Don’t forget quiz sheets have two sides!

September 9, 2015

1 Short answer questions

1. (Counting: possible overcounting) How many ways can you pick a committee of three people from a room full of eight people, where the order of the three people doesn’t matter?

2. (Concept: counting by independent choices) How many ways can you write down a 3-letter ‘word’ (doesn’t need to mean anything!) using the alphabet \{a, b, c, d, e, f, g\}, where the first letter must be a vowel?

3. (Concept: counting subsets) Compute \(|\mathcal{P}(\mathcal{P}(\{1, 2, 3\}))|\).

4. (Concept: cardinality of Cartesian product or power) 
   Compute \(|A \times \mathcal{P}(A)|\).

5. (Def: universe, complement, Venn diagram) Draw a Venn Diagram of three sets \(A, B,\) and \(C\) and shade in the region corresponding to \((A \cup B) \cap C\).
6. (Def: union, intersection, difference) Which two of the following are equal, no matter what the sets $A$ and $B$ are?

(a) $(A \cup B) \cap A$
(b) $(A \cap B) \cup B$
(c) $(A \cap B) - B$
(d) $(A - B) \cap B$

7. LAST CHANCE (Def: subset, power set) Compute the power set of \{\emptyset, \{\emptyset\}\}.

8. LAST CHANCE (Def: ordered pair, ordered $n$-tuple, Cartesian products and powers) Draw in a picture of $\mathbb{R}^2$, the set $[0, 1] \times \{2\}$.

9. LAST CHANCE (Def: set builder notation)
   Give set builder notation for the set \{1, 3, 5, 7, \ldots\} i.e., the set of positive odd numbers.

10. LAST CHANCE (Def: set, element, equality of sets, empty set, cardinality of set)
    Give an example of a single set $S$ which satisfies the following properties, all at once:
    
    • $|S| = 4$
    • $\{\emptyset\} \in S$
    • $\{\emptyset\} \subset S$