

# Instruction Coach<sup>TM</sup> Mathematics













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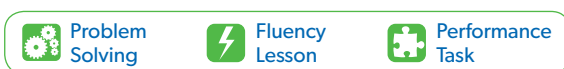
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## Using Percent

**EXAMPLE A** At the book fair, 40% of the books sold were science related. For every 100 books sold, how many were science related?

1

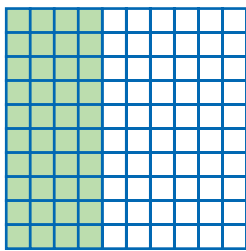
Use a model to show 40%.

A **percent** is a special ratio. It is a rate per 100.

A 10 by 10 grid has 100 equal parts.

40% means 40 out of 100 equal parts.

Shade 40 parts to show 40%.



2

Write an equivalent ratio to show the percent.

40% is equivalent to 40 per 100 or  $\frac{40}{100}$ .

3

Use the ratio to find the number of science-related books sold per 100.

$$40\% = \frac{40}{100}$$

$$40\% \text{ of } 100 = \frac{40}{100} \times 100 = \frac{400}{100} = 40$$

40 out of 100 books sold were science related.

► For every 100 books sold, 40 were science related.

MODEL

Explain how to use the model to show how many books sold per 100 were not science related. What percent of the books sold were not science related?

**EXAMPLE B** In a jar of 500 beads, 30% are red. How many of the beads are red?

1

Understand what you have to find.

Find 30% of 500 to find the number of red beads.

2

Write an expression for 30% of 500.

30% of 500 means 30% times 500.

$$30\% \text{ of } 500 = 30\% \times 500$$

3

Write the percent as a ratio.

$$30\% = \frac{30}{100}$$

4

Simplify the expression.

$$30\% \times 500 = \frac{30}{100} \times 500 \quad \leftarrow \text{Substitute the ratio for the percent.}$$

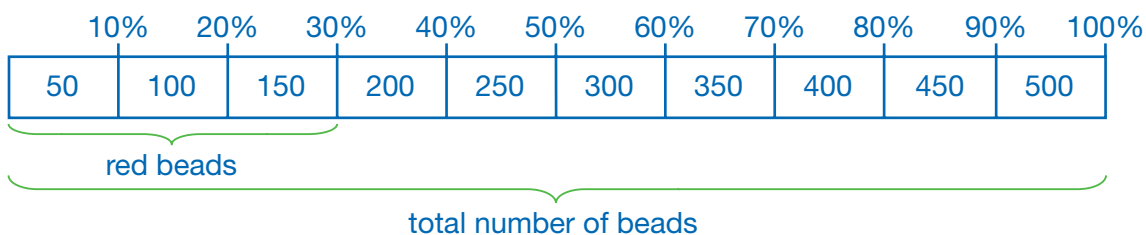
$$= \frac{30}{100} \times \frac{500}{1} \quad \leftarrow \text{Write 500 as a fraction.}$$

$$= \frac{15,000}{100} \quad \leftarrow \text{Multiply the numerators. Then multiply the denominators.}$$

$$= 150 \quad \leftarrow \text{Simplify.}$$

5

Use a tape diagram to illustrate the percents.



► There are 150 red beads in the jar.

**DISCUSS**

Explain how to use the tape diagram to find 80% of 500.

**EXAMPLE C** 21 is 70% of what number?

1

Make a tape diagram to model the problem.

If you know the part and the percent, you can find the whole.



21 is part of the whole. It is 70% of the whole.

2

Use the tape diagram to find the size of each part.

There are 7 equal parts up to 21.

Think: What number times 7 is equal to 21?

$3 \times 7 = 21$ , so each part increases by 3.

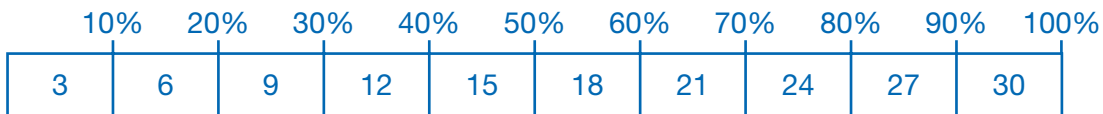
Each part is 10% on the tape diagram, so 10% of the whole is 3.

