Lesson 26: Percent of a Quantity

Student Outcomes

- Students find the percent of a quantity. Given a part and the percent, students solve problems involving finding the whole.

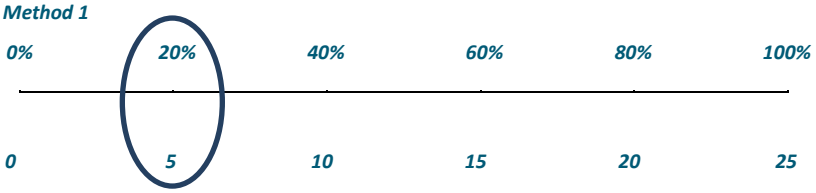
Classwork

Example 1 (5 minutes)

Example 1

Five of the 25 girls on Alden Middle School's soccer team are 7th-grade students. Find the percentage of 7th graders on the team. Show two different ways of solving for the answer. One of the methods must include a diagram or picture model.

Method 1



Method 2

$\frac{5}{25} = \frac{1}{5} = \frac{20}{100} = 20\%$

Students take time to make their own diagram or model and discuss with a partner. Students will be reviewing the work they completed in Lesson 25. If they made a tape diagram, they begin by deciding to divide the tape diagram into 5 equal rectangles. Each rectangle will represent 5 girls. From there they will need to divide the 100% into 5 equal sections.

If time permits, students share the model they chose and explain why it did or did not help them solve the question. Students need to come to the conclusion that $\frac{5}{25} = \frac{20}{100}$, which is the same as 20%.

Note: Students who are struggling may need help figuring out which model to use and how to divide up the diagram. Help them think through the different options. Would it make sense to count by 5s, 10s, 20s, 25s, etc.?

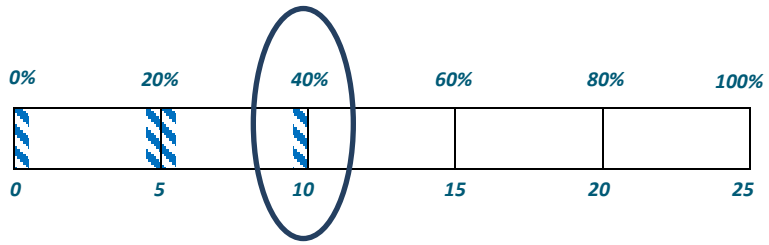
Example 2 (5 minutes)

Example 2

Of the 25 girls on the Alden Middle School soccer team, 40% also play on a travel team. How many of the girls on the middle school team also play on a travel team?

One method: $40\% = \frac{40}{100} = \frac{10}{25}$ *Therefore, 10 of the 25 are on the travel team.*

Another method: Use of tape diagram shown below.



10 of the girls also play on a travel team.

Example 3 (5 minutes)

Example 3

The Alden Middle School girls' soccer team won 80% of their games this season. If the team won 12 games, how many games did they play? Solve the question using at least two different methods.

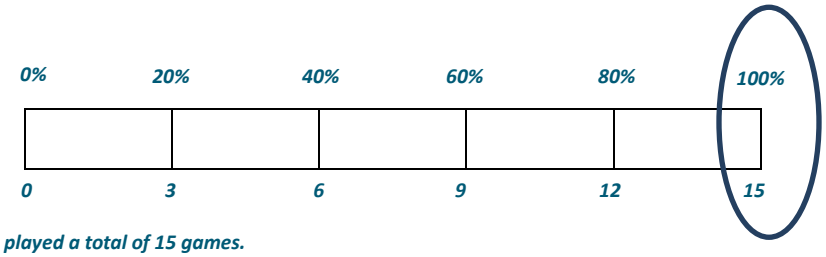
Method 1:

$80\% = \frac{80}{100} = \frac{8}{10} = \frac{4}{5}$

$\frac{4 \times 3 \rightarrow}{5 \times 3 \rightarrow} = \frac{12}{15(total\ games)}$

15 total games

Method 2:



The girls played a total of 15 games.

Exercises 1–4 (20 minutes)

At this time, the students break out into pairs or small thinking groups to solve the problems.

Exercises 1–4

1. There are 60 animal exhibits at the local zoo. What percent of the zoo's exhibits does each animal class represent?

Exhibits by Animal Class	Number of Exhibits	Percent of the Total Number of Exhibits
Mammals	30	$\frac{30}{60} = \frac{5}{10} = \frac{50}{100} = 50\%$
Reptiles & Amphibians	15	$\frac{15}{60} = \frac{3}{12} = \frac{1}{4} = \frac{25}{100} = 25\%$
Fish & Insects	12	$\frac{12}{60} = \frac{2}{10} = \frac{20}{100} = 20\%$
Birds	3	$\frac{3}{60} = \frac{1}{20} = \frac{5}{100} = 5\%$

2. A sweater is regularly $\$32$. It is 25% off the original price this week.
   a. Would the amount the shopper saved be considered the part, whole or percent?

      Part because the $\$32$ is the whole amount of the sweater, and we want to know the part that was saved.

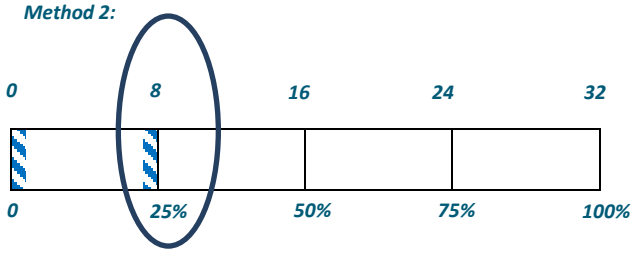
   b. How much would a shopper save by buying the sweater this week? Show two methods for finding your answer.

