Essential Question How Can You Use Arrays to Find the Factor Pairs of a Number?

A

The music director is trying to find the best way to arrange the chairs for a performance. The chairs must be arranged in a rectangular array. How many different ways can the chairs be arranged into a rectangular array? Use grids to show all the ways the chairs can be arranged.

Pairs of whole numbers multiplied together to find a product are called factor pairs. Think about multiplication to decompose a number into its factors.
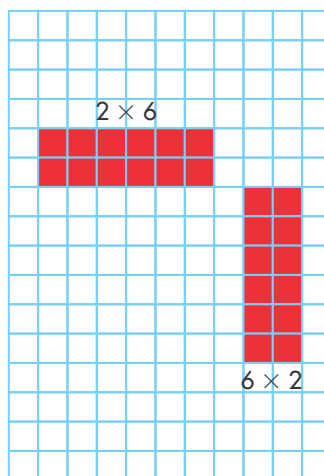
12 chairs

B
1 row of 12 chairs
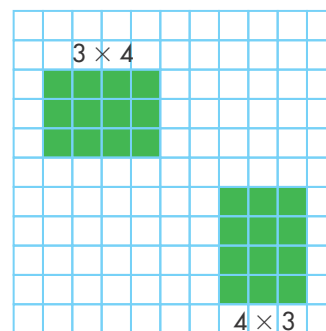12 rows of 1 chair

1×12

12×1
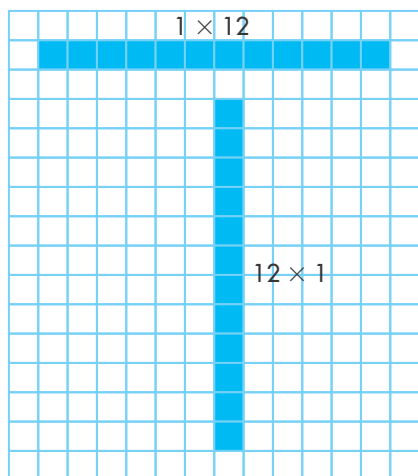
1 and 12 are a factor pair.

C
2 rows of 6 chairs
6 rows of 2 chairs

2×6

6×2

2 and 6 are a factor pair.

D
3 rows of 4 chairs
4 rows of 3 chairs

3×4

4×3

3 and 4 are a factor pair.

There are 6 possible ways the 12 chairs can be arranged.

Convince Me! **Critique Reasoning** Blake says, "Greater numbers will always have more factors." Do you agree? Explain.

Name _____

☆ Guided Practice

Do You Understand?

1. How are the lengths of the sides of the arrays shown on the grids on the previous page related to the factors of 12?

2. What are the lengths of the sides of the arrays that show how 5 chairs can be arranged?

Do You Know How?

For **3–4**, find all of the factor pairs for each number. You can use grids to help.

3. 6

4. 16

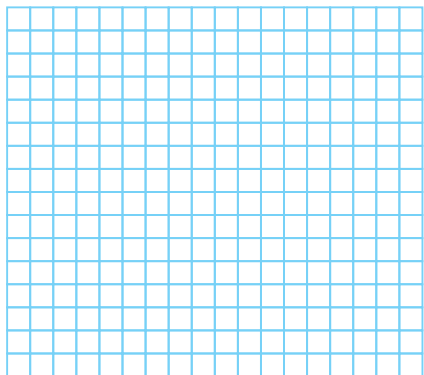For **5–6**, find the factors of each number.
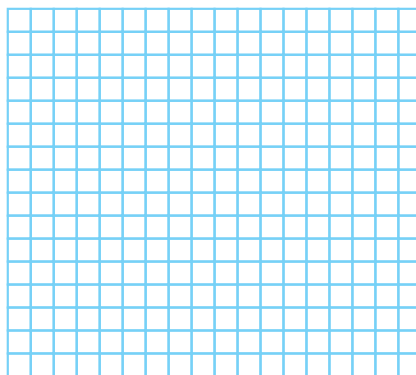
5. 45

6. 30

Independent Practice ☆

For **7–8**, use the grids to find all the possible arrays for each number. Use the arrays to help write the factors.

7. 9

8. 14

For **9–14**, use grids to find the factor pair or pairs for each number.
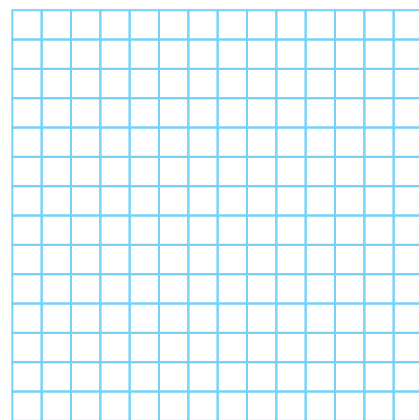
9. 5

10. 25

11. 8

12. 36

13. 23

14. 27

Problem Solving

15. Reasoning Use the grid to find two numbers that have 2 and 3 as factors.

Draw arrays with side lengths that have 2 and 3 as factors.

16. The dwarf planet Pluto takes about 90,403 days to orbit the sun. Write this number in expanded form and using number names.

17. David makes 17 dollars in an hour and works 25 hours each week. Linda makes 25 dollars in an hour and works 17 hours each week. How much do David and Linda make together each week? What property of multiplication does this represent?

18. What do you notice about the number of possible arrays and the number of factors of 22?

19. **Higher Order Thinking** Jane says 5 is a factor of every whole number that has a 5 in the ones place. Fred says 5 is a factor of every whole number that has a 0 in the ones place. Who is correct? Explain.

☑ Assessment Practice

20. Which of the following are factors of both 18 and 42? Select all that apply.

   ☐ 1
   ☐ 3
   ☐ 4
   ☐ 6
   ☐ 14

21. Which of the numbers below have 2, 3, and 4 as factors? Select all that apply.

   ☐ 86
   ☐ 72
   ☐ 36
   ☐ 32
   ☐ 24