

# Multiplication as Scaling (Resizing)

Grade 5 Math • Section 5.5

Name: \_\_\_\_\_

Date: \_\_\_\_\_

Score: \_\_\_\_\_ / 14

## Quick Review and Helpful Hints

**Key concept:** Multiplying by a fraction scales (resizes) the other number:

- Factor  $> 1 \Rightarrow$  product is **larger** than the original.
- Factor  $= 1 \Rightarrow$  product is **equal** to the original.
- Factor  $< 1 \Rightarrow$  product is **smaller** than the original.

**Lightbulb:** You can compare without computing:  $\frac{3}{4} \times 12$  is less than 12 because  $\frac{3}{4} < 1$ .

**Example:** Without computing, decide: is  $\frac{5}{3} \times 18$  greater than, less than, or equal to 18?

**Lightbulb:** Since  $\frac{5}{3} > 1$ , multiplying 18 by  $\frac{5}{3}$  makes the result larger than 18.

**Lightbulb Answer:** Greater than 18

## Practice Problems

Without calculating, write  $<$ ,  $>$ , or  $=$  to compare.

1.  $\frac{2}{3} \times 15 \bigcirc 15$  \_\_\_\_\_

7.  $1\frac{1}{3} \times 6 \bigcirc 6$  \_\_\_\_\_

2.  $\frac{7}{7} \times 8 \bigcirc 8$  \_\_\_\_\_

8.  $\frac{3}{4} \times 100 \bigcirc 100$  \_\_\_\_\_

3.  $\frac{5}{4} \times 20 \bigcirc 20$  \_\_\_\_\_

9.  $\frac{6}{6} \times 45 \bigcirc 45$  \_\_\_\_\_

4.  $\frac{1}{2} \times 36 \bigcirc 36$  \_\_\_\_\_

10.  $\frac{11}{10} \times 50 \bigcirc 50$  \_\_\_\_\_

5.  $\frac{9}{8} \times 24 \bigcirc 24$  \_\_\_\_\_

11.  $\frac{3}{8} \times 16 \bigcirc 16$  \_\_\_\_\_

6.  $\frac{4}{5} \times 10 \bigcirc 10$  \_\_\_\_\_

12.  $2\frac{1}{5} \times 9 \bigcirc 9$  \_\_\_\_\_

## Word Problems

13. A garden produces 24 pounds of tomatoes. This year the gardener expects  $\frac{5}{6}$  of last year's harvest. Without computing, will this year's harvest be more or less than 24 pounds? Explain.

\_\_\_\_\_

14. A bottle holds  $\frac{3}{2}$  times as much water as a cup that holds 8 ounces. Does the bottle hold more or less than 8 ounces? Find the exact amount.

\_\_\_\_\_



## Answer Keys

1.  <
2.  =
3.  >
4.  <
5.  >
6.  <
7.  >

8.  <
9.  =
10.  >
11.  <
12.  >
13.
14.

### Step-by-Step Explanations

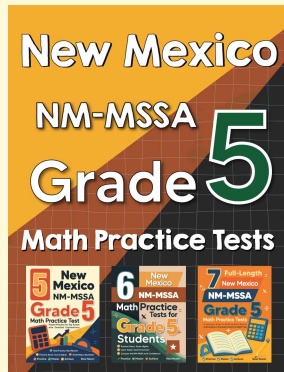
1. Start with the main idea. For multiplication as scaling (resizing), multiplying by a factor less than 1 makes the number smaller. A factor less than 1 shrinks the amount, while a factor greater than 1 stretches it.
2. Keep the work tidy. For multiplication as scaling (resizing), multiplying by 1 keeps the number the same. Before multiplying, decide whether the answer should be smaller, equal, or larger.
3. Look at what the numbers mean. For multiplication as scaling (resizing), multiplying by a factor greater than 1 makes the number larger. The comparison symbol should agree with the size of the scale factor.
4. Use the setup first. For multiplication as scaling (resizing), multiplying by a factor less than 1 makes the number smaller. A factor less than 1 shrinks the amount, while a factor greater than 1 stretches it.
5. Check the size of the answer. For multiplication as scaling (resizing), multiplying by a factor greater than 1 makes the number larger. Before multiplying, decide whether the answer should be smaller, equal, or larger.
6. Match the operation to the words. For multiplication as scaling (resizing), multiplying by a factor less than 1 makes the number smaller. The comparison symbol should agree with the size of the scale factor.
7. Write the important values first. For multiplication as scaling (resizing), multiplying by a factor greater than 1 makes the number larger. A factor less than 1 shrinks the amount, while a factor greater than 1 stretches it.

8. Follow the pattern carefully. For multiplication as scaling (resizing), multiplying by a factor less than 1 makes the number smaller. Before multiplying, decide whether the answer should be smaller, equal, or larger.
9. Start with the main idea. For multiplication as scaling (resizing), multiplying by 1 keeps the number the same. The comparison symbol should agree with the size of the scale factor.
10. Keep the work tidy. For multiplication as scaling (resizing), multiplying by a factor greater than 1 makes the number larger. A factor less than 1 shrinks the amount, while a factor greater than 1 stretches it.
11. Look at what the numbers mean. For multiplication as scaling (resizing), multiplying by a factor less than 1 makes the number smaller. Before multiplying, decide whether the answer should be smaller, equal, or larger.
12. Use the setup first. For multiplication as scaling (resizing), multiplying by a factor greater than 1 makes the number larger. The comparison symbol should agree with the size of the scale factor.
13. Check the size of the answer. For multiplication as scaling (resizing), the scale factor  $\frac{5}{6}$  is less than 1, so the harvest will be less than 24 pounds. A factor less than 1 shrinks the amount, while a factor greater than 1 stretches it.
14. Match the operation to the words. For multiplication as scaling (resizing),  $\frac{3}{2} > 1$ , so the bottle holds more;  $\frac{3}{2} \times 8 = 12$  ounces. Before multiplying, decide whether the answer should be smaller, equal, or larger.



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