ALBERT

Name _____ Date _____

Multiplication as Scaling Worksheet

Grade 5 · Common Core 5.NF.B.5

> Interpret multiplication as scaling (resizing), by: (a) Comparing 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) Explaining why multiplying a given number by a fraction greater than 1 results in a product greater than the given number (recognizing multiplication by whole numbers greater than 1 as a familiar case); explaining why multiplying a given number by a fraction less than 1 results in a product smaller than the given number; and relating the principle of fraction equivalence a/b = (n × a)/(n × b) to the effect of multiplying a/b by 1.

Practice

Builds the skill step by step.

1. Without multiplying, how does $\frac{3}{4} \times 12$ compare to 12?
   A. It is less than 12.
   B. It is equal to 12.
   C. It is greater than 12.
   D. There is no way to tell without multiplying.

2. Without multiplying, how does $\frac{5}{4} \times 8$ compare to 8?
   A. It is less than 8.
   B. It is equal to 8.
   C. It is greater than 8.
   D. There is no way to tell without multiplying.

3. Without multiplying, how does $\frac{4}{4} \times 9$ compare to 9?
   A. It is less than 9.
   B. It is equal to 9.
   C. It is greater than 9.
   D. There is no way to tell without multiplying.

4. Which product is greater than 15?

   A. $\frac{2}{3} \times 15$

   B. $\frac{1}{2} \times 15$

   C. $\frac{7}{5} \times 15$

   D. $\frac{9}{10} \times 15$

5. Which product is less than 20?

   A. $\frac{3}{2} \times 20$

   B. $\frac{3}{8} \times 20$

   C. $\frac{5}{5} \times 20$

   D. $\frac{4}{3} \times 20$

6. $\frac{3}{3} \times 7 = ?$

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7. When you multiply a whole number greater than 0 by a fraction less than 1, the product is

   A. less than the whole number.

   B. equal to the whole number.

   C. greater than the whole number.

   D. always less than 1.

8. Which fraction makes the product greater than 10 when it is multiplied by 10?

   A. $\frac{1}{3}$

   B. $\frac{5}{6}$

   C. $\frac{8}{9}$

   D. $\frac{6}{5}$

9. $\frac{1}{2} \times 30 = ?$

10. Without multiplying, which is greater: $\frac{2}{3} \times 45$ or 45?

    A. $\frac{2}{3} \times 45$

    B. 45

    C. They are equal.

    D. There is no way to tell without multiplying.

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On Level

Grade-level practice.

1. Without multiplying, which list is in order from least to greatest?

   A. $24, \frac{1}{2} \times 24, \frac{3}{2} \times 24$

   B. $\frac{1}{2} \times 24, \frac{3}{2} \times 24, 24$

   C. $\frac{1}{2} \times 24, 24, \frac{3}{2} \times 24$

   D. $\frac{3}{2} \times 24, 24, \frac{1}{2} \times 24$

2. Without multiplying, how does $\frac{7}{8} \times \frac{5}{6}$ compare to $\frac{5}{6}$?

   A. It is less than $\frac{5}{6}$.

   B. It is equal to $\frac{5}{6}$.

   C. It is greater than $\frac{5}{6}$.

   D. There is no way to tell without multiplying.

3. Without multiplying, how does $\frac{9}{7} \times \frac{2}{3}$ compare to $\frac{2}{3}$?

   A. It is less than $\frac{2}{3}$.

   B. It is equal to $\frac{2}{3}$.

   C. It is greater than $\frac{2}{3}$.

   D. There is no way to tell without multiplying.

4. Ella multiplied $\frac{3}{5}$ by a fraction equal to 1 and got $\frac{12}{20}$. Which fraction did she use?

   A. $\frac{4}{5}$

   B. $\frac{4}{4}$

   C. $\frac{3}{3}$

   D. $\frac{5}{4}$

5. Every amount in a recipe is multiplied by $2\frac{1}{2}$. Compared to the original amounts, the new amounts are

   A. smaller.

   B. the same.

   C. larger.

   D. half as much.

6. Maria's dog weighs $\frac{3}{4}$ as much as Jake's dog. Jake's dog weighs 48 pounds. Without computing, which statement is true?

