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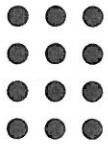
STUDY LINK 1·2

More Array Play

A **rectangular array** is an arrangement of objects in rows and columns. Each row has the same number of objects, and each column has the same number of objects. We can write a multiplication number model to describe a rectangular array.



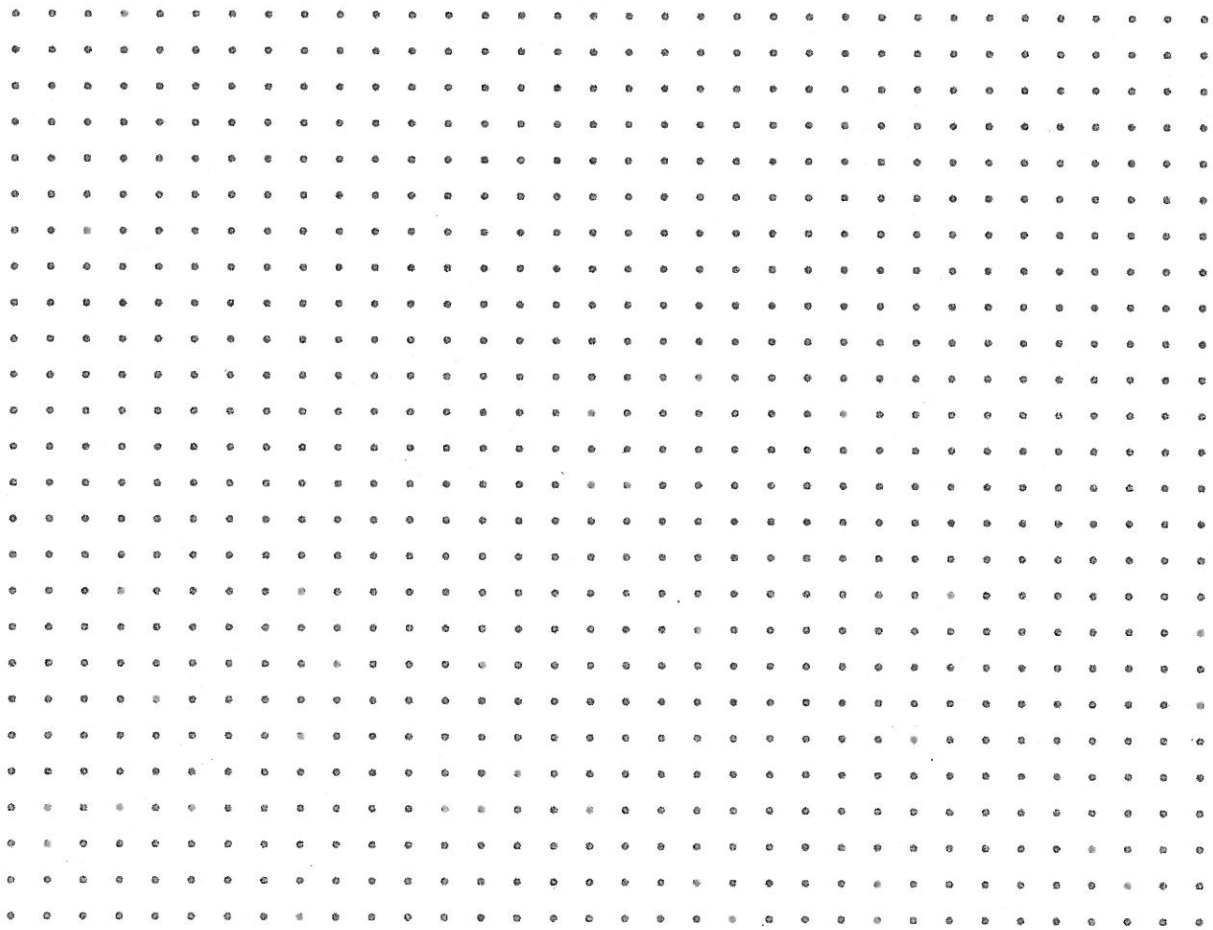
$4 * 3 = 12$

For each number below, use pennies or counters to make as many different arrays as possible. Draw each array on the grid with dots. Write the number model next to each array.

