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## Unit 3, Lesson 11: Percentages and Double Number Lines

Let's use double number lines to represent percentages.

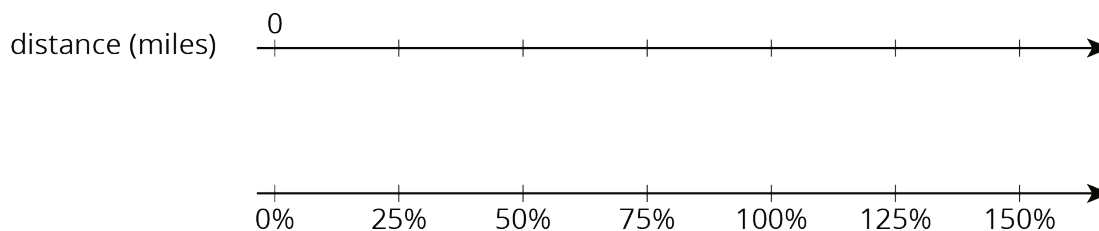
### 11.1: Fundraising Goal

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?

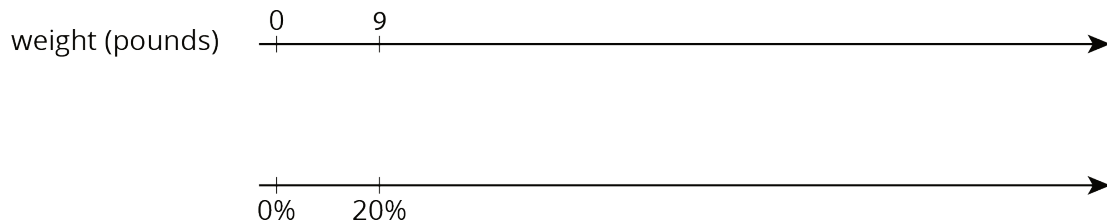
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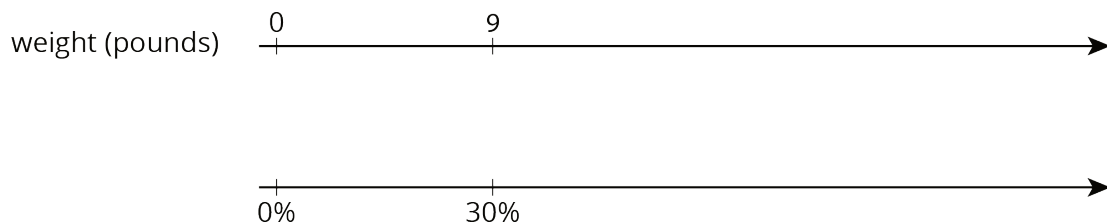
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### 11.3: Puppies Grow Up

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 \$3.00 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?

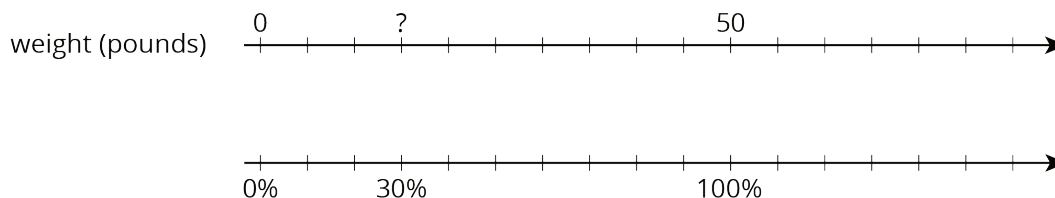
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### Lesson 11 Summary

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:



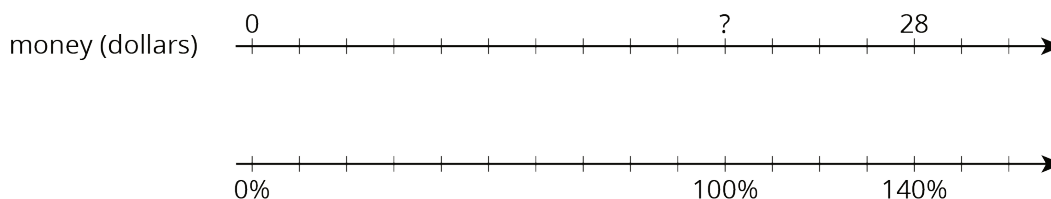
We divide the distance between 0% and 100% and that between 0 and 50 pounds into ten equal parts. We label the tick marks on the top line by counting by 5s ( $50 \div 10 = 5$ ) and on the bottom line counting by 10% ( $100 \div 10 = 10$ ). We can then see that 30% of 50 pounds is 15 pounds.

