

MATH 30 - 2

1.1 TYPES OF SETS AND SET NOTATION

INVESTIGATE the Math, Page 6 & 7

Categorize Canadian provinces AND territories using sets. You may need to look at pages 6 and 7 to help you with some of the new words.



\subset subset

- A. Using the two letter abbreviations of Canadian provinces, list the elements of the universal set of Canadian provinces and territories. Use proper set notation! (ie: $C = \{BC, AB, \text{etc.}\}$)

$$C = \{YT, NT, NU, BC, AB, SK, MB, ON, QC, NL, PEI, NB, NS\}$$

- B. One subset of C is W , the set of western provinces and territories. Write W in set notation.

$$W = \{YT, NT, NU, BC, AB, SK, MB\} \quad W \subset C$$

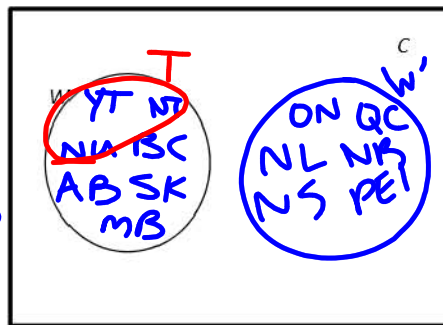
- C. The Venn diagram represents the universal set C and the subset W .

- i. Write the elements of W in the circle representing W .
- ii. The complement of W is W' . Describe what W' contains.

Eastern

$$W' = \{ON, QC, NL, NB, NS, PEI\}$$

- iii. Write W' in set notation.
- iv. Draw a circle representing W' in the diagram. Does it intersect W ? Write the elements of W' in W' .



disjoint

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D. Write the set of Eastern provinces, E . How is E related to W '?

$$E = W'$$

E. The territories of Canada will be called set T .

i. List T in set notation.

$$T = \{YT, NT, NU\}$$

ii. The territories are a subset of the western provinces. Show this fact in set notation.

$$T \subset W$$

iii. The territories are also a subset of Canada. Show this in set notation.

$$T \subset C$$

iv. Show, in set notation, that the territories are a subset of the western provinces and a subset of Canada.

$$T \subset W \subset C$$

v. Show and label the subset of the territories (T) on the Venn diagram on the other side.

F. Write the set of all Canadian provinces south of Mexico, M , in set notation. Write this in TWO different ways.

$$\emptyset \quad \{ \}$$

G. Using just the sets C , W , E and T , list a pair of disjoint sets.

$$W \text{ and } E, \quad T \text{ and } E$$

H. Create a new set, N , which will contain all province abbreviations that start with the letter N. Show the sets W , E and N in the below box as a Venn diagram, listing each province/territory only ONCE.

$$W = \{NT, YT, NU, AB, BC, MB, SK\}$$

$$E = \{ON, QC, NS, NL, NB, PEI\}$$

$$N = \{NU, NL, NB, NS, NT\}$$



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1.1 TYPES OF SETS AND SET NOTATION: YOUR TURNS

Your Turn, Page 9.

- Write down all the multiples of 4 from 1 to 240. If you write neatly and in columns, this exercise goes quickly and easily, especially when you get past 100. This *sample space* (writing down EVERY number) should have 60 elements.

4 8 (12) 16 20 (24) 28 32 (36) 40
 44 (48) 52 56 (60) 64 68 (72) 76 80
 (84) 88 92 (96) 100 104 (108) 112 116 (120)
 124 128 (132) 136 140 (144) 148 152 (156) 160
 164 (168) 172 176 (180) 184 188 (192) 196
 200 (204) 208 212 (216) 220 224 (228)
 232 236 (240)

- In the above sample space, circle all the numbers that are multiples of 12.
- Answer each of the following questions in SET NOTATION only. Follow the left side of page 8 as a guide.

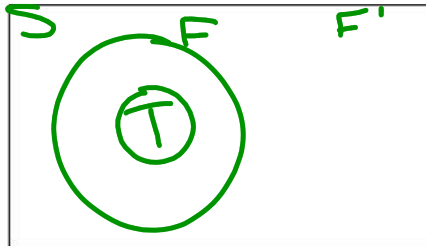
- Use S to show all the numbers between 1 and 240. Show this two different ways.
 $S = \{1, 2, 3, \dots, 238, 239, 240\}$
 $S = \{s \mid 1 \leq s \leq 240, s \in \mathbb{N}\}$
- Use F to show all the multiples of four between 1 and 240. Show this two different ways.
 $F = \{4, 8, 12, \dots, 232, 236, 240\}$
 $F = \{f \mid 4 \leq f \leq 240, f \in \mathbb{W}\}$
- Use T to show all the multiples of twelve between 1 and 240. Show this two different ways.
 $T = \{12, 24, 36, \dots, 216, 228, 240\}$
 $T = \{t \mid 12 \leq t \leq 240, t \in \mathbb{N}\}$
- In a sentence, explain what F' might mean. What type of sets are F and F' ? *disjoint*
 $F' = \text{any \# that is not a multiple of 4}$

$F \subset S$
 $T \subset S$

$T \subset F \subset S$

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4. Show your answer to #3e (previous page) in a Venn diagram in the below box. Ensure you label the box and the circles correctly.



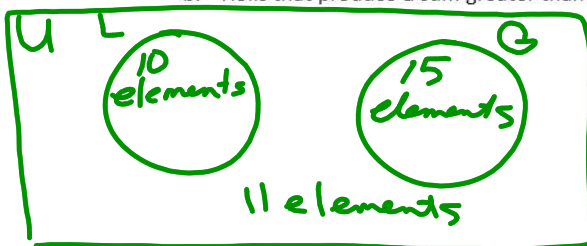
Your Turn page 13

The table to the right shows the sum when two six-sided dice are rolled.

		Die Two					
		1	2	3	4	5	6
Die One	1	2	3	4	5	6	7
	2	3	4	5	6	7	8
	3	4	5	6	7	8	9
	4	5	6	7	8	9	10
	5	6	7	8	9	10	11
	6	7	8	9	10	11	12

Table 1. Possible Sums of Two Dice

1. Illustrate the following sets in one Venn diagram:
 a. Rolls that produce a sum less than 6. *10 elements*
 b. Rolls that produce a sum greater than 7. *15 elements*



2. Using proper notation, state the number of elements in each set.

$$\begin{aligned}
 n(U) &= 36 \text{ elements} \\
 n(L) &= 10 \text{ elements} \\
 n(G) &= 15 \text{ elements} \\
 n(L \& G)' &= 11 \text{ elements}
 \end{aligned}$$

3. Determine a formula for the number of ways that a sum less than 6 or greater than 7 can occur.

$$\begin{aligned}
 n(L \text{ or } G) &= n(L) + n(G) \\
 &= 10 + 15 \\
 &= 25
 \end{aligned}$$

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