Name _____

Factors and Divisibility

Essential Question How can you tell whether one number is a factor of another number?

Common Core **Operations and Algebraic Thinking—4.OA.B.4**

MATHEMATICAL PRACTICES
MP2, MP4, MP6

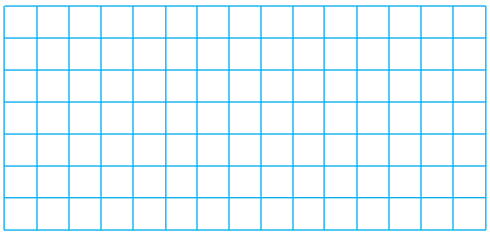
Unlock the Problem Real World

Students in Carlo's art class painted 32 square tiles for a mosaic. They will arrange the tiles to make a rectangle. Can the rectangle have 32 tiles arranged into 3 equal rows, without gaps or overlaps?

▲ Mosaics are decorative patterns made with pieces of glass or other materials.

One Way Draw a model.

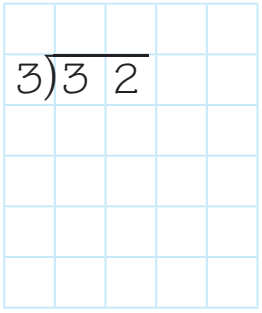
Think: Try to arrange the tiles into 3 equal rows to make a rectangle.



A rectangle _____ have 32 tiles arranged into 3 equal rows.

Another Way Use division.

If 3 is a factor of 32, then the unknown factor in $3 \times \square = 32$ is a whole number.



Think: Divide to see whether the unknown factor is a whole number.

The unknown factor in $3 \times \square = 32$ _____ a whole number.

So, a rectangle _____ have 32 tiles arranged in 3 rows.

Math Idea

A factor of a number divides the number evenly. This means the quotient is a whole number and the remainder is 0.

- Explain how you can tell if 4 is a factor of 30.

_____

_____

Math Talk MATHEMATICAL PRACTICES 4

Interpret a Result How does the model relate to the quotient and remainder for 32 ÷ 3?

Divisibility Rules A number is **divisible** by another number if the quotient is a counting number and the remainder is 0.

Some numbers have a divisibility rule. You can use a divisibility rule to tell whether one number is a factor of another.

Is 6 a factor of 72?

Think: If 72 is divisible by 6, then 6 is a factor of 72.

Test for divisibility by 6:

Is 72 even? _____

What is the sum of the digits of 72?

_____ + _____ = _____

Is the sum of the digits divisible by 3?

_____

72 is divisible by _____.

So, 6 is a factor of 72.

Divisibility Rules

Number	Divisibility Rule
2	The number is even.
3	The sum of the digits is divisible by 3.
5	The last digit is 0 or 5.
6	The number is even and divisible by 3.
9	The sum of the digits is divisible by 9.

Try This! **List all the factor pairs for 72 in the table.**

Complete the table.

Factors of 72	
1 × 72 = 72	1, 72
_____ × _____ = _____	_____, _____
_____ × _____ = _____	_____, _____
_____ × _____ = _____	_____, _____
_____ × _____ = _____	_____, _____
_____ × _____ = _____	_____, _____

Show your work.

Math Talk

MATHEMATICAL PRACTICES 7

Identify Relationships How are divisibility and factors related? Explain.

- How did you check if 7 is a factor of 72? Explain.

_____

_____

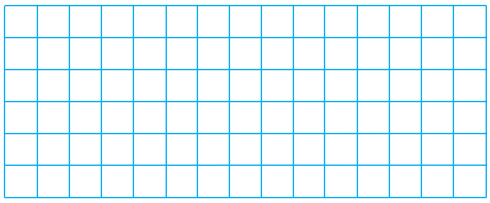
Name _____

Share and Show

MATH BOARD

1. Is 4 a factor of 28? Draw a model to help.

Think: Can you make a rectangle with 28 squares in 4 equal rows?



4 _____ a factor of 28.

Math Talk

MATHEMATICAL PRACTICES 3

Use Counterexamples If 3 is a factor of a number, is 6 always a factor of the number? If not, give an example.

Is 5 a factor of the number? Write *yes* or *no*.

2. 27 _____

3. 30 _____

4. 36 _____

5. 53 _____

On Your Own

Is 9 a factor of the number? Write *yes* or *no*.

6. 54 _____

7. 63 _____

8. 67 _____

9. 93 _____

List all the factor pairs in the table.

10.

Factors of 24	
____ × ____ = ____	____, ____
____ × ____ = ____	____, ____
____ × ____ = ____	____, ____
____ × ____ = ____	____, ____

11.

Factors of 39	
____ × ____ = ____	____, ____
____ × ____ = ____	____, ____

Practice: Copy and Solve **List all the factor pairs for the number. Make a table to help.**

12. 56

13. 64

Problem Solving • Applications

Real World

Use the table to solve 14–15.

Math on the Spot

Stamps Sets	
Country	**Number of stamps**
Germany	90
Sweden	78
Japan	63
Canada	25

14. THINK SMARTER Dirk bought a set of stamps. The number of stamps in the set he bought is divisible by 2, 3, 5, 6, and 9. Which set is it?

_____

15. GO DEEPER Geri wants to put 6 stamps on some pages in her stamp book and 9 stamps on other pages. Explain how she could do this with the stamp set for Sweden.

_____

_____

_____

_____

WRITE Math
Show Your Work

16. MATHEMATICAL PRACTICE 3 **Use Counterexamples** George said if 2 and 4 are factors of a number, then 8 is a factor of the number. Is he correct? Explain.

_____

_____

_____

17. THINK SMARTER Classify the numbers. Some numbers may belong in more than one box.

27 45 54 72 81 84

Divisible by 5 and 9	Divisible by 3 and 9	Divisible by 2 and 6

Name _____

Factors and Divisibility

Common Core **COMMON CORE STANDARD—4.OA.B.4**
Gain familiarity with factors and multiples.

Is 6 a factor of the number? Write *yes* or *no*.

1. 36

Think: $6 \times 6 = 36$

yes

2. 56 _____

3. 42 _____

4. 66 _____

Is 5 a factor of the number? Write *yes* or *no*.

5. 38 _____

6. 45 _____

7. 60 _____

8. 39 _____

List all the factor pairs in the table.

9.

Factors of 12	
____ × ____ = ____	____, ____
____ × ____ = ____	____, ____
____ × ____ = ____	____, ____

10.

Factors of 25	
____ × ____ = ____	____, ____
____ × ____ = ____	____, ____

11. List all the factor pairs for 48. Make a table to help.

_____

_____

Problem Solving Real World

12. Bryson buys a bag of 64 plastic miniature dinosaurs. Could he distribute them equally into six storage containers and not have any left over? **Explain**.

_____

13. WRITE Math Find the factors of 42. Show and explain your work, and list the factor pairs in a table.

_____

Lesson Check (4.OA.B.4)

1. Write three numbers greater than 20 that have 9 as a factor.

2. What digit(s) can be in the ones place of a number that has 5 as a factor?

Spiral Review (4.NBT.B.4, 4.NBT.B.5)

3. Write an expression that can be used to find 4×275 using mental math and properties of numbers.

4. Jack broke apart 5×216 as $(5 \times 200) + (5 \times 16)$ to multiply mentally. What strategy did Jack use?

5. Jordan has $55. She earns $67 by doing chores. How much money does Jordan have now?

6. Trina has 72 collector's stamps. She puts 43 of the stamps into a stamp book. How many stamps are left?

FOR MORE PRACTICE GO TO THE Personal Math Trainer