

1.1

Divisibility by 10, 5, and 2

GOAL

Create and use divisibility rules to determine if 10, 5, or 2 is a factor of a whole number.

- For each number, answer these questions:
 - Is it an even number?
 - Does it end in 5 or 0?
 - Does it end in 0?

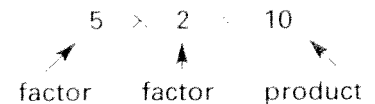
Then, circle the factor(s) of the number.

- | | | | | |
|--------------|-----------------------|----|---|---|
| a) 2458 | Circle the factor(s): | 10 | 5 | 2 |
| b) 147 905 | Circle the factor(s): | 10 | 5 | 2 |
| c) 3 324 670 | Circle the factor(s): | 10 | 5 | 2 |
| d) 21 875 | Circle the factor(s): | 10 | 5 | 2 |
| e) 190 | Circle the factor(s): | 10 | 5 | 2 |
| f) 3832 | Circle the factor(s): | 10 | 5 | 2 |

- Create a 4-digit number to fit each of the following rules.
 - This number is divisible by 5 but not by 10 or 2.
 - This number is divisible by 2 but not by 10 or 5.
 - This number is divisible by 10, 5, and 2.
- List all the numbers between 3400 and 3500 that are divisible by 10, 5, and 2. Explain your thinking.

At-Home Help

In a multiplication operation, you multiply factors to get a **product**.



Some Divisibility Rules

- A number that is even is divisible by 2.
- A number that ends in 5 or 0 is divisible by 5.
- A number that ends in 0 is divisible by 10.

1.2 Divisibility by 3 and 9

FOAL

Apply divisibility rules to determine if 3 or 9 is a factor of a whole number.

- Which of these numbers are divisible by 3?
Use divisibility rules.
 - 7317
 - 19 333
 - 1863
 - 10 781
 - 67 398
 - 33 332
- Which of these numbers are divisible by 9?
Use divisibility rules.
 - 9102
 - 71 451
 - 27 000
 - 25 278
 - 88 002
 - 1462
- Determine whether each number is divisible by 3.
Divide by 3 to check your answer.
 - 915
 - 11 100
 - 712 233
- Fill in the missing digit to make each number divisible by 9.
 - 67__2
 - 256__
 - 5__20
 - __211
- What is the greatest number between 5000 and 6000 that is divisible by both 3 and 9? Explain your thinking.

At-Home Help

Some Divisibility Rules

- If the sum of a number's digits is a multiple of 3, the number is divisible by 3.

For example, 342 (sum of digits = $3 + 4 + 2 = 9$) is divisible by 3.

- If the sum of a number's digits is a multiple of 9, the number is divisible by 9.

For example, 342 (sum of digits = $3 + 4 + 2 = 9$) is also divisible by 9.

1.4 Divisibility by 4 and 8

GOAL

Explain and apply divisibility rules to decide if 4 or 8 is a factor of a whole number.

1. Determine which numbers are divisible by 4.

a) 9102

Multiply the tens digit by 2. _____

Add this to the ones digit. _____

Is 9102 divisible by 4? _____

b) 71 452

Multiply the tens digit by 2. _____

Add this to the ones digit. _____

Is 71 452 divisible by 4? _____

2. Answer to determine which numbers are divisible by 8.

a) 8372

Multiply the hundreds digit by 4. _____

Multiply the tens digit by 2. _____

Add these to the ones digit. _____

Is 8372 divisible by 8? _____

b) 20 328

Multiply the hundreds digit by 4. _____

Multiply the tens digit by 2. _____

Add these to the ones digit. _____

Is 20 328 divisible by 8? _____

3. The chamber choir has 1348 members. Can the choir leader organize the choir into even rows of 4 or 8?

At-Home Help

Some Divisibility Rules

- Multiply the tens digit by 2 and add the sum of this product to the ones digit. If the sum is divisible by 4, then the number is also divisible by 4.

For example, 464 is divisible by 4 because $6 \times 2 + 4 = 16$, and 16 is divisible by 4.

- Multiply the hundreds digit by 4 and the tens digit by 2. Add the sum of these products to the ones digit. If the sum is divisible by 8, then the number is also divisible by 8.

For example,

Hundreds	Tens	Ones
4	6	4

Multiply the hundreds digit by 4. $4 \times 4 = 16$

Multiply the tens digit by 2.
 $6 \times 2 = 12$

Add the sum of these products to the ones digit.

$$16 + 12 + 4 = 32$$

32 is divisible by 8, so 464 is divisible by 8.

1.5 Divisibility by 0



Determine whether or not a number can be divided by 0.

1. Jessica has 46 pennies.
 - a) Can she divide her pennies into equal groups of 4? Draw a picture to show your answer.

 - b) Jessica wonders if 46 can be divided by 1. Draw a picture to show what happens when Jessica divides her pennies into 1 group.

