Increasing and Decreasing

Let's use percentages to describe increases and decreases.

4.1 Improving Their Game

Here are the scores from three different sports teams from their last two games.

sports team	total points in Game 1	total points in Game 2
football team	22	30
basketball team	100	108
baseball team	4	12

1. What do you notice about the teams' scores? What do you wonder?

2. Which team improved the most? Explain your reasoning.

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4.2 More Shampoo and a Discounted Shirt

1. A shampoo bottle says that now it contains 20% more. Originally, it came with 18.5 fluid ounces of shampoo. How much shampoo does the bottle come with now?



2. The price of a shirt is $18.50, but you have a coupon that lowers the price by 20%. What is the price of the shirt after using the coupon?



Are you ready for more?

Shirts are on sale for 20% off. You buy two of them. As you pay, the cashier says, "20% off of each shirt means 40% off of the total price."

Do you agree or disagree with this statement? Explain your reasoning.

4.3 Using Tape Diagrams

1. Match each situation to a diagram. Be prepared to explain your reasoning.

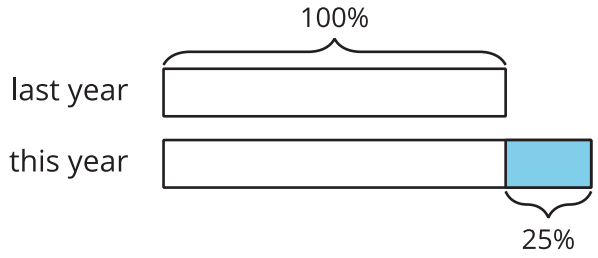
   a. Compared with last year's strawberry harvest, this year's strawberry harvest is a 25% increase.

   b. This year's blueberry harvest is 75% of last year's.

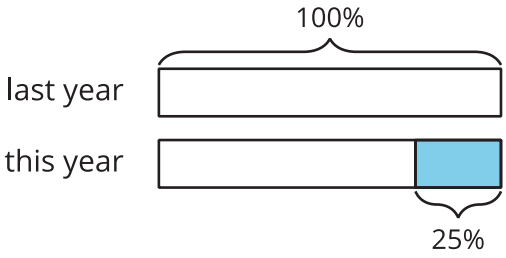
   c. Compared with last year, this year's peach harvest decreased 25%.

   d. This year's plum harvest is 125% of last year's plum harvest.

A



B



2. Draw a diagram to represent these situations.

   a. The number of ducks living at the pond increased by 40%.

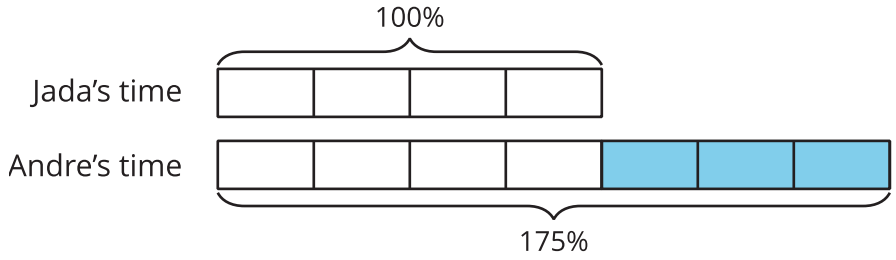
   b. The number of mosquitoes decreased by 80%.

Are you ready for more?

What could it mean to say there is a 100% decrease in a quantity? Give an example of a quantity where this makes sense.

Lesson 4 Summary

Imagine that it takes Andre $\frac{3}{4}$ more than the time it takes Jada to get to school. Then we know that Andre's time is $1\frac{3}{4}$, or 1.75, times Jada's time. We can also describe this in terms of percentages:

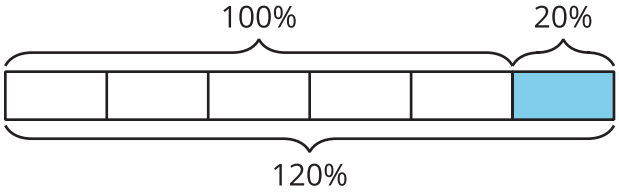


We say that Andre's time is 75% more than Jada's time. We can also see that Andre's time is 175% of Jada's time. In general, the terms **percent increase** and **percent decrease** describe an increase or decrease in a quantity as a percentage of the starting amount.

For example, if there were 500 grams of cereal in the original package, then "20% more" means that 20% of 500 grams has been added to the initial amount, $500 + (0.2) \cdot 500 = 600$, so there are 600 grams of cereal in the new package.



We can see that the new amount is 120% of the initial amount because $500 + (0.2) \cdot 500 = (1 + 0.2)500$.



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