

Homework 3

Section 1.7 Venn Diagrams: #4, A, 12

For 12, try to make it simple!

- A.
- Draw a Venn diagram for the set $(A - B) \cup C$
 - Draw a Venn diagram for the set $A - (B \cup C)$
 - Explain what the Venn diagrams in #4 (above) and parts (a) and (b) indicate.

Section 1.8 #1, 4, ,6, 8, 9, 10, A, B

- A. Let $A_n = \left(-\frac{1}{n}, \frac{1}{n}\right) \subseteq \mathbb{R}$ for $n \in \mathbb{N}$. (For clarity, A_n is an **interval** on the real line, not a point in the xy -plane.) Determine $\bigcup_n A_n$ and $\bigcap_n A_n$
- B. Let $A_\alpha = \mathbb{R} - \alpha$ for $\alpha \in [0, 1]$. Determine $\bigcup_n A_n$ and $\bigcap_n A_n$

Section 2.2 And, Or, or Not

Translate each sentence to logical symbols by reducing chunks of the language to symbolic statements (like P , Q , R) and using \vee , \wedge or \sim . An example is below.

Sentence: The integer n is divisible by the first three primes.

Answer: Let $P(n) = n$ is divisible by 2, $Q(n) = n$ is divisible by 3, and $R(n) = n$ is divisible by 5. Now, the statement becomes $P(n) \wedge Q(n) \wedge R(n)$.

- The function $f(x)$ is continuous but not differentiable.
- At least one of x or y is equal to zero.
- Each of the functions $f(x)$, $g(x)$ and $h(x)$ contains the point $(1, 2)$.

Section 2.3 Conditional Statements #1-7, A, B, C, D

The directions for problems 1-7 apply for problems A, B, C, D

- A. For the integer to be even, it is sufficient that the integer is greater than 5.
 - B. For the bird to be black, it is necessary that the bird is a raven.
 - C. Whenever a series converges, the ratio test will give a value greater than 1.
 - D. Luna will eat a treat only if today is Tuesday.
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Section 2.4 Biconditional Statements #3,4

Section 2.5 Truth Tables for Statements #1,2,3,4,7,10,11

Section 2.6 Logical Equivalence # 5,7, 10*, 11*, 12*

* Note: The directions use the word "Decide..." The expectation is that you determine whether or not the statements are logically equivalent **and** rigorously justify your conclusion.