We can also use a table to solve this problem.

weight (pounds)	percentage
50	100
5	10
15	30

Green arrows on the left indicate operations:  $\cdot \frac{1}{10}$  from 50 to 5, and  $\cdot 3$  from 5 to 15. Green arrows on the right indicate operations:  $\cdot \frac{1}{10}$  from 100 to 10, and  $\cdot 3$  from 10 to 30.

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

Green arrows on the left indicate operations:  $\cdot \frac{1}{14}$  from 28 to 2, and  $\cdot 10$  from 2 to 20. Green arrows on the right indicate operations:  $\cdot \frac{1}{14}$  from 140 to 10, and  $\cdot 10$  from 10 to 100.

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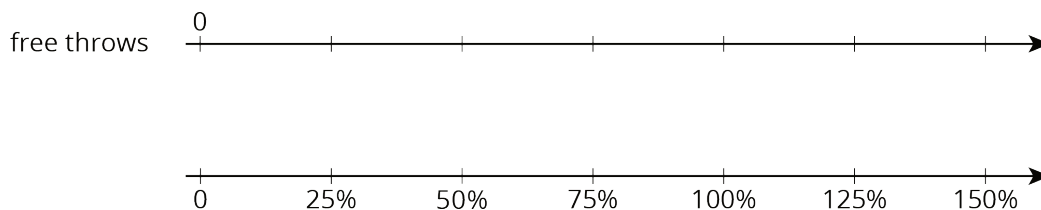
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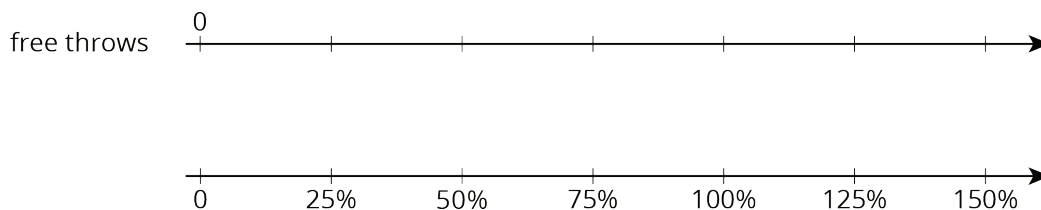
## Unit 3, Lesson 11: Percentages and Double Number Lines

1. Solve each problem. If you get stuck, consider using the double number lines.

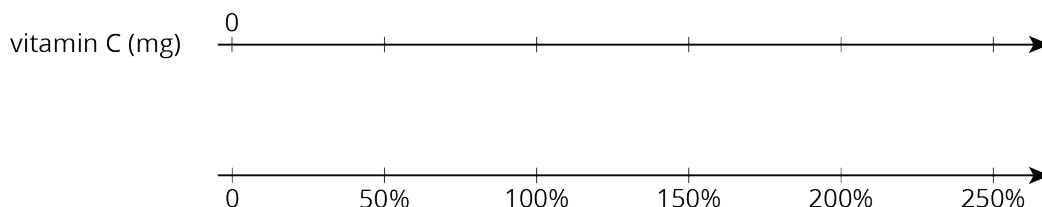
- a. During a basketball practice, Mai attempted 40 free throws and was successful on 25% of them. How many successful free throws did she make?



- b. Yesterday, Priya successfully made 12 free throws. Today, she made 150% as many. How many successful free throws did Priya make today?



2. A 16-ounce bottle of orange juice says it contains 200 milligrams of vitamin C, which is 250% of the daily recommended allowance of vitamin C for adults. What is 100% of the daily recommended allowance of vitamin C for adults?



3. At a school, 40% of the sixth-grade students said that hip-hop is their favorite kind of music. If 100 sixth-grade students prefer hip hop music, how many sixth-grade students are at the school? Explain or show your reasoning.
4. Diego has a skateboard, scooter, bike, and go-cart. He wants to know which vehicle is the fastest. A friend records how far Diego travels on each vehicle in 5 seconds. For each vehicle, Diego travels as fast as he can along a straight, level path.

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vehicle	distance traveled
skateboard	90 feet
scooter	1,020 inches
bike	4,800 centimeters
go-cart	0.03 kilometers

(from Unit 3, Lesson 9)

- a. 100 inches equal 254 centimeters. What is the distance each vehicle traveled in centimeters?
- b. Rank the vehicles in order from fastest to slowest.

5. It takes 10 pounds of potatoes to make 15 pounds of mashed potatoes. At this rate:

- a. How many pounds of mashed potatoes can they make with 15 pounds of potatoes?
- b. How many pounds of potatoes are needed to make 50 pounds of mashed potatoes?

(from Unit 3, Lesson 7)