LESSON MAKER PRO

Size Shift Sleuths

Tell how a factor changes a size without finding the product.

GRADE 5 · 5.NOS.D.14

5.NOS.D.14 "Interpret multiplication as scaling (sizing) in context. Compare the size of a product to the size of one factor based on the size of the other factor, without performing the indicated multiplication..."

NAME _____ DATE _____

COMPARE THE FACTOR

For a positive amount, a factor greater than 1 makes the product larger, and a factor less than 1 makes it smaller. A factor of 1 leaves the amount unchanged. Multiplying the top and bottom of a fraction by the same nonzero number is multiplying by 1, so the fraction's value stays the same.

WORKED EXAMPLE

A ribbon is 18 cm long. Its new length is 7/6 times as long. Without multiplying, is the new length greater or less than 18 cm?

1. 7/6 is greater than 1 because 7 is greater than 6.
2. A factor greater than 1 makes a positive length larger.

Answer: The new length is greater than 18 cm.

PRACTICE 6 problems

1 Write <, >, or = in the blank without multiplying: 12 × 2/3 ___ 12

ANSWER _____

2 Write <, >, or = in the blank without multiplying: 9 × 11/10 ___ 9

ANSWER _____

3 Write <, >, or = in the blank without multiplying: 15 × 1 ___ 15

ANSWER _____

4 Write <, >, or = in the blank without multiplying: 21 × 3 ___ 21

ANSWER _____

5 Without multiplying, compare 20 × 3/2 with 20. Explain why.

ANSWER _____

6 Without multiplying, compare 16 × 1/8 with 16. Explain why.

ANSWER _____

APPLY IT Show your work

1 A skatepark map shows a ramp as 32 mm long. Sam resizes the map so each length is 3/4 of its old length. Will the ramp look longer or shorter than 32 mm on the new map? Explain without finding the new length.

WORK SPACE

ANSWER _____

2 In a game, a character can jump 25 tiles. A power-up makes the jump 5/3 times as far. Will the new jump be farther or shorter than 25 tiles? Explain without multiplying.

WORK SPACE

ANSWER _____

CHALLENGE One step up

Maya says that changing 2/9 to 10/45 makes the fraction larger because both numbers grew. Explain why she is mistaken using multiplication by 1. Then compare 30 × 10/45 with 30 without finding the product.

WORK SPACE AND ANSWER

ANSWER KEY

Size Shift Sleuths

GRADE 5 · 5.NOS.D.14

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Write <, >, or = in the blank without multiplying: 12 × 2/3 ___ 12	**<**
2	Write <, >, or = in the blank without multiplying: 9 × 11/10 ___ 9	**>**
3	Write <, >, or = in the blank without multiplying: 15 × 1 ___ 15	**=**
4	Write <, >, or = in the blank without multiplying: 21 × 3 ___ 21	**>**
5	Without multiplying, compare 20 × 3/2 with 20. Explain why.	**20 × 3/2 is greater than 20 because 3/2 is greater than 1.**
6	Without multiplying, compare 16 × 1/8 with 16. Explain why.	**16 × 1/8 is less than 16 because 1/8 is less than 1.**

PART 2 · APPLY IT

1. **Shorter than 32 mm, because 3/4 is less than 1.** The scale factor 3/4 is less than 1, so the length decreases.
2. **Farther than 25 tiles, because 5/3 is greater than 1.** The scale factor 5/3 is greater than 1, so the jump distance increases.

CHALLENGE

10/45 = (2 × 5)/(9 × 5) = 2/9 × 5/5 = 2/9. Since 5/5 equals 1, the fraction did not change. Also, 30 × 10/45 is less than 30 because 10/45 is less than 1.

Accept equivalent comparisons in words or symbols. For explanations, look for a comparison of the scale factor with 1, not a calculated product.