Name _____

Model Factors

Use tiles to find all the factors of 25. Record the arrays and write the factors shown.

Step 1 Record the array and list the factors.

Think: Every whole number greater than 1 has at least two factors, that number and 1.

$1 \times 25 = 25$

Factors: 1 , 25

Step 2 Make an array to see if 2 is a factor of 25.

Think: An array has the same number of tiles in every row and the same number of tiles in every column.

You cannot use all 25 tiles to make an array that has 2 rows. There is 1 tile left.

So, 2 is not a factor of 25.

Step 3 Continue making arrays, counting by 1, to find all the other factors of 25.

Is 3 a factor?

3 rows, 1 tile left

No, 3 is not a factor of 25.

Is 4 a factor?

4 rows, 1 tile left

No, 4 is not a factor of 25.

Is 5 a factor?

5 rows, all tiles used.
$5 \times 5 = 25$

There are the same number of tiles in each row and column. Yes, 5 is a factor of 25.

If you continue to make arrays up to 24, you will find there are no additional factors of 25.

So, the factors of 25 are 1, 5, and 25.

Two factors that make a product are sometimes called a factor pair. What are the factor pairs for 25? 1 and 25, 5 and 5

Use tiles to find all the factors of the product. Record the arrays and write the factors shown.

1. 35

2. 36

Name _____

Festive Factors

Ms. Ramirez is a professional party planner. One of her tasks is to arrange the seating at tables. Ms. Ramirez likes to have the same number of party guests seated at each table.

For each number of guests below, use factors to determine all the ways Ms. Ramirez can arrange tables and chairs to have the same number of guests at each table. You do not have to include the factor 1 and the number itself.

1. 24 guests

_____

_____

_____

_____

2. 56 guests

_____

_____

_____

3. Write Math Two factors that make a product are sometimes called a factor pair. Describe how using factor pairs helped you solve the problems.

_____

_____

_____

_____

Name _____

Factors and Divisibility

A number is divisible by another number if the quotient is a counting number and the remainder is 0.
You can decide if a number is divisible by 2, 3, 5, 6, or 9 by using divisibility rules instead of dividing. Divisibility rules help you decide if one number is a factor of another.

Is 39 divisible by 2, 3, 5, 6, or 9?

	Divisibility Rules
$39 \div 2 = 19$ r1 $\rightarrow$ 39 is not divisible by 2.	The last digit, 9, is not even, so 39 is not divisible by 2.
$39 \div 3 = 13$ r0 $\rightarrow$ 39 is divisible by 3.	The sum of the digits, $3 + 9 = 12$, is divisible by 3, so 39 is divisible by 3.
$39 \div 5 = 7$ r4 $\rightarrow$ 39 is not divisible by 5.	The last digit, 9, is not a 0 or 5, so 39 is not divisible by 5.
$39 \div 6 = 6$ r3 $\rightarrow$ 39 is not divisible by 6.	39 is not divisible by both 2 and 3, so it is not divisible by 6.
$39 \div 9 = 4$ r3 $\rightarrow$ 39 is not divisible by 9.	The sum of the digits, $3 + 9 = 12$, is not divisible by 9, so 39 is not divisible by 9.

39 is divisible by 3.
3 is a factor of 39.

Tell whether 30 is divisible by 2, 3, 5, 6, or 9. Show your work.

1. $30 \div 2$ _____

2. $30 \div 3$ _____

3. $30 \div 5$ _____

4. $30 \div 6$ _____

5. $30 \div 9$ _____

Is 4 a factor of the number? Write *yes* or *no.*

6. 81 _____

7. 24 _____

8. 56 _____

Invisible Divisible

Use the clues to find all possibilities for the unknown digit in each number.

1. The number below has 2 as a factor. What could the unknown digit be?

5,83 ■

_____

2. The number below has 4 as a factor. What could the unknown digit be?

3,2 ■ 6

_____

3. The number below has 5 as a factor. What could the unknown digit be?

1,9 ■ 5

_____

4. The number below has 9 as a factor. What could the unknown digit be?

6,30 ■

_____

5. The number below has 6 as a factor. What could the unknown digit be?

7,71 ■

_____

6. The number below has 3 as a factor. What could the unknown digit be?

4, ■ 11

_____

7. The number below has 3 and 5 as factors. What could the unknown digit be?

6,1 ■ 5

_____

8. The number below has 2 and 9 as factors. What could the unknown digit be?

2,3 ■ 6

_____

9. **Stretch Your Thinking** A number is divisible by 2 if the last digit is divisible by 2. A number is divisible by 4 if the last two digits form a number divisible by 4. A number is divisible by 8 if the last three digits form a number divisible by 8. Describe a possible pattern in the divisibility rules. Then test each of the following numbers for divisibility by 8.

