Lesson 2: Part of a Whole as a Percent

Classwork

Opening Exercise

1. What is the whole unit in each scenario?

|  |  |
| --- | --- |
| Scenario | Whole Unit |
| $15$ is what percent of $90$? |  |
| What number is $10\%$ of $56$? |  |
| $90\%$ of a number is $180$. |  |
| A bag of candy contains $300$ pieces and $25\%$ of the pieces in the bag are red. |  |
| Seventy percent ($70\%$) of the students earned a B on the test. |  |
| The $20$ girls in the class represented $55\%$ of the students in the class. |  |

1. Read each problem and complete the table to record what you know.

|  |  |  |  |
| --- | --- | --- | --- |
| **Problem** | **Part** | **Percent** | **Whole** |
| $40\%$ of the students on the field trip love the museum. If there are $20$ students on the field trip, how many love the museum? |  |  |  |
| $40\%$ of the students on the field trip love the museum. If $20$ students love the museum, how many are on the field trip? |  |  |  |
| $20$ students on the field trip love the museum. If there are $40$ students on the field trip, what percent love the museum? |  |  |  |

**Example 1: Visual Approaches to Finding a Part, Given a Percent of the Whole**

In Ty’s math class, $20\%$ of students earned an A on a test. If there were $30$ students in the class, how many got an A?

Exercise 1

In Ty’s art class, $12\%$ of the Flag Day art projects received a perfect score. There were $25$ art projects turned in by Ty’s class. How many of the art projects earned a perfect score? (Identify the whole.)

**Example 2: A Numeric Approach to Finding a Part, Given a Percent of the Whole**

In Ty’s English class, $70\%$ of the students completed an essay by the due date. There are $30$ students in Ty’s English class. How many completed the essay by the due date?

**Example 3: An Algebraic Approach to Finding a Part, Given a Percent of the Whole**

A bag of candy contains $300$ pieces of which $28\%$ are red. How many pieces are red?

Which quantity represents the whole?

Which of the terms in the percent equation is unknown? Define a letter (variable) to represent the unknown quantity.

Write an expression using the percent and the whole to represent the number of pieces of red candy.

Write and solve an equation to find the unknown quantity.

Exercise 2

A bag of candy contains$ 300$ pieces of which $28\%$ are red. How many pieces are not red?

* 1. Write an equation to represent the number of pieces that are not red, $n$.
	2. Use your equation to find the number of pieces of candy that are not red.
	3. Jah-Lil told his math teacher that he could use the answer from part (b) and mental math to find the number of pieces of candy that are not red. Explain what Jah-Lil meant by that.

Example 4: Comparing Part of a Whole to the Whole with the Percent Formula

Zoey inflated $24$ balloons for decorations at the middle school dance. If Zoey inflated $15\%$ of the balloons that are inflated for the dance, how many balloons are there total? Solve the problem using the percent formula, and verify your answer using a visual model.

**Example 5: Finding the Percent Given a Part of the Whole and the Whole**

Haley is making admission tickets to the middle school dance. So far she has made $112$ tickets, and her plan is to make $320$ tickets. What percent of the admission tickets has Haley produced so far? Solve the problem using the percent formula, and verify your answer using a visual model.

Problem Set

1. Represent each situation using an equation. Check your answer with a visual model or numeric method.
	1. What number is $40\%$ of $90$?
	2. What number is $45\%$ of $90$?
	3. $27$ is $30\%$ of what number?
	4. $18$ is $30\%$ of what number?
	5. $25.5$ is what percent of $85$?
	6. $21$ is what percent of $60$?
2. $40\%$ of the students on a field trip love the museum. If there are $20$ students on the field trip, how many love the museum?

Lesson Summary

* Visual models or numeric methods can be used to solve percent problems.
* An equation can be used to solve percent problems:

$Part=Percent × Whole$.

1. Maya spent $40\% $of her savings to pay for a bicycle that cost her $\$85$.
	1. How much money was in her savings to begin with?
	2. How much money does she have left in her savings after buying the bicycle?
2. Curtis threw $15$ darts at a dartboard. $40\%$ of his darts hit the bull’s-eye. How many darts did not hit the bull’s-eye?
3. A tool set is on sale for $\$424.15$. The original price of the tool set was $\$499.00$. What percent of the original price is the sale price?
4. Matthew scored a total of $168$ points in basketball this season. He scored $147$ of those points in the regular season, and the rest were scored in his only playoff game. What percent of his total points did he score in the playoff game?
5. Brad put $10$ crickets in his pet lizard’s cage. After one day, Brad’s lizard had eaten $20\%$ of the crickets he had put in the cage. By the end of the next day, the lizard had eaten $25\%$ of the remaining crickets. How many crickets were left in the cage at the end of the second day?
6. A furnace used $40\%$ of the fuel in its tank in the month of March and then used $25\%$ of the remaining fuel in the month of April. At the beginning of March, there were $240$ gallons of fuel in the tank. How much fuel (in gallons) was left at the end of April?
7. In Lewis County, there were$2,277$student athletes competing in spring sports in 2014. That was $110\%$ of the number from 2013, which was $90\%$ of the number from the year before. How many student athletes signed up for a spring sport in 2012?
8. Write a real-world word problem that could be modeled by the equation below. Identify the elements of the percent equation and where they appear in your word problem, and then solve the problem.

$$57.5=p\left(250\right)$$