

MATH 6: THANKSGIVING MATH BATTLE

November 22, 2020

1. Find A if you know that $A \cup \{5, 7\} = \{3, 5, 7, 8\}$, $A \cap \{1, 2, 5, 7\} = \{5, 7\}$.
2. Find sets A {}, B {}, C {} if you now that
$$A \cup B = \{1, 3, 4, 5, 7\},$$
$$B \cup C = \{1, 2, 4, 5, 6, 8, 9\},$$
$$(A \cup B) \cap C = \emptyset,$$
$$(B \cup C) \cap A = \{1, 5\}.$$
3. Draw on a number line: $(-6, 15] \cap [-15, 6)$.
4. Draw the complement to the interval $(-15, 15)$ on a number line and describe it using interval notations.
5. Complete logic expression $A \text{ and } B = \bar{A} \text{ ? } \bar{B}$, Prove that this is correct using truth table.
6. 150 people at a Billie Eilish concert were asked if they knew how to play piano, drums or guitar.
 - a. 18 people could play none of these instruments.
 - b. 10 people could play all three of these instruments.
 - c. 77 people could play drums or guitar but could not play piano.
 - d. 73 people could play guitar.
 - e. 49 people could play at least two of these instruments.
 - f. 13 people could play piano and guitar but could not play drums.
 - g. 21 people could play piano and drums.

How many people can play piano? drums?

7. Oksana is waiting in the main room during the Math Battle and is bored. She tosses a coin. She tossed it 6 times and got 2 T and 4 H. In how many ways she can have this outcome?
8. A Zagzigzeger alphabet has 7 letters. Each word in Zagzigzeger language consists of exactly 7 letters. Write an expression (you don't have to calculate it!) how many possible words you can have. (*Hint: (a) for the first position how many possibilities you have? (b) For every position in (a) how many possibilities you have given that you have already used one letter? and so on...*)