3,488 5,614 4,320 3,052

_____

_____

_____

Name _____

Problem Solving • Common Factors

Susan sorts a collection of beads. There are 35 blue, 49 red, and 21 pink beads. She arranges all the beads into rows. Each row will have the same number of beads, and all the beads in a row will be the same color. How many beads can she put in each row?

Read the Problem	Solve the Problem
What do I need to find? I need to find the number of beads in each row, if each row is equal and has only one color.	
What information do I need to use? Susan has 35 blue, 49 red, and 21 pink beads.	
How will I use the information? I can make a list to find all of the factors of 35, 49, and 21. Then I can use the list to find the common factors.	

Factors of 35	Factors of 49	Factors of 21
1	1	1
5	7	3
7	49	7
35		21

The common factors are 7 and 1.

So, Susan can put 1 or 7 beads in each row.

1. Allyson has 60 purple buttons, 36 black buttons, and 24 green buttons. She wants to put all of the buttons in bins. She wants each bin to have only one color and all bins to have the same number of buttons. How many buttons can Allyson put in one bin?

2. Ricardo has a marble collection with 54 blue marbles, 24 red marbles, and 18 yellow marbles. He arranges the marbles into equal rows. The marbles in each row will be the same color. How many marbles can he put in one row?

Name _____

Common Ground

Find common factors to solve.

1. Desiree has 100 pink, 80 blue, and 120 purple beads. She puts all of the beads into jars equally. Each jar has one type of bead. How many beads can she put in one jar?

_____

_____

2. Sam has 50 blue and 150 red marbles. She puts all of the marbles into bags equally. Each bag has one type of marble. How many marbles can she put in one bag?

_____

_____

3. The table shows the number of students in each grade at Bayside School. Mrs. Anderson wants to put students into equal rows during an assembly. Each row has students from the same grade. How many students can she put in one row?

Fifth	Sixth	Seventh	Eighth
50	25	75	100

_____

_____

4. The table shows the number of instruments a music company has in stock. The company discounts the same number of each type of instrument each month. How many instruments can be discounted in a month?

Trumpet	Clarinet	Flute	Drum
88	42	100	26

_____

_____

5. **Stretch Your Thinking** Jill wrote three numbers on the board. A common factor of the three numbers is 18. List three possible numbers. Tell how you chose the numbers.

_____

_____

_____

Name _____

Factors and Multiples

You know that $1 \times 10 = \underline{10}$ and $2 \times 5 = \underline{10}$.

So, 1, 2, 5, and 10 are all **factors** of 10.

You can skip count to find **multiples** of a number:

Count by 1s: 1, 2, 3, 4, 5, 6, 7, 8, 9, **10,** . . .

Count by 2s: 2, 4, 6, 8, **10,** 12, . . .

Count by 5s: 5, **10,** 15, 20, 25, . . .

Count by 10s: **10,** 20, 30, 40, . . .

Note that **10** is a multiple of 1, 2, 5, and 10. A number is a multiple of all of its factors.

A **common multiple** is a multiple of two or more numbers. So, 10 is a common multiple of 1, 2, 5, and 10.

1. Multiply to list the next five multiples of 3.

3, ____, ____, ____, ____, ____

2. Multiply to list the next five multiples of 7.

7, ____, ____, ____, ____, ____

Is the number a factor of 8? Write *yes* or *no*.

3. 2 _____

4. 8 _____

5. 15 _____

6. 20 _____

Is the number a multiple of 4? Write *yes* or *no*.

7. 2 _____

8. 12 _____

9. 16 _____

10. 18 _____

Name _____

Multiple Dates

On January 1, 2011, the Petersons began a new allowance program for their four children:

Every third day, beginning January 3, Adrian will get his allowance.
Every fourth day, beginning January 4, Beth will get her allowance.
Every fifth day, beginning January 5, Zoe will get her allowance.
Every seventh day, beginning January 7, Eddie will get his allowance.

1. What is the first day that Adrian and Beth will get their allowances on the same day?

_____

2. What is the first day that Beth and Zoe will get their allowances on the same day?

_____

3. What is the first day that Adrian and Eddie will get their allowances on the same day?

_____

4. What is the first day that Adrian, Beth, and Zoe will get their allowances on the same day?

_____

5. **Stretch Your Thinking** How many days will it be until all four children will get their allowances on the same day? **Explain.**

_____

_____

_____

Name _____

Prime and Composite Numbers

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

A **composite number** is a whole number greater than 1 that has more than two factors.

You can use division to find the factors of a number and tell whether the number is prime or composite.

Tell whether 55 is *prime* or *composite*.

Use division to find all the numbers that divide into 55 without a remainder. Those numbers are the factors of 55.

55 ÷ 1 = 55, so 1 and 55 are factors.