 - c) Jessica wonders if 46 can be divided by 0. Can Jessica divide 46 pennies into 0 groups? Explain why or why not.

2. Shade the true statements in the chart to find a hidden message.

4185 is divisible by 9	7655 is divisible by 9	9965 is divisible by 5	3345 is divisible by 4	51315 is divisible by 3 and 5	432 is divisible by 0
832 is divisible by 2	1863 is divisible by 3	88 is divisible by 2	777 is divisible by 5	7332 is divisible by 3	3740 is divisible by 5 but not 10
3548 is divisible by 4	6740 is divisible by 3 and 10	810 is divisible by 2, 5, and 9	8324 is divisible by 10	270 is divisible by 3 and 2	4766 is divisible by 4
38920 is divisible by 10 but not 3	553 is divisible by 0	5416 is divisible by 8	6615 is divisible by 5 but not 3	1485 is divisible by 3 and 9	334 is divisible by 9

1.6

Determining Common Multiples



Identify multiples, common multiples, and least common multiples of whole numbers.

1. a) Fill in the blanks to list the first ten multiples of 3.

3, 6, _____, 12, _____, 18, 21, _____, _____, _____

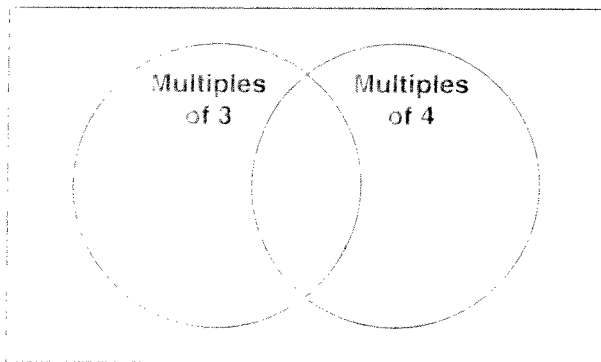
- b) Fill in the blanks to list the first ten multiples of 5.

5, _____, 15, 20, _____, _____, 35, 40, _____, _____

- c) What are two common multiples of 3 and 5?

- d) What is the LCM of 3 and 5? _____

2. Place the numbers from 30 to 45 into the Venn Diagram. If a number does not fit, place it outside of the circles.



3. Write multiples to determine the LCM of each set of numbers.

a) multiples of 3

b) multiples of 5

At-Home Help

A **multiple** is the product of a whole number (for example, 1, 2, 3, ...) when multiplied by any other whole number. The **least common multiple** or **LCM** is the lowest multiple that two or more numbers have in common.

For example,

- The multiples of 6 are: 6, 12, 18, 24, etc.
- The multiples of 8 are: 8, 16, 24, 32, etc.
- The lowest common multiple of 6 and 8 is 24.

1.7 Determining Common Factors



Determine factors, common factors, and the greatest common factor of whole numbers.

1. Write all the multiplication sentences for each of the following:

a) 15 $1 \times$ _____
 $3 \times$ _____
 $5 \times$ _____

b) 325 $1 \times$ _____
 $2 \times$ _____
 $4 \times$ _____

2. List all the factors for each number:

a) 18 _____

b) 21 _____

3. Circle the numbers in the box that are factors of 8 and cross out the numbers in the box that are multiples of 8.

4. Find the GCF of each pair of numbers.

a) 24 and 12

factors of 24 _____

factors of 12 _____

GCF of 24 and 12 _____

b) factors of 30 _____

factors of 20 _____

GCF of 30 and 20 _____

5. Kaylee and Jacob planted gardens beside each other. Their gardens share one side. Kaylee's garden measures 36 m^2 and Jacob's garden measures 24 m^2 . What is the greatest length the two gardens can share?

At-Home Help

A **common factor** is a factor that two or more numbers have in common. For example, 4 is a common factor of 8 and 12.

The **greatest common factor** or **GCF** is the greatest whole number that divides two or more whole numbers with no remainder. For example, 3 is the GCF of 9 and 12.

Every number has at least 2 factors, 1 and itself.

16	24	40	4	48
64	2	1	32	

1.8

Solve Problems by Identifying and Extending a Pattern

GOAL

Identify and extend number patterns to solve problems.

1. In the following chart, numbers up to 40 with a factor of 4 are highlighted.

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

- a) What pattern do you see?
- b) Use the pattern to help you complete the chart up to 100.
- c) What numbers between 70 and 100 have a factor of 4?
2. Oshana wrote out the numbers 3009, 3021, 3033, 3045, etc. She continued her pattern, but did not go past 3100. What was the last number in Oshana's sequence? You can use a calculator to help you.

At-Home Help

Looking at patterns helps you make predictions.

For example,
5010, 5025, 5040, 5055, ...

The numbers in the pattern go up by 15 each time. The numbers are all divisible by 5 and by 3. Using this information, you can predict the next numbers in the pattern.

5010, 5025, 5040, 5055, **5070**, **5085**, ...