      Method 1:

      $25\% = \frac{25}{100} = \frac{1}{4}$

      $32 \times \frac{1}{4} = \$8$ *saved*

      Method 2:



      The shopper would save $\$8$.

3. A pair of jeans was 30% off the original price. The sale resulted in a $\$24$ discount.
   a. Is the original price of the jeans considered the whole, part or percent?

      The original price is the whole.

b. What was the original cost of the jeans before the sale? Show two methods for finding your answer.

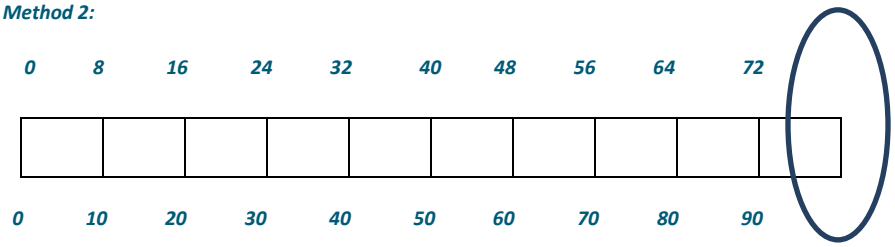
Method 1:

$30\% = \frac{30}{100} = \frac{3}{10}$

$\frac{3 \times 8 \rightarrow}{10 \times 8 \rightarrow} = \frac{24}{80}$

The original cost was $\$80$.

Method 2:



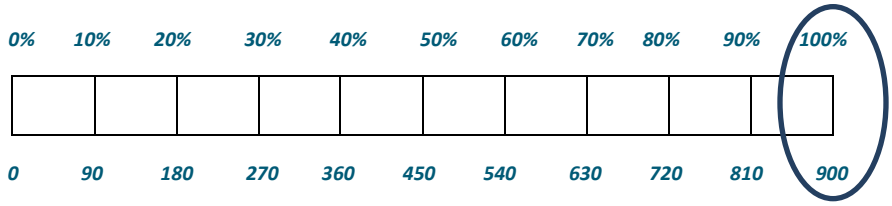
4. Purchasing a TV that is 20% off will save $\$180$.

a. Name the different parts with the words: PART, WHOLE, PERCENT.

PERCENT	PART	WHOLE
20% off	$180	Original Price

b. What was the original price of the TV? Show two methods for finding your answer.

Method 1:



Method 2:

$20\% = \frac{20}{100}$

$\frac{20 \times 9 \rightarrow}{100 \times 9 \rightarrow} = \frac{180}{900}$

The original price was $900.

Closing (10 minutes)

- Describe additional questions.
- Discuss the main differences in solving strategies.
- Were there times when you preferred to use one method over another method?
- How did the steps change when you were given the part instead of the total?

Lesson Summary

Models and diagrams can be used to solve percent problems. Tape diagrams, 10×10 grids, double number line diagrams, and others can be used in a similar way to using them with ratios to find the percent, the part or the whole.

Exit Ticket (5 minutes)

Name _____ Date_____

Lesson 26: Percent of a Quantity

Exit Ticket

1. Find 40% of 60 using two different strategies, one of which must include a pictorial model or diagram.

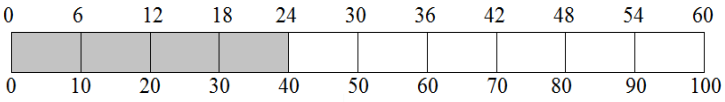
2. 15% of an amount is 30. Calculate the whole amount using two different strategies, one of which must include a pictorial model.

Exit Ticket Sample Solutions

The following solutions indicate an understanding of the objectives of this lesson:

1. **Find 40% of 60 using two different strategies, one of which must include a pictorial model or diagram.**

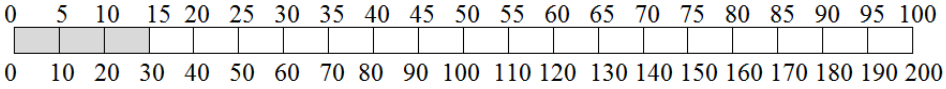
40% of 60 *40% = $\frac{40}{100} = \frac{4}{10} = \frac{24}{60}$* *40% of 60 is 24.*



2. **15% of an amount is 30. Calculate the whole amount using two different strategies, one of which must include a pictorial model.**

15% = $\frac{15}{100} = \frac{30}{200}$

The whole quantity is 200.



Problem Set Sample Solutions

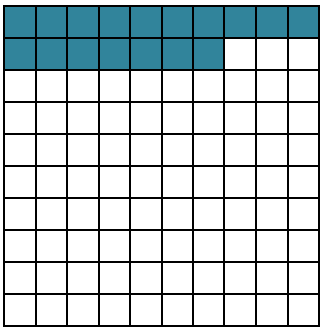
1. **What is 15% of 60? Create a model to prove your answer.**

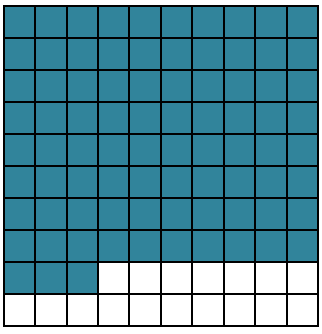
9

2. **If 40% of a number is 56, what was the original number?**

140

3. **In a 10×10 grid that represents 800, one square represents ____8____.**
Use the grids below to represent 17% and 83% of 800.





17% of 800 is ____136____. **83% of 800 is ____664____.**