CSCI 301 - Assignment 1, Fall 2024

Your name here

Modify the .tex source file for this document, replacing the placeholders with your solutions. This is an individual assignment. See the syllabus for the collaboration policy.

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1. (3 points) Write the following set using set builder notation: $\{..., -4, -1, 2, 5, 8, 11, 14, 17, ...\}$

   Answer
   Replace this text, including the emphasis, with your answer.

2. (3 points) Write the set of all rational numbers using set builder notation and without using $\mathbb{Q}$.

   Answer
   Replace this text, including the emphasis, with your answer.

3. (3 points) Explicitly write out the contents of the following set: $\{X \in \mathcal{P}(\{1, 2, 3\}) : 2 \in X\}$

   Answer
   Replace this text, including the emphasis, with your answer.

4. (6 points) Let $S = \{\mathbb{Z}, 1, \{1, 2\}, \{\varnothing\}\}$. Indicate whether each of the following statements is True or False.

   (a) $|S| = 4$ **Answer:** *Replace this text, including emphasis, with True or False*
   (b) $1 \in S$ **Answer:** *Replace this text, including emphasis, with True or False*
   (c) $2 \in S$ **Answer:** *Replace this text, including emphasis, with True or False*
   (d) $\varnothing \in S$ **Answer:** *Replace this text, including emphasis, with True or False*
   (e) $\varnothing \subseteq S$ **Answer:** *Replace this text, including emphasis, with True or False*
   (f) $\mathbb{Z} \subseteq S$ **Answer:** *Replace this text, including emphasis, with True or False*

5. (5 points) Suppose we define the following sets:

   - $A = \{1, 2\}$
   - $B = \{\varnothing\}$
   - $C = \varnothing$
   - $D = \{\varnothing, \{1, 3\}\}$

   Compute each of the following Cartesian products. Add your answer to the existing line:

   (a) $A \times B =$
   (b) $A \times C =$
   (c) $A \times D =$