   A. Maria's dog weighs less than 48 pounds.

   B. Maria's dog weighs more than 48 pounds.

   C. Both dogs weigh the same.

   D. Maria's dog weighs $\frac{3}{4}$ pound.

7. A photo is 6 inches wide. It is enlarged so the new width is $\frac{3}{2}$ times the old width. How wide is the new photo?

8. Which expression has a value less than $\frac{4}{5}$?

   A. $\frac{4}{5} \times \frac{6}{5}$

   B. $\frac{4}{5} \times 1$

   C. $\frac{4}{5} \times \frac{2}{3}$

   D. $\frac{4}{5} \times \frac{7}{7}$

9. A drawing is shrunk so every length is $\frac{1}{4}$ of its old length. A road was 20 inches long on the old drawing. How long is it on the new drawing?

10. Without multiplying, which product is greatest?

    A. $\frac{6}{6} \times 30$

    B. $\frac{1}{6} \times 30$

    C. $\frac{5}{6} \times 30$

    D. $\frac{6}{5} \times 30$

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Challenge

Multi-step and word problems that stretch it.

1. Ben says $\frac{11}{10} \times 50$ is less than 50 because $\frac{11}{10}$ is close to 1. Which response is correct?

   A. He is wrong. The product is exactly 50.

   B. He is right. Any fraction makes a number smaller.

   C. He is right. $\frac{11}{10}$ is less than 1.

   D. He is wrong. $\frac{11}{10}$ is greater than 1, so the product is greater than 50.

2. Without multiplying, which statement about $\frac{3}{4} \times \frac{5}{3}$ is true?

   A. It is greater than $\frac{5}{3}$.

   B. It is less than $\frac{5}{3}$.

   C. It is less than $\frac{3}{4}$.

   D. It is equal to $\frac{3}{4}$.

3. A rectangle is 12 cm long and 8 cm wide. Both side lengths are multiplied by $\frac{3}{4}$. What are the new length and width?

4. Which number could be k if $k \times 24$ is between 12 and 24?

   A. $\frac{1}{4}$

   B. $\frac{3}{8}$

   C. $\frac{2}{3}$

   D. $\frac{5}{4}$

5. Which explains why $\frac{2}{3} = \frac{10}{15}$?

   A. $2 + 8 = 10$ and $3 + 12 = 15$.

   B. $\frac{10}{15}$ has bigger numbers, so it is greater.

   C. $\frac{2}{3} \times \frac{5}{5} = \frac{10}{15}$, and $\frac{5}{5} = 1$.

   D. $\frac{2}{3} \times 5 = \frac{10}{15}$.

6. A plant is 18 cm tall. A second plant is $1\frac{1}{3}$ times as tall. How tall is the second plant?

7. Tara multiplies 40 by a fraction and gets 25. Which fraction did she use?

   A. $\frac{3}{8}$

   B. $\frac{8}{5}$

   C. $\frac{5}{8}$

   D. $\frac{5}{4}$

8. Without computing, which list is in order from least to greatest?

   A. $\frac{6}{6} \times 7$, $\frac{5}{6} \times 7$, $\frac{9}{8} \times 7$

   B. $\frac{5}{6} \times 7$, $\frac{6}{6} \times 7$, $\frac{9}{8} \times 7$

   C. $\frac{9}{8} \times 7$, $\frac{6}{6} \times 7$, $\frac{5}{6} \times 7$

   D. $\frac{5}{6} \times 7$, $\frac{9}{8} \times 7$, $\frac{6}{6} \times 7$

9. A recipe uses 4 cups of flour. Jen makes $\frac{3}{4}$ of the recipe. Lee makes $1\frac{1}{2}$ times the recipe. How many more cups of flour does Lee use than Jen?

10. a is a whole number greater than 0, b is a fraction greater than 1, and a × b = c. Which must be true?

    A. c is less than b.

    B. c is equal to a.

    C. c is less than a.

    D. c is greater than a.