**UNIT 1: Number Relationships**

*TOPICS:*

* *1.1 Divisibility by 10, 5, and 2*
* *1.2 Divisibility by 3, and 9 + 1.3 Divisibility by 6*
* *1.4 Divisibility by 4 and 8*
* *1.6 Common Multiples*
* *1.7 Determining Common Factors*
  1. **Divisibility by 10, 5, and 2**

**Divisibility means** that a number goes evenly (with no remainder) into a number.

Ex. 1) 32 is divisible by 2 because 32 ÷ 2 = 16 🡪 no remainder is produced.

* This also means that 2 is a **factor** of 32

Ex. 2) 65 is not divisible by 10 because 65 ÷ 10 = 6 R5 🡪 a remainder is produced.

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| **RULES**:  Divisible by 10 🡪 The last digit of the number is 0.  Divisible by 5 🡪 The last digit of the number is 0, 5.  Divisible by 2 🡪 The last digit of the number is even (0, 2, 4, 6, 8) |

Ex. 3) Indicate whether each number is divisible by the number indicated using yes (Y) or no (N).

|  |  |  |  |
| --- | --- | --- | --- |
|  | ***Divisible by 10*** | ***Divisible by 5*** | ***Divisible by 2*** |
| 1. *54* |  |  |  |
| 1. *370* |  |  |  |
| 1. *4188* |  |  |  |
| 1. *17 535* |  |  |  |
| 1. *90029* |  |  |  |

Ex. 4) Write all the possibilities for the missing digit.

1. 570\_\_\_ is divisible by 2 and 10. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. 4579\_\_\_ is divisible by 2 but not 10 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. 102\_\_\_ is divisible by 5 but not 2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Ex. 5) Write the remainder without dividing.

1. 652 ÷ 10 🡪 R = \_\_\_\_
2. 8103 ÷ 2 🡪 R = \_\_\_\_
3. 12 874 ÷ 5 🡪 R = \_\_\_\_

ASSIGNMENT: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

* 1. **Divisibility by 3, and 9 and 1.3 Divisibility by 6**

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| **RULES**:  Divisible by 3 🡪 The sum of the digits is divisible by 3.  Divisible by 9 🡪 The sum of the digits is divisible by 9.  Divisible by 6 🡪 The last digit of the number is even and the number is divisible by 3. |

Ex. 1) 39 is divisible of 3 because the sum of the digits is 3 + 9 = 12. Because the sum (12) is divisible by 3, then the whole number is divisible by 3.

* This also means that 3 is a **factor** of 39

Ex. 2) 65 is not divisible by 9 because the sum of the digits is 6 + 5 = 11. Because the sum (11) is not divisible by 9, then the whole number is not divisible.

Ex. 3) 429 🡪 The sum of the digits is 4 + 2 + 9 = 15. This number is divisible by 3 but not 9 (the sum of the digits 15 is not divisible by 9) or 6 (it is not even).

Ex. 4) 8304 🡪 The sum of the digits is 8 + 3 + 4 = 15. The sum (15) is divisible by 3 and the whole number is even therefore 8304 is divisible by 6.

Ex. 5) Indicate whether each number is divisible by the number indicated using yes (Y) or no (N).

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | ***Sum of Digits*** | ***Divisible by 9*** | ***Divisible by 3*** | ***Divisible by 6*** |
| 1. *94* |  |  |  |  |
| 1. *372* |  |  |  |  |
| 1. *1188* |  |  |  |  |
| 1. *7 515* |  |  |  |  |
| 1. *90039* |  |  |  |  |

Ex. 4) Write all the possibilities for the missing digit.

1. 570\_\_\_ is divisible by 3 and 9, but not 6. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. 4579\_\_\_ is divisible by 3 but not 9 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. 102\_\_\_ is divisible by 6 but not 9. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Ex. 5) Write the remainder without dividing.

