Lesson 3: Comparing Quantities with Percent

Classwork

Opening Exercise

If each unit square represents one whole, then what percent is represented by the shaded region?

In the model above, represents a quantity of students. How many students does the shaded region represent?

**Example 1**

* 1. The members of a club are making friendship bracelets to sell to raise money. Anna and Emily made bracelets over the weekend. They need to produce bracelets by the end of the week. What percent of the bracelets were they able to produce over the weekend?
	2. Anna produced bracelets of the bracelets produced by Emily and Anna over the weekend. Compare the number of bracelets that Emily produced as a percent of those that Anna produced.
	3. Write the number of bracelets that Anna produced as a percent of those that Emily produced.

Exercises 1–4

1. There are students in the seventh-grade class and students in the eighth-grade class at Kent Middle School.
	1. What percent is the seventh-grade class of the eighth-grade class at Kent Middle School?
	2. The principal will have to increase the number of eighth-grade teachers next year if the seventh-grade enrollment exceeds of the current eighth-grade enrollment. Will she need to increase the number of teachers? Explain your reasoning.
2. At Kent Middle School, there are students in the band and students in the choir. What percent of the number of students in the choir is the number of students in the band?
3. At Kent Middle School, breakfast costs and lunch costs . What percent of the cost of lunch is the cost of breakfast?
4. Describe a real-world situation that could be modeled using the equation . Describe how the elements of the equation correspond with the real-world quantities in your problem. Then, solve your problem.

Problem Set

Lesson Summary

* Visual models or arithmetic methods can be used to solve problems that compare quantities with percents.
* Equations can be used to solve percent problems using the basic equation

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* *Quantity* in the new percent formula is the equivalent of *part* in the original percent formula.
1. Solve each problem using an equation.
	1. is what percent of ?
	2. is what percent of ?
	3. What percent of is ?
2. This year, Benny is years old, and his mom is years old.
	1. What percent of his mom’s age is Benny’s age?
	2. What percent of Benny’s age is his mom’s age?
	3. In two years, what percent of his age will Benny’s mom’s age be at that time?
	4. In 10 years, what percent will Benny’s mom’s age be of his age?
	5. In how many years will Benny be of his mom’s age?
	6. As Benny and his mom get older, Benny thinks that the percent of difference between their ages will decrease as well. Do you agree or disagree? Explain your reasoning.
3. This year, Benny is years old. His brother Lenny’s age is of Benny’s age. How old is Lenny?
4. When Benny’s sister Penny is , Benny’s age will be of her age.
	1. How old will Benny be then?
	2. If Benny is years old now, how old is Penny now? Explain your reasoning.
5. Benny’s age is currently of his sister Jenny’s age. What percent of Benny’s age will Jenny’s age be in years?
6. At an animal shelter, there are dogs, cats, snakes, and parakeets.
	1. What percent of the number of cats is the number of dogs?
	2. What percent of the number of cats is the number of snakes?
	3. What percent less parakeets are there than dogs?
	4. Which animal has of the number of another animal?
	5. Which animal makes up approximately of the animals in the shelter?
7. Is hours and minutes more or less than of a day? Explain your answer.
8. A club’s membership increased from to members.
	1. Express the new membership as a percent of the old membership.
	2. Express the old membership as a percent of the new membership.
9. The number of boys in a school is the number of girls at the school.
	1. Find the number of boys if there are girls.
	2. Find the number of girls if there are boys.
10. The price of a bicycle was increased from to .
	1. What percent of the original price is the increased price?
	2. What percent of the increased price is the original price?
11. The population of Appleton is of the population of Cherryton.
	1. Find the population in Appleton if the population in Cherryton is people.
	2. Find the population in Cherryton if the population in Appleton is people.
12. A statistics class collected data regarding the number of boys and the number of girls in each classroom at their school during homeroom. Some of their results are shown in the table below.
	1. Complete the blank cells of the table using your knowledge about percent.

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| --- | --- | --- |
| Number of Boys () | Number of Girls () | Number of Girls as a Percent of the Number of Boys |
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* 1. Using a coordinate plane and grid paper, locate and label the points representing the ordered pairs .
	2. Locate all points on the graph that would represent classrooms in which the number of girls is of the number of boys . Describe the pattern that these points make.
	3. Which points represent the classrooms in which the number of girls is greater than of the number of boys? Which points represent the classrooms in which the number of girls is less than of the number of boys? Describe the locations of the points in relation to the points in part (c).
	4. Find three ordered pairs from your table representing classrooms where the number of girls is the same percent of the number of boys. Do these points represent a proportional relationship? Explain your reasoning.
	5. Show the relationship(s) from part (e) on the graph, and label them with the corresponding equation(s).
	6. What is the constant of proportionality in your equation(s), and what does it tell us about the number of girls and the number of boys at each point on the graph that represents it? What does the constant of proportionality represent in the table in part (a)?