whose numerator is greater than 9, or whose denominator is greater than $9+9 = 18$. This leaves $37.5\% = \frac{3}{8} = \frac{6}{16}$.

If we use $37.5\% = \frac{6}{16}$, then the top-left square is 6, and the top-right square is $16 - 6 = 10$, which is not a digit.

If we use $37.5\% = \frac{3}{8}$, then the top-left square is 3, and the top-right square is $8 - 3 = 5$.

This works! We can use the remaining clues to complete the puzzle as shown below.



PRACTICE | Solve each Percent Square puzzle below.