1. 752 ÷ 9 🡪 R = \_\_\_\_
2. 8102 ÷ 3 🡪 R = \_\_\_\_
3. 12 874 ÷ 6 🡪 R = \_\_\_\_

ASSIGNMENT: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

* 1. **Divisibility by 4 and 8**

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| **RULES**:  Divisible by 4 🡪 The number formed by the last 2 digits is divisible by 4.  Divisible by 8 🡪 The number formed by the last 3 digits is divisible by 4. |

Ex. 1) 5632 is divisible of 4 because the number formed by the last 2 digits is 32. 32 is divisible by 4, therefore the whole number is divisible by 4.

* This also means that 4 is a **factor** of 5632

Ex. 2) 6728 is divisible by 8 because the number formed by the last 3 digits is 728. 728 is divisible by 8, therefore the whole number is divisible by 8.

* This also means that 8 is a **factor** of 6728

Ex. 3) Indicate whether each number is divisible by the number indicated using yes (Y) or no (N).

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | ***Last 2 digits*** | ***Divisible by 4*** | ***Last 3 digits*** | ***Divisible by 8*** |
| 1. *2694* |  |  |  |  |
| 1. *372* |  |  |  |  |
| 1. *89288* |  |  |  |  |

Ex. 4) Answer true (T) or false (F).

1. A number that is divisible by 4 is always also divisible by 8? \_\_\_\_\_
2. A number that is divisible by 8 is always also divisible by 4? \_\_\_\_\_
3. A number must be even to be divisible by 4 or 8? \_\_\_\_

Ex. 5) Write all the possibilities for the missing digit.

1. 57\_\_\_2 is divisible by 4. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. 4579\_\_\_ is divisible by 4 but not 8. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. 1\_\_\_32 is divisible by 8. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Ex. 5) Write the remainder without dividing.

1. 722 ÷ 4 🡪 R = \_\_\_\_
2. 8173 ÷ 4 🡪 R = \_\_\_\_
3. 12 805 ÷ 8 🡪 R = \_\_\_\_

ASSIGNMENT: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**1.6 Common Multiples**

**Multiples** – The integer that is produced from multiplying an integer by a counting number (1,2,3, …).

4 x 1 = 4 4 x 2 = 8 4 x 3 = 12 4 x 4 = 16

*4, 8, 12, and 16 are all multiples of 4*

**Common Multiples** – Is a multiple that is common to two different numbers.

Multiples of 4 🡪 4, 8, 12, 16, 20, 24, 28, 32, 36, 40, …

Multiples of 5 🡪 5, 10, 15, 20, 25, 30, 35, 40, …

20 and 40 are common multiples of 4 and 5.

**Lowest Common Multiples** – Is the lowest multiple common to two or more integers.

20 is the lowest common multiple (LCM) of 4 and 5

Ex. 1) Write the first 5 multiples of 9.

\_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_

Ex 2) Write the multiple of 2 and 3, then circle the common ones.

1. 🡪 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. 🡪 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Ex. 3) Find the lowest common multiples for the number groups below.

1. 3 and 7
2. 3, 6, and 15
3. 2, 3, and 4

Ex. 4) Use divisibility rules to determine if the number is a common multiple of 3 and 5.

1. 345
2. 18312

ASSIGNMENT: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**1.7 Determining Common Factors**

**Factors** – A number that divides evenly (with no remainder) into a number. **Think divisibility.**

**Common Factors** – Factors that are common to a set of numbers.

**Greatest Common Factor** – The greatest number that will divide evenly into all numbers of a set.

Ex. 1) What are the factors of 36?

Ex. 2) What are the factors of 64?

Ex. 3) What are the common factors of 16 and 36? Circle the GCF

Ex. 4) What are the common factors of 24 and 80? Circle the GCF

Ex. 5) Johnny is laying tile on a table that is 135 cm by 120 cm. What is the largest tile he can use such that he does not require any cuts?

ASSIGNMENT: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_