

Name _____

Prime and Composite Numbers

Essential Question How can you tell whether a number is prime or composite?



Operations and Algebraic Thinking—4.OA.B.4

MATHEMATICAL PRACTICES
MP4, MP6, MP7

Unlock the Problem

Students are arranging square tables to make one larger, rectangular table. The students want to have several ways to arrange the tables. Should they use 12 or 13 tables?

Use a grid to show all the possible arrangements of 12 and 13 tables.

Draw all of the possible arrangements of 12 tables and 13 tables. Label each drawing with the factors modeled.

A large grid for drawing arrangements. A pencil icon is at the top left. A rectangle is drawn, spanning 1 row and 12 columns, with the label 1×12 centered below it.

• What are the factors of 12?

ERROR Alert
The same factors in a different order should be counted only once. For example, 3×4 and 4×3 are the same factor pair.

MATHEMATICAL PRACTICES 6
Make Connections Explain how knowing whether 12 and 13 are prime or composite could have helped you solve the problem above.

So, there are more ways to arrange _____ tables.

- A **prime number** is a whole number greater than 1 that has exactly two factors, 1 and itself.
- A **composite number** is a whole number greater than 1 that has more than two factors.

Factors of 12: _____, _____, _____, _____, _____, _____

Factors of 13: _____, _____

12 is a _____ number, and 13 is a _____ number.

Divisibility You can use divisibility rules to help tell whether a number is prime or composite. If a number is divisible by any number other than 1 and itself, then the number is composite.

 Tell whether 51 is *prime* or *composite*.

Is 51 divisible by 2?

Is 51 divisible by 3?

Think: 51 is divisible by a number other than 1 and 51.
51 has more than two factors.

So, 51 is _____.

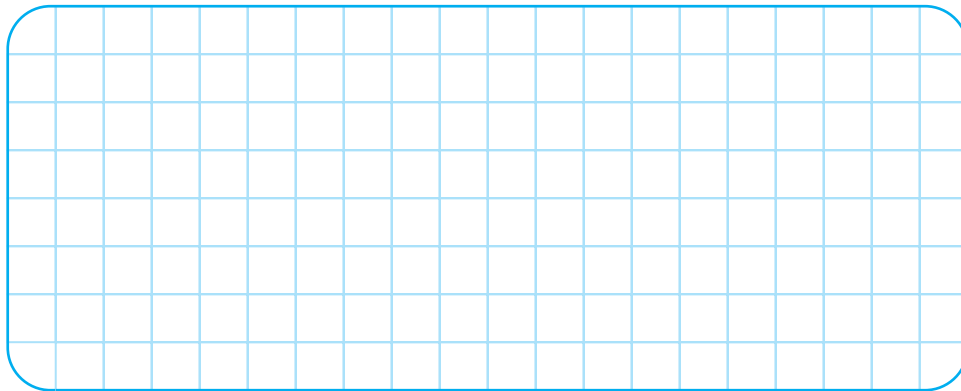
Math Idea

The number 1 is neither prime nor composite, since it has only one factor: 1.

Share and Show



1. Use the grid to model the factors of 18. Tell whether 18 is *prime* or *composite*.



Factors of 18: _____, _____, _____, _____, _____, _____

Think: 18 has more than two factors.

So, 18 is _____.

Tell whether the number is *prime* or *composite*.

2. 11

Think: Does 11 have other factors besides 1 and itself?

3. 73

 4. 69

 5. 42

Math Talk

MATHEMATICAL PRACTICES 7

Look for Structure Is the product of two prime numbers prime or composite? Explain.

Name _____

On Your Own

Tell whether the number is *prime* or *composite*.

6. 18

7. 49

8. 29

9. 64

10. 33

11. 89

12. 52

13. 76

Write *true* or *false* for each statement. Explain or give an example to support your answer.

14. **GO DEEPER** Only odd numbers are prime numbers.

15. **THINK SMARTER** A composite number cannot have three factors.



Problem Solving • Applications



16. **GO DEEPER** I am a number between 60 and 100. My ones digit is two less than my tens digit. I am a prime number. What number am I?

17. Name a 2-digit odd number that is prime. Name a 2-digit odd number that is composite.

18. **THINK SMARTER** Choose the words that correctly complete the sentence.

The number 9 is

prime
composite

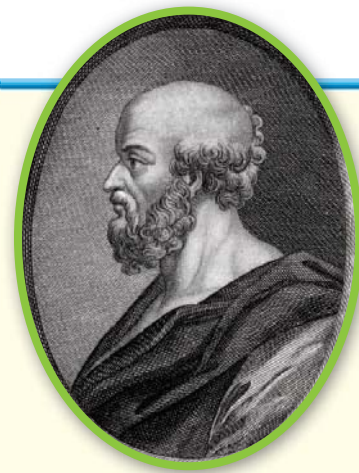
 because it has

exactly
more than

 two factors.

The Sieve of Eratosthenes

Eratosthenes was a Greek mathematician who lived more than 2,200 years ago. He invented a method of finding prime numbers, which is now called the Sieve of Eratosthenes.



19. Follow the steps below to circle all prime numbers less than 100. Then list the prime numbers.

STEP 1

Cross out 1, since 1 is not prime

STEP 2

Circle 2, since it is prime. Cross out all other multiples of 2.

STEP 3

Circle the next number that is not crossed out. This number is prime. Cross out all the multiples of this number.

STEP 4

Repeat Step 3 until every number is either circled or crossed out.

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

So, the prime numbers less than 100 are

20. **MATHEMATICAL PRACTICE 6** Explain why the multiples of any number other than 1 are not prime numbers.

Name _____

Prime and Composite Numbers



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

Tell whether the number is *prime* or *composite*.

1. 47

2. 68

3. 52

Think: Does 47 have other factors besides 1 and itself?

prime

4. 63

5. 75

6. 31

7. 77

8. 59

9. 87

Problem Solving



10. Kai wrote the number 85 on the board. Is 85 prime or composite? **Explain.**

11. Lisa says that 43 is a 2-digit odd number that is composite. Is she correct? **Explain.**

12. **WRITE** *Math* Describe how to decide if 94 is a prime number or composite number.

Lesson Check (4.OA.B.4)

1. Is the number 5 prime, composite, or neither?
2. Is the number 1 prime, composite, or neither?

Spiral Review (4.OA.A.3, 4.NBT.A.2, 4.NBT.A.3, 4.NBT.B.6)

3. A recipe for a vegetable dish contains a total of 924 calories. The dish serves 6 people. How many calories are in each serving?
4. A store clerk has 45 shirts to pack in boxes. Each box holds 6 shirts. What is the fewest boxes the clerk will need to pack all the shirts?

5. A total of 152,909 people visited a national park during one weekend. What is this number rounded to the nearest hundred thousand?
6. What is the word form of the number 602,107?