55 ÷ 5 = 11, so 5 and 11 are factors.

The factors of 55 are 1, 5, 11, and 55.

Because 55 has more than two factors, 55 is a composite number.

Tell whether 61 is *prime* or *composite*.

Use division to find all the numbers that divide into 61 without a remainder. Those numbers are the factors of 61.

61 ÷ 1 = 61, so 1 and 61 are factors.

There are no other numbers that divide into 61 evenly without a remainder.

The factors of 61 are 1 and 61.

Because 61 has exactly two factors, 61 is a prime number.

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

1. 44 Think: Is 44 divisible by any number other than 1 and 44?

_____

2. 53 Think: Does 53 have other factors besides 1 and itself?

_____

3. 12

_____

4. 50

_____

5. 24

_____

6. 67

_____

7. 83

_____

8. 27

_____

9. 34

_____

10. 78

_____

Name _____

Prime Search

All the prime numbers from 1 to 100 are listed below.

2, 3, 5, 7, 11, 13, 17, 19, 23, 29, 31, 37, 41, 43, 47, 53, 59, 61, 67, 71, 73, 79, 83, 89, 97

1. Find the prime numbers from 101 to 200.

- First draw a line through all the multiples of 2.
- Then draw a line through all the multiples of 3, then all the multiples of 5, and continue until you have drawn lines through all the multiples of prime numbers less than 100.
- The remaining numbers are the prime numbers from 101 to 200. List these below the table.

101	102	103	104	105	106	107	108	109	110
111	112	113	114	115	116	117	118	119	120
121	122	123	124	125	126	127	128	129	130
131	132	133	134	135	136	137	138	139	140
141	142	143	144	145	146	147	148	149	150
151	152	153	154	155	156	157	158	159	160
161	162	163	164	165	166	167	168	169	170
171	172	173	174	175	176	177	178	179	180
181	182	183	184	185	186	187	188	189	190
191	192	193	194	195	196	197	198	199	200

_____

_____

2. The number 143 has two lines through it, first as a multiple of 11 and second as a multiple of 13; so, 143 is the product of two prime numbers. Find another number that is the product of two different prime numbers greater than 7.

_____

_____

_____

3. Write Math **Explain** how you can find all the prime numbers from 201 to 1,000.

_____

_____

_____

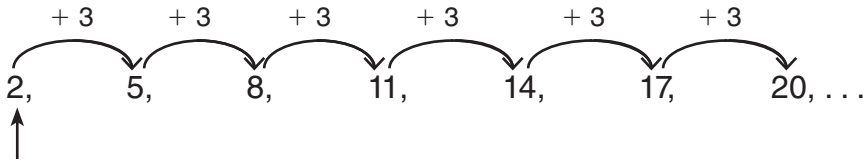
_____

_____

Name _____

Algebra • Number Patterns

A pattern is an ordered set of numbers or objects, called terms. The numbers below form a pattern. The first term in the pattern is 2.

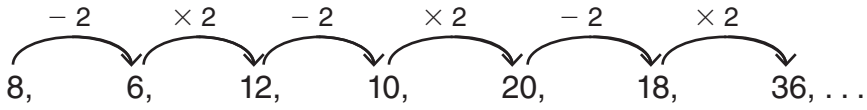


First term

A rule is used to describe a pattern. The rule for this pattern is *add 3.*

You can describe other patterns in the numbers. Notice that the terms in the pattern shown alternate between even and odd numbers.

For some patterns, the rule may have two operations.



The rule for this pattern is *subtract 2, multiply by 2.* The first term is 8. Notice that all of the terms in this pattern are even numbers.

Use the rule to write the numbers in the pattern.

1. Rule: Add 7. First term: 12

12, ____, ____, ____, ____, . . .

2. Rule: Multiply by 3, subtract 1. First term: 2

2, ____, ____, ____, ____, . . .

Use the rule to write the numbers in the pattern. Describe another pattern in the numbers.

3. Rule: Subtract 5. First term: 50

50, ____, ____, ____, ____, . . .

_____

_____

4. Rule: Multiply by 2, add 1. First term: 4

4, ____, ____, ____, ____, . . .

_____

_____

Name _____

Pattern Perfect

Write a rule for each pattern. Then use your rule to find the next two terms in the pattern.

1. **1, 4, 9, 16, 25, 36, 49, . . .**

_____

_____

2. **1, 1, 2, 3, 5, 8, 13, 21, 34, . . .**

_____

_____

3. **1, 3, 6, 10, 15, 21, 28, 36, . . .**

_____

_____

4. **Stretch Your Thinking** Find a rule for the pattern below without using inverse operations (such as "subtract 4, add 4").

8, 4, 8, 4, 8, 4, 8, 4, . . .

Then create a similar pattern of your own and give its rule.

_____

_____

_____