

SET THEORY

PROBLEMS

1.
 - a) Using set notation, list the colours of a rainbow as a set, R .
 - b) E is a subset of $(E \subseteq R)$. E is made up of colours that end in the letter 'e'. Write E in set notation.
 - c) E' is the compliment of E . Write E' in set notation.

2. Dogs at a dog park were asked what items they like to play fetch with. The table shows their choices and the number of dogs that selected each choice.

FETCH ITEM	NUMBER OF DOGS
ONLY FRISBEE	21
ONLY TENNIS BALL	30
FRISBEE AND TENNIS BALL	15
NEITHER FRISBEE/TENNIS BALL	7

- a) How many dogs are in the universal set?
- b) How many dogs, in total, like to play with frisbees?
- c) How many dogs would like to play fetch with a frisbee OR a tennis ball?
- d) How many dogs DO NOT like to play fetch with a tennis ball?



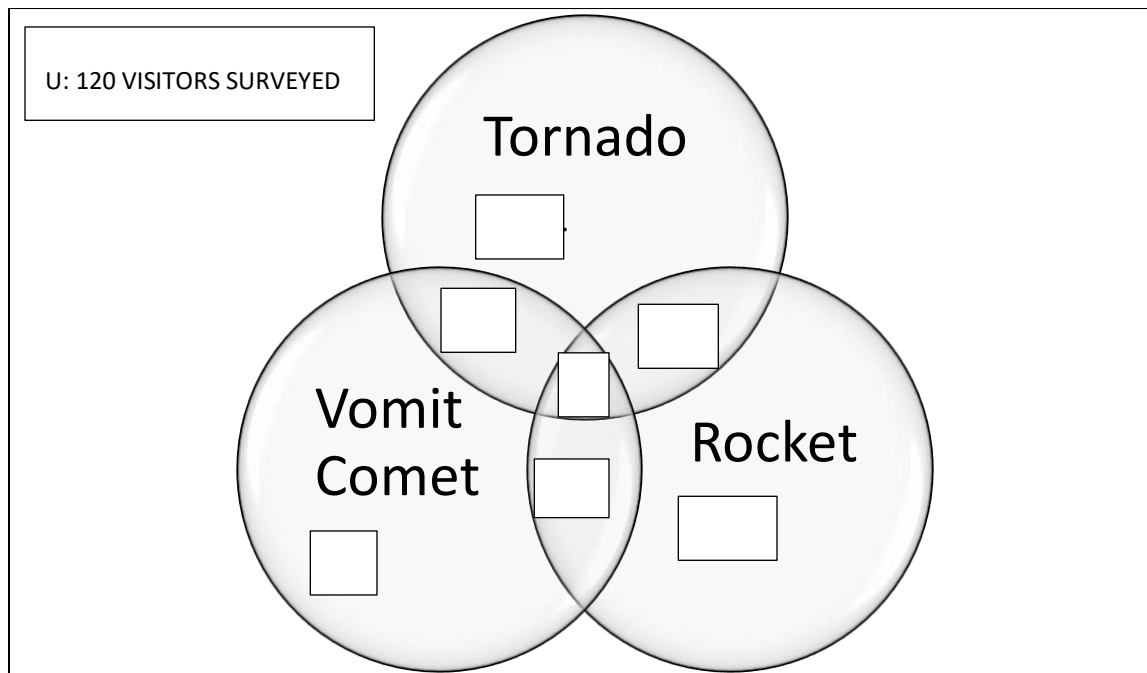
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3. A group of **120 visitors** to an amusement park were asked what rides they had been on. They were asked whether they had ridden **The Tornado**, **The Rocket**, and/or **The Vomit Comet**.

- 7 people had ridden all three rides
- 10 people did not go on any of the rides
- 13 people went on “The Tornado” and the “Rocket”
- 20 people went on “The Tornado” and the “Vomit Comet”
- 16 people went on “The Rocket” and the Vomit Comet”
- 24 people went on “The Tornado” only
- 12 people went on “The Rocket” only
- 18 people went on “The Vomit Comet” only

a) Complete the Venn diagram for the following survey results:



- b) How many visitors rode “The Rocket”?
- c) How many visitors rode both “The Tornado” and “The Rocket”?
- d) How many visitors rode both “The Tornado” and “The Rocket”, but did not ride “The Vomit Comet”?



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4. There are two sets of numbers. Both are subsets of a universal set of whole numbers, W .

$$A = \{\text{Factors of } 24\}$$

$$B = \{\text{Prime numbers less than } 24\}$$

- Find the intersection of A and B .
- Find the union of A and B .
- Find the set of numbers $B - A$

5. Which of the following pairs describes two sets that are **DISJOINT**?

A: People who like chocolate. People who like soda.

B: People who live in Germany. People who live in North America.

C: People who live in Toronto. People who live in Canada.

6. Given:

$$A = \{X \mid X = 2n, n \in \mathbb{N}\}$$

$$B = \{2, 4, 6, 8\}$$

$$C = \{20, 40, 60, 80\}$$

Is $(B \cup C) \subset A$? TRUE or FALSE?

7. A cat may have fish, mice or bird toys. Use the following information to determine how many cats only a bird and a mouse toy.

- There are 50 cats with toys.
- 29 cats have a fish toy
- 17 cats have a bird toy
- 35 cats have a mouse toy
- 5 cats have only a fish toy and a bird toy
- 14 cats have only a fish and a mouse toy
- 4 cats have one of each type of toy
- No cats have more than one of the same type of toy (i.e. no cat has more than one fish toy, etc)



Use the following information to answer questions 8 and 9:
Consider all whole numbers, up to and including 15.

$$A = \{1, 2, 3, 5, 7, 11, 13\}$$

$$A \cup B = \{1, 2, 3, 4, 5, 7, 8, 9, 11, 13, 15\}$$

$$A \cap B = \{2, 7, 13\}$$

8. Using Set Notation, what is the Universal Set?

9. What is set B?

10. The Universal Set, U, consists of all positive integers.
 $P = \{x \mid x < 55\}$
What is P' ?