3

Complete the tape diagram.

10% of the whole is 3.

Count by 3s to complete the tape diagram.



**CHECK**

What is 70% of 30? Explain.

4

Use the tape diagram to find the whole.

100% is the whole. 30 is 100% of the whole.

► 21 is 70% of 30.



## Problem Solving

### READ

At Shaun's Skate World, 18 of the skateboards in stock are on sale. If 20% of the skateboards in stock are on sale, how many skateboards are in stock?

### PLAN

18 is 20% of the skateboards in stock.

Use a tape diagram to model the problem.

Complete the tape diagram to find the number of skateboards in stock.

### SOLVE

Make the tape diagram.



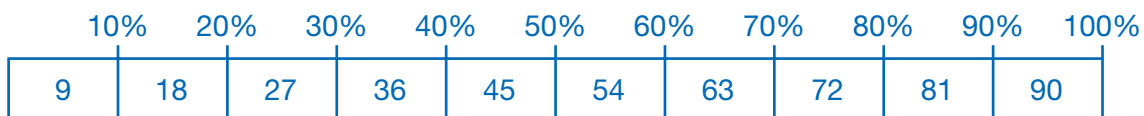
There are \_\_\_\_\_ equal parts up to 18.

Think: What number times \_\_\_\_\_ is equal to 18?

$2 \times \underline{\hspace{2cm}} = 18$ , so each part increases by \_\_\_\_\_.

Each part is 10% on the tape diagram, so 10% of the whole is \_\_\_\_\_.

Count by \_\_\_\_\_ to complete the tape diagram.



What number is 100% of the tape diagram? \_\_\_\_\_

### CHECK

Look back at the completed tape diagram.

What is 20% of the total? \_\_\_\_\_

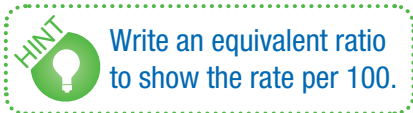
Does the number match the quantity in the problem? \_\_\_\_\_

→ There are \_\_\_\_\_ skateboards in stock at Shaun's Skate World.

# Practice

## Write a percent for each situation.

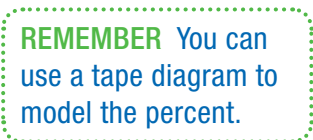
1. 20 out of 100 people \_\_\_\_\_
2. 7 out of 10 stores \_\_\_\_\_



3. 65 votes for Derek per 100 voters \_\_\_\_\_

## Find the percent of each number.

- |              |              |               |
|--------------|--------------|---------------|
| 4. 20% of 20 | 5. 10% of 30 | 6. 60% of 400 |
| _____        | _____        | _____         |



- |                |               |                |
|----------------|---------------|----------------|
| 7. 80% of 40   | 8. 50% of 60  | 9. 30% of 200  |
| _____          | _____         | _____          |
| 10. 70% of 600 | 11. 40% of 50 | 12. 90% of 300 |
| _____          | _____         | _____          |

## Make a tape diagram to find each percent.

13. 5 is 10% of what number? \_\_\_\_\_
14. 75 is 50% of what number? \_\_\_\_\_
15. 12 is 30% of what number? \_\_\_\_\_
16. 48 is 80% of what number? \_\_\_\_\_
17. 120 is 60% of what number? \_\_\_\_\_
18. 50 is 20% of what number? \_\_\_\_\_



**Choose the best answer.**

19. What is 5% of 200?

- A. 5
- B. 10
- C. 20
- D. 25

20. 72 is 60% of what number?

- A. 12
- B. 112
- C. 120
- D. 172

**Solve.**

21. A play ran for 100 performances. The theater was full for 85% of the performances. For how many performances was the theater **not** full?

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23. In a batch of lightbulbs, 30% are tinted. If 45 lightbulbs are tinted, how many light bulbs are in the batch?

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25. **CRITIQUE** Taylor says that 40% of 50 is the same amount as 50% of 40. Is Taylor correct? Explain.

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22. In a survey of 800 students, 70% said they liked pop music. How many students surveyed like pop music?

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24. Keith spent 60% of his birthday money at the mall. If he spent \$24 at the mall, how much money did Keith receive for his birthday?

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26. **WRITE MATH** Explain how to use a tape diagram to find 90% of 180.

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