1. 5

2. 14

3. 18



Practice

4. $487 + 308 =$ _____

5. $679 - 408 =$ _____

6. $14 * 7 =$ _____

7. $164 * 6 =$ _____

8. $45 \div 9 =$ _____

There's more on the other side. >

Name Date Time

STUDY LINK 1·3

Number Models for Arrays

Complete the chart. You will need to find each missing part and write it in the correct space.

	Array	Number Model	Factors	Product
1		6 * 4 = _____	6, 4	
2			2, 12	
3		3 * 8 = _____		
4			1, 15	
5				15
6				5

Reminder: Look for examples of arrays and bring them to school.

Practice

7. 12 / 3 = _____

8. 1,288 + 2,631 = _____

9. 307 * 9 = _____

10. 306 − 147 = _____

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STUDY LINK 1•4

Factors

To find the factors of a number, ask yourself: *Is 1 a factor of the number? Is 2 a factor? Is 3 a factor?* Continue with larger numbers. For example, to find all the factors of 15, ask yourself these questions.

	Yes/No	Number Sentence	Factor Pair
Is 1 a factor of 15?	*Yes*	*1 * 15 = 15*	*1, 15*
Is 2 a factor of 15?	*No*		
Is 3 a factor of 15?	*Yes*	*3 * 5 = 15*	*3, 5*
Is 4 a factor of 15?	*No*		

1. You don't need to go any further. Can you tell why?

So the factors of 15 are 1, 3, 5, and 15.

List as many factors as you can for each of the numbers below.

2. 25 _____

3. 28 _____

4. 42 _____

5. 100 _____

Practice

6. 8,417 + 1,134 = _____

7. 73 − 25 = _____

8. 6,924 * 6 = _____

9. 634 − 193 = _____

10. 56 / 8 = _____

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STUDY LINK 1•5

Divisibility Rules

- All even numbers are divisible by 2.
- A number is divisible by 3 if the sum of its digits is divisible by 3.
- A number is divisible by 6 if it is divisible by both 2 and 3.
- A number is divisible by 9 if the sum of its digits is divisible by 9.
- A number is divisible by 5 if it ends in 0 or 5.
- A number is divisible by 10 if it ends in 0.

1. Use divisibility rules to test whether each number is divisible by 2, 3, 5, 6, 9, or 10.

Number	Divisible...					
	by 2?	by 3?	by 6?	by 9?	by 5?	by 10?
998,876						
5,890						
36,540						
33,015						
1,098						

A number is divisible by 4 if the tens and ones digits form a number that is divisible by 4.

Example: 47,**836** is divisible by 4 because 36 is divisible by 4.

It isn't always easy to tell whether the last two digits form a number that is divisible by 4. A quick way to check is to divide the number by 2 and then divide the result by 2. It's the same as dividing by 4, but is easier to do mentally.

Example: 5,**384** is divisible by 4 because 84 / 2 = 42 and 42 / 2 = 21.

2. Place a star next to any number in the table that is divisible by 4.

Practice

3. 250 * 7 = _____

4. 1,931 + 4,763 + 2,059 = _____

5. (20 + 30) * 5 = _____

6. 78 ÷ 6 = _____

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STUDY LINK 1•6

Prime and Composite Numbers

A **prime number** is a whole number that has exactly two factors—1 and the number itself. A **composite number** is a whole number that has more than two factors.

For each number:

- List all of its factors.
- Write whether the number is prime or composite.
- Circle all of the factors that are prime numbers.

Number		Factors	Prime or Composite?
1	11		
2	18		
3	24		
4	28		
5	36		
6	49		
7	50		
8	70		
9	100		

Practice

10. 4,065 + 2,803 + 2,954 = _____

11. 392 − 158 = _____

12. 1,532 * 14 = _____

13. 39 / 4 → _____

14. 48 * 15 = _____

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STUDY LINK 1•7

Exploring Square Numbers

A **square number** is a number that can be written as the product of a number multiplied by itself. For example, the square number 9 can be written as 3 * 3.

