Lesson 5: Finding One Hundred Percent Given Another Percent

Classwork

Opening Exercise

What are the whole number factors of $100$? What are the multiples of those factors? How many multiples are there of each factor (up to $100$)?

|  |  |  |
| --- | --- | --- |
| **Factors of** $100$ | **Multiples of the Factors of** $100$ | **Number of Multiples** |
| $$100$$ | $100$  | $$1$$ |
| $$50$$ | $50,100$  | $$2$$ |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
| $$1$$ | $1, 2, 3, 4, 5, 6, …, 98, 99, 100$  | $$100$$ |

**Example 1: Using a Modified Double Number Line with Percent**

The $42 $students who play wind instruments represent $75\%$ of the students who are in band. How many students are in band?

Exercises 1–3

1. Bob’s Tire Outlet sold a record number of tires last month. One salesman sold $165$ tires, which was $60\%$ of the tires sold in the month. What was the record number of tires sold?
2. Nick currently has $7,200$ points in his fantasy baseball league, which is $20\%$ more points than Adam. How many points does Adam have?
3. Kurt has driven $276$ miles of his road trip but has $70\%$ of the trip left to go. How many more miles does Kurt have to drive to get to his destination?

**Example 2: Mental Math Using Factors of** $100$

Answer each part below using only mental math, and describe your method.

* 1. If $39$ is $1\%$ of a number, what is that number? How did you find your answer?
	2. If $39$ is $10\%$ of a number, what is that number? How did you find your answer?
	3. If $39$ is $5\%$ of a number, what is that number? How did you find your answer?
	4. If $39$ is $15\%$ of a number, what is that number? How did you find your answer?
	5. If $39$ is $25\%$ of a number, what is that number? How did you find your answer?

Exercises 4–5

1. Derrick had a $0.250$ batting average at the end of his last baseball season, which means that he got a hit $25\%$ of the times he was up to bat. If Derrick had $47$ hits last season, how many times did he bat?
2. Nelson used $35\%$ of his savings account for his class trip in May. If he used $\$140$ from his savings account while on his class trip, how much money was in his savings account before the trip?

Lesson Summary

To find $100\%$ of the whole, you can use a variety of methods, including factors of $100$ ($1$, $2$, $4$, $5$, $10$, $20$, $25$, $50$, and $100$) and double number lines. Both methods will require breaking $100\%$ into equal-sized intervals. Use the greatest common factor of $100$ and the percent corresponding to the part.

Problem Set

Use a double number line to answer Problems 1–5.

1. Tanner collected $360 $cans and bottles while fundraising for his baseball team. This was $40\%$ of what Reggie collected. How many cans and bottles did Reggie collect?
2. Emilio paid $\$287.50$ in taxes to the school district that he lives in this year. This year’s taxes were a $15\% $increase from last year. What did Emilio pay in school taxes last year?
3. A snowmobile manufacturer claims that its newest model is $15\%$ lighter than last year’s model. If this year’s model weighs$ 799 lb.$, how much did last year’s model weigh?
4. Student enrollment at a local school is concerning the community because the number of students has dropped to $504$, which is a $20\%$ decrease from the previous year. What was the student enrollment the previous year?
5. The color of paint used to paint a race car includes a mixture of yellow and green paint. Scotty wants to lighten the color by increasing the amount of yellow paint $30\%$. If a new mixture contains $3.9$ liters of yellow paint, how many liters of yellow paint did he use in the previous mixture?

Use factors of $100$ and mental math to answer Problems 6–10. Describe the method you used.

1. Alexis and Tasha challenged each other to a typing test. Alexis typed $54 $words in one minute, which was $120\%$ of what Tasha typed. How many words did Tasha type in one minute?
2. Yoshi is $5\%$ taller today than she was one year ago. Her current height is $168$ cm. How tall was she one year ago?
3. Toya can run one lap of the track in $1 min. 3 sec.$, which is $90\% $of her younger sister Niki’s time. What is Niki’s time for one lap of the track?
4. An animal shelter houses only cats and dogs, and there are $25\%$ more cats than dogs. If there are $40$ cats, how many dogs are there, and how many animals are there total?
5. Angie scored $91$ points on a test but only received a $65\%$ grade on the test. How many points were possible on the test?

For Problems 11–17, find the answer using any appropriate method.

1. Robbie owns $15\%$ more movies than Rebecca, and Rebecca owns $10\%$ more movies than Joshua. If Rebecca owns $220$ movies, how many movies do Robbie and Joshua each have?
2. $20\%$of the seventh-grade students have math class in the morning. $16\frac{2}{3}\%$ of those students also have science class in the morning. If $30$ seventh-grade students have math class in the morning but not science class, find how many seventh-grade students there are.
3. The school bookstore ordered three-ring notebooks. They put $75\%$ of the order in the warehouse and sold $80\%$ of the rest in the first week of school. There are $25$ notebooks left in the store to sell. How many three-ring notebooks did they originally order?
4. In the first game of the year, the modified basketball team made $62.5\%$ of their foul shot free throws. Matthew made all $6$ of his free throws, which made up for $25\%$ of the team’s free throws. How many free throws did the team miss altogether?
5. Aiden’s mom calculated that in the previous month, their family had used $40\%$ of their monthly income for gasoline, and $63\%$ of that gasoline was consumed by the family’s SUV. If the family’s SUV used $\$261.45$ worth of gasoline last month, how much money was left after gasoline expenses?
6. Rectangle A is a scale drawing of Rectangle B and has $25\%$ of its area. If Rectangle A has side lengths of $4 cm$ and $5 cm$, what are the side lengths of Rectangle B?

A

B

$$5 cm$$

$$4 cm$$

1. Ted is a supervisor and spends $20\%$ of his typical work day in meetings and $20\%$ of that meeting time in his daily team meeting. If he starts each day at 7:30 a.m., and his daily team meeting is from 8:00 a.m. to 8:20 a.m., when does Ted’s typical work day end?