**Introduction of Venn Diagrams**

**Let’s create a Venn diagram of the following elements.**

* Cucumber
* Tomato
* Banana
* Goat
* Lettuce
* Apple
* Pear
* Zucchini

**Create a Venn diagram of the following elements; you get to choose your categories.**

|  |  |  |
| --- | --- | --- |
| **Athlete** | **Sport** | **Country** |
| Andre Lakos | Hockey | Austria |
| Patrice Bergeron | Hockey | Canada |
| Hannah Teter | Snowboarding | USA |
| Rana Okada | Snowboarding | China |
| Alex Gough | Luge | Canada |
| Joe Mortensen | Luge | USA |
| Matthia Mayer | Skiing | Austria |
| Krasnaya Polyana | Skiing | Russia |

**Set Theory**

The following is on your formula sheet.

|  |  |
| --- | --- |
| **Logical Reasoning** | |
|  | Complement |
|  | Empty Set |
|  | Intersection |
|  | Subset |
|  | Union |

Below is a Venn Diagram representing all numbers from 1 to 20. The circle on the left hand side represents the prime numbers, while the circle on the right hand side represents the even numbers.

Prime: a number that is divisible by one and itself. Note, zero and one are not prime numbers and 2 is the only even prime number.

**Universal Set (U)**

**Even (E)**

**Prime (P)**

9

10

5

8

7

11

20

12

2

16

17

19

18

15

14

13

6

1

3

4

Universal Set: All elements of the context

* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Subset: a set whose elements belong to another set

* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Union: all the elements of two combined sets

* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Intersection: elements of both sets

* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Complement: “not”

* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

e.g. Students in a particular high school were surveyed to determine the subjects in which they were currently enrolled. The table below represents the data that was collected.

|  |  |
| --- | --- |
| Courses Enrolled In | Number of Students |
| Math only | 28 |
| Art only | 33 |
| Math and Art | 17 |
| Neither course | 20 |

The number of students in the Universal set is

A. 61

B. 64

C. 74

D. 98

Below is a Venn Diagram representing all numbers from 1 to 20. The circle on the left hand side represents the odd numbers, while the circle on the right hand side represents the even numbers.

**Even (E)**

**Odd (O)**

10

5

8

7

11

20

1

12

16

17

19

2

18

9

14

13

6

3

4

15

Disjoint: when two sets have nothing in common

* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

e.g. In an Alberta school, there are 65 Grade 12 students.

* 23 play volleyball
* 26 play basketball
* 31 students who do not play either sport

Determine the number of students who play volleyball only, basketball only, and both volleyball and basketball?

Are the sets disjoint?

Homework:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Shade the following Venn diagrams based on the set theory notation stated.

|  |  |
| --- | --- |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |

Applying Set Theory Notation

1. Draw a Venn diagram to represent these sets:

* The universal set U ={natural numbers from 1 to 40 inclusive}
* E = {multiples of 8}
* F = {multiples of 4}
* S = {multiples of 17}

Are there any disjoint sets? If so, which sets are disjoint?

State whether each statement is true or false:

|  |  |  |
| --- | --- | --- |
|  | True | False |
|  | True | False |
|  | True | False |
| 1. ={odd numbers from 1 to 40} | True | False |
| 1. In this example, the set of natural numbers from 41 to 50 is | True | False |

Let’s create three true statements using our set theory notation about the Venn diagram in this example.

* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Draw a Venn diagram to represent these sets:
   * The universal set R ={real numbers}
   * N = {natural numbers}
   * W= {whole numbers}
   * I = {integers}
   * Q = {rational numbers}

* +  = {irrational numbers}

1. Identify the complement of each set.
2. Identify any disjoint sets

1. is a subset of which sets?

1. \_\_\_\_\_\_\_\_\_\_\_\_\_

1. \_\_\_\_\_\_\_\_\_\_\_\_\_

Let’s create three true statements using our set theory notation about the Venn diagram in this example.

* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Draw a Venn diagram to represent these sets:

* 

* 

* 

1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. Determine the sum of.
3. Determine the product of.

**~Diploma Connection~**

1. What is the meaning of the complement in set theory?
2. All the element in the universal set that are not identical
3. A set of elements that work well with a given set
4. All the elements of a universal set that do not belong to s subset of it
5. All the elements that are the opposite of the elements in a given set
6. What is the meaning *disjoint* in set theory?
7. Two or more sets having no elements in common
8. Two or more sets that do not match
9. Sets that are in universal sets
10. Sets that contain no elements
11. Liam asked 90 people if they preferred tea or coffee.
    * 8 people like both
    * 55 people liked coffee
    * 32 people liked tea

Determine how many people did not like tea or coffee. Draw a Venn diagram to show your solution.

1. Carlos surveyed 50 students about their favorite subjects in school. He recorded his results.

|  |  |
| --- | --- |
| **Favorite Subject** | **Number of students** |
| Mathematics | 18 |
| Science | 15 |
| Neither mathematics or science | 20 |

Determine how many students like only mathematics or only science.

Homework:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_