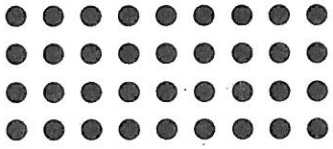
$9 = 3 * 3 = 3^2$

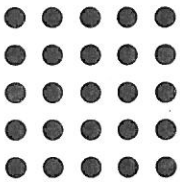
Fill in the missing numbers.

1. $4 * 4 =$ _____ **2.** _____ $= 7 * 7$ **3.** _____ $* 6 = 36$

4. $8^2 =$ _____ **5.** $5^2 =$ _____ **6.** _____ $= 9^2$

Write a number model to describe each array.





7. Number model: _____ **8.** Number model: _____

9. a. Which of the arrays above shows a square number? _____

b. Explain your answer.

_____

_____

_____

Practice

10. $97 * 43 =$ _____ **11.** $4{,}006 - 2{,}675 =$ _____

12. $1{,}416 + 8{,}348 =$ _____ **13.** $725 - 414 =$ _____

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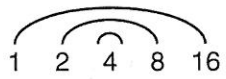
STUDY LINK 1·8

Factor Rainbows, Squares, and Square Roots

1. List all the factors of each square number. Make a **factor rainbow** to check your work. Then fill in the missing numbers.

Reminder: In a factor rainbow, the product of each connected factor pair should be equal to the number itself. For example, the factor rainbow for 16 looks like this:



$1 * 16 = 16$ $2 * 8 = 16$ $4 * 4 = 16$

Example:	
4: 1, 2, 4 124 $\underline{2}^2 = 4$ The square root of 4 is $\underline{2}$.	**9:** $\underline{\quad}^2 = 9$ The square root of 9 is $\underline{\quad}$.
25: $\underline{\quad}^2 = 25$ The square root of 25 is $\underline{\quad}$.	**36:** $\underline{\quad}^2 = 36$ The square root of 36 is $\underline{\quad}$.

2. Do all square numbers have an odd number of factors? _____

Unsquare each number. The result is its square root. Do not use the square root key $\sqrt{\ }$ on your calculator.

3. $\underline{\quad}^2 = 121$

The square root of 121 is _____.

4. $\underline{\quad}^2 = 2{,}500$

The square root of 2,500 is _____.

Practice

5. 4,318 + 1,901

6. 36 × 85

7. 2,852 × 5

8. $50 \div 6 \rightarrow$ _____

9. $333 - 291 =$ _____

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STUDY LINK 1·9

Exponents

An **exponent** is a raised number that shows how many times the number to its left is used as a factor.

Examples:

5^2 ← exponent	5^2 means 5 * 5, which is 25.
10^3 ← exponent	10^3 means 10 * 10 * 10, which is 1,000.
2^4 ← exponent	2^4 means 2 * 2 * 2 * 2, which is 16.

1. Write each of the following as a factor string. Then find the product.

Example: $2^3 =$ 2*2*2 = 8

a. $10^4 =$ _____ = _____

b. $7^2 =$ _____ = _____

c. $20^3 =$ _____ = _____

2. Write each factor string using an exponent.

Example: 6 * 6 * 6 * 6 = 6^4

a. 11 * 11 =

b. 9 * 9 * 9 = _____

c. 50 * 50 * 50 * 50 =

3. Write each of the following as a factor string that does *not* have any exponents. Then use your calculator to find the product.

Example: $2^3 * 3 =$ 2*2*2*3 = 24

a. $2 * 3^3 * 5^2 =$ _____ = _____

b. $2^4 * 4^2 =$ _____ = _____

4. Write the prime factorization of each number. Then write it using exponents.

Example: 18 = 2 * 3 * 3 = $2 * 3^2$

a. 40 = _____ = _____

b. 90 = _____ = _____

Practice

5. 6,383 − 1,342 = _____

6. 48 * 15 = _____

7. $7\overline{)354}$ → _____

8. 50,314 + 48,826 = _____

9. 84 ÷ 7 = _____

10. 701 * 68 = _____