MATH 6: REVIEW

Review Problems

1. If logic variables A=True, B=False, C=True, what is the truth value of
   (a) A AND B
   (b) A OR B
   (c) A AND(B OR C)
   (d) NOT(A OR B)
   (e) $A \implies B$

2. Given both $A \implies B$ and NOT B are True, what can you conclude about A?

3. Let $A = [1, 3] = \{x | 1 \leq x \leq 3\}$, $B = (1, 4] = \{x | 1 < x \leq 4\}$
   (a) What is $A \cup B$?
   (b) What is $A \cap B$?
   (c) What is $B - A$?
   (d) What is $A - B$?

4. $|A| = 7$, $|B| = 5$, $|A \cup B| = 10$. What is $|A \cap B| =$?

5. A standard deck of cards is placed in random order.
What is the probability that the first two cards are both red? (There are 52 cards in the deck, half of them are red)

6. If we toss a coin 10 times, what is the probability that at least one will be heads?

7. How many ways are there to arrange 4 different books on a bookshelf?

8. What is $P(4, 3)$?

9. How many arrangements are possible for the letters in the word PAPA?

10. $\binom{5}{2} =$

11. In how many ways can you choose a committee of 4 people out of 6?

12. Write the first 5 terms for an arithmetic sequence in which $a_1 = 5$ and common difference $d = 3$.

13. Given $1 + 3 + 5 + ... + 99$
   (a) How many terms are in this sum?
   (b) What is the sum?

14. What is the geometric mean of 12 and 3?

15. What is $1 + \frac{1}{3} + \frac{1}{9} + \frac{1}{27}$?

16. What is $1 + \frac{1}{3} + \frac{1}{9} + ...$?

1. Additional Review Problems

1. Write the truth tables for logical operations NOT, OR, AND, NAND, XOR, logical implication $\implies$

2. Given $A = \{1, 2, 3, 4\}$, $B = \{4, 5, 6, 7\}$.
   (a) What is $A \cap B$
   (b) What is $A \cup B$
   (c) What is $A - B$
   (d) What is $B - A$

3. $A = \{x | x \leq 1\}$
   $B = \{x | x > 0\}$
   (a) What is $A \cap B$
   (b) What is $A \cup B$
   (c) What is $A - B$
   (d) What is $B - A$

4. In a school of 100 students there are
   81 know French
   65 know German
   56 know both languages
   (a) How many students do not know French?
   (b) How many students do not know either French or German?
   (c) How many students do know German, but not French?

5. A standard deck of cards has 52 cards.
   (a) What is the probability of drawing an ace from the shuffled deck of cards?
   (b) What is the probability of drawing anything but an ace?
   (c) What is the probability of drawing two aces?
   (d) What is the probability of drawing two red aces?

6. A number is chosen at random from a set of whole numbers from 1 to 50. Calculate the probability that the chosen number is not a perfect square.

7. How many arrangements of the letters in the word LETTERS?

8. How many arrangements of the letters in the word MISSISSIPPI?

9. Formula for Permutations? Combinations?

10. Calculate $P(5, 3)$, $C(5, 3)$.

11. In how many ways can you arrange 3 objects?

12. In how many ways can you select a team of 2 from 6 people (order does not matter)?

13. In how many ways can you select the team captain and the goalie out of 6 players?