

Lesson 11: Percentages and Double Number Lines

Let's use double number lines to represent percentages.

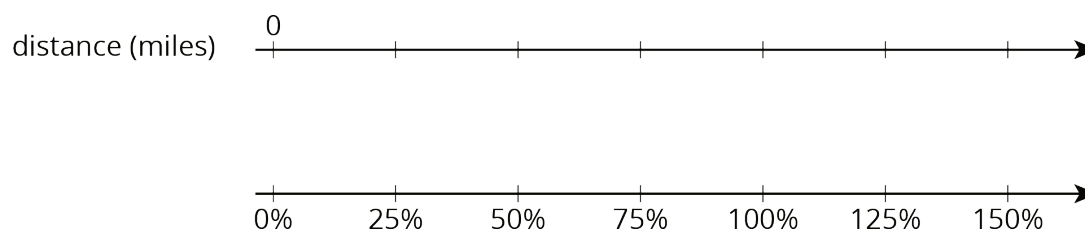
11.1: Fundraising Goal

Each of three friends—Lin, Jada, and Andre—had the goal of raising \$40. How much money did each person raise? Be prepared to explain your reasoning.

1. Lin raised 100% of her goal.
2. Jada raised 50% of her goal.
3. Andre raised 150% of his goal.

11.2: Three-Day Biking Trip

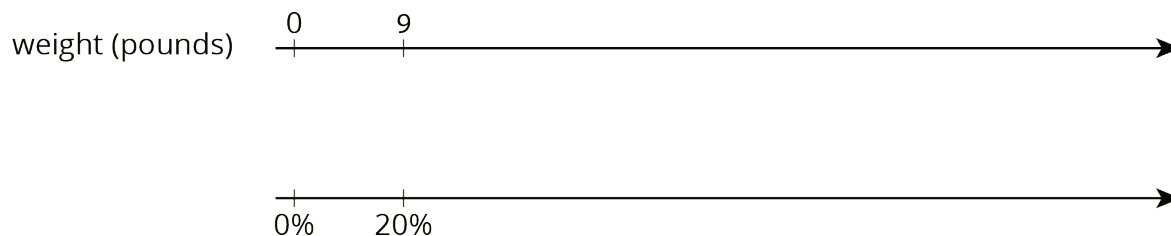
Elena biked 8 miles on Saturday. Use the double number line to answer the questions. Be prepared to explain your reasoning.



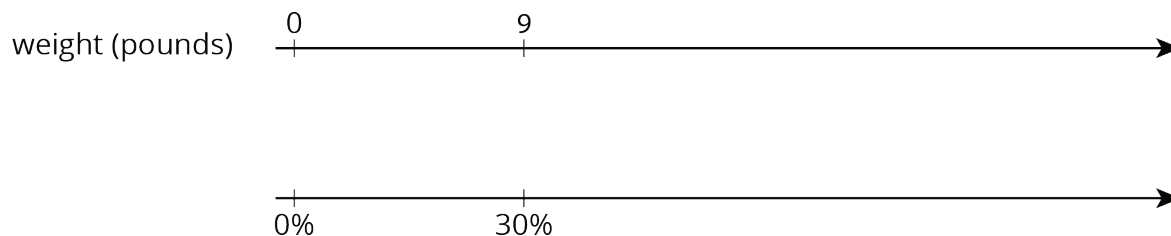
1. What is 100% of her Saturday distance?
2. On Sunday, she biked 75% of her Saturday distance. How far was that?
3. On Monday, she biked 125% of her Saturday distance. How far was that?

11.3: Puppies Grow Up

1. Jada has a new puppy that weighs 9 pounds. The vet says that the puppy is now at about 20% of its adult weight. What will be the adult weight of the puppy?



2. Andre also has a puppy that weighs 9 pounds. The vet says that this puppy is now at about 30% of its adult weight. What will be the adult weight of Andre's puppy?



3. What is the same about Jada and Andre's puppies? What is different?

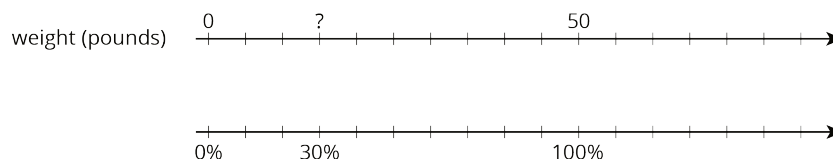
Are you ready for more?

A loaf of bread costs \$2.50 today. The same size loaf cost 20 cents in 1955.

1. What percentage of today's price did someone in 1955 pay for bread?
2. A job pays \$10.00 an hour today. If the same percentage applies to income as well, how much would that job have paid in 1955?

Lesson 11 Summary

We can use a double number line to solve problems about percentages. For example, what is 30% of 50 pounds? We can draw a double number line like this:



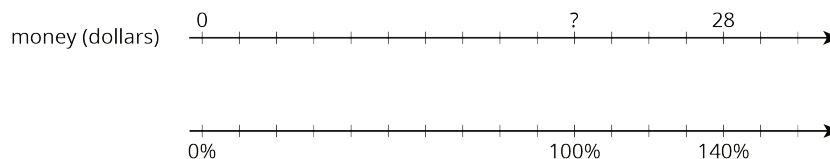
We divide the distance between 0% and 100% and that between 0 and 50 pounds into ten equal parts. We label the tick marks on the top line by counting by 5s ($50 \div 10 = 5$) and on the bottom line counting by 10% ($100 \div 10 = 10$). We can then see that 30% of 50 pounds is 15 pounds.

We can also use a table to solve this problem.

| weight (pounds) | percentage |
|-----------------|------------|
| 50 | 100 |
| 5 | 10 |
| 15 | 30 |

Annotations: On the left, a green arrow points from 50 to 5 with the label $\cdot \frac{1}{10}$, and another green arrow points from 5 to 15 with the label $\cdot 3$. On the right, a green arrow points from 100 to 10 with the label $\cdot \frac{1}{10}$, and another green arrow points from 10 to 30 with the label $\cdot 3$.

Suppose we know that 140% of an amount is \$28. What is 100% of that amount? Let's use a double number line to find out.



We divide the distance between 0% and 140% and that between \$0 and \$28 into fourteen equal intervals. We label the tick marks on the top line by counting by 2s and on the bottom line counting by 10%. We would then see that 100% is \$20.

Or we can use a table as shown.

| money (dollars) | percentage |
|-----------------|------------|
| 28 | 140 |
| 2 | 10 |
| 20 | 100 |

Annotations: On the left, a green arrow points from 28 to 2 with the label $\cdot \frac{1}{14}$, and another green arrow points from 2 to 20 with the label $\cdot 10$. On the right, a green arrow points from 140 to 10 with the label $\cdot \frac{1}{14}$, and another green arrow points from 10 to 100 with the label $\cdot 10$.