LESSON MAKER PRO

Size It Up

Compare products without multiplying.

GRADE 5 · 5.NF.B.13

5.NF.B.13 "Interpret multiplication as scaling (resizing). a. Compare the size of a product to the size of one factor on the basis of the size of the other factor, without performing the indicated multiplication. b..."

NAME _____ DATE _____

MULTIPLICATION CAN RESIZE

Multiplying a number by a fraction greater than 1 makes it larger. Multiplying by a fraction less than 1 makes it smaller. To explain why, write the starting number as itself times a fraction equal to 1, then compare the fractions.

WORKED EXAMPLE

Without multiplying, compare $14 \times 7/8$ with 14.

1. Write 14 as $14 \times 8/8$, since $8/8 = 1$.
2. Compare the fractions: $7/8 < 8/8$.
3. So $14 \times 7/8 < 14 \times 8/8$.

Answer: $14 \times 7/8$ is less than 14.

PRACTICE 6 problems

1 Without multiplying, is $10 \times 2/3$ greater than, less than, or equal to 10?

ANSWER _____

2 Without multiplying, is $15 \times 4/3$ greater than, less than, or equal to 15?

ANSWER _____

3 Without multiplying, is $18 \times 11/11$ greater than, less than, or equal to 18?

ANSWER _____

4 Without multiplying, compare $21 \times 5/4$ with 21. Explain your choice using a fraction equal to 1.

ANSWER _____

_____

5 Without multiplying, compare $16 \times 3/10$ with 16. Explain your choice using a fraction equal to 1.

ANSWER _____

_____

6 Fill in the blank with a whole number so that $24 \times ___/9$ is greater than 24. Give one possible answer.

ANSWER _____

APPLY IT Show your work

1 A student makes a 30-second video. An extended cut is 5/3 as long as the original. Without finding the extended cut's length, is it longer or shorter than 30 seconds? Explain using a fraction equal to 1.

WORK SPACE

ANSWER _____

2 A music club's first playlist is 32 minutes long. Its second playlist is 3/4 as long. Without finding the second playlist's length, is it shorter or longer than 32 minutes? Explain using a fraction equal to 1.

WORK SPACE

ANSWER _____

CHALLENGE One step up

Two players each begin with 36 points. One player's score is scaled by 4/3, and the other's by 5/4. Whose new score is greater? Explain using equivalent fractions, without finding either new score.

WORK SPACE AND ANSWER

ANSWER KEY # Size It Up

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Without multiplying, is 10 × 2/3 greater than, less than, or equal to 10?	**Less than 10.**
2	Without multiplying, is 15 × 4/3 greater than, less than, or equal to 15?	**Greater than 15.**
3	Without multiplying, is 18 × 11/11 greater than, less than, or equal to 18?	**Equal to 18.**
4	Without multiplying, compare 21 × 5/4 with 21. Explain your choice using a fraction equal to 1.	**21 × 5/4 is greater than 21. Write 21 as 21 × 4/4; since 5/4 > 4/4, the product is greater.**
5	Without multiplying, compare 16 × 3/10 with 16. Explain your choice using a fraction equal to 1.	**16 × 3/10 is less than 16. Write 16 as 16 × 10/10; since 3/10 < 10/10, the product is less.**
6	Fill in the blank with a whole number so that 24 × ___/9 is greater than 24. Give one possible answer.	**10. Any whole number greater than 9 works.**

PART 2 · APPLY IT

1. **Longer. Since 5/3 > 3/3, multiplying 30 by 5/3 gives more than multiplying 30 by 3/3.** Write 30 as 30 × 3/3. Compare 5/3 with 3/3.
2. **Shorter. Since 3/4 < 4/4, multiplying 32 by 3/4 gives less than multiplying 32 by 4/4.** Write 32 as 32 × 4/4. Compare 3/4 with 4/4.

CHALLENGE

The player whose score is scaled by 4/3 has more points. Since 4/3 = 16/12 and 5/4 = 15/12, 4/3 is the larger scale factor. Both players started with 36 points.

Accept equivalent explanations that compare each scale factor with 1. For the challenge, students may use any valid common denominator without calculating the new scores.