Problem Set 2 - PS & SOC Math Prefresher

NAME HERE

Include all your work. You can do this by hand or type it up in R markdown. Your choice as long as it's readable.

Due start of class on Day 5.

1. Summation
   (a) $\sum_{n=1}^{7} 3$
   (b) $\sum_{n=0}^{4} 2n + 8$
2. Limits and Continuity
   (a) Graph $x^2 + 2$ and plot the tangent line at $x = 0$.
   (b) What is a limit?
   (c) Why do we care about limits and tangents?
   (d) What is a continuous function?
3. Set theory
   (a) In roster notation, write the set characterized in set-builder notation as $S = \{x \in \mathbb{Z}, 2 < x < 5\}$.
   (b) Is the following statement True or False? $\forall x \in S, x \geq 2$ for $S = \{3, 2, 5, 9\}$.
   (c) Is the following statement True or False? $\exists x \in S \; s.t. \; x \notin \mathbb{Z}$ for $S = \{3, 2, 5, 9\}$.
   (d) Is $\{1, 2, 3, 4\}$ a subset of $\{4, 3, 1, 2\}$? Is it a proper subset?
   (e) Using logical symbols (including $\exists$ and $\forall$) write the definition of a proper subset.
   (f) If $A = \{soup, 8\}$ and $B = \{x, soup\}$ find $A \cup B$.
   (g) (Follow-up): Now find $A \cap B$.
   (h) (Follow-up): Find the Cartesian Product $A \times B$.
4. Review:
   (a) Write out '6 choose 3' mathematically and solve.
   (b) Add these two matrices: $\begin{bmatrix} 2 & 4 & 2 \\ 1 & 4 & 0 \\ 2 & 6 & 0 \end{bmatrix} + \begin{bmatrix} 5 & 1 & 1 \\ 2 & 2 & 2 \\ 4 & 1 & 3 \end{bmatrix}$
   (c) Multiply these two matrices: $\begin{bmatrix} 2 & 4 & 2 \\ 1 & 4 & 0 \\ 2 & 6 & 0 \end{bmatrix} * \begin{bmatrix} 5 & 1 & 1 \\ 2 & 2 & 2 \\ 4 & 1 & 3 \end{bmatrix}$
   (d) Provide an example matrix, showing what happens when you multiply by the identity matrix.
   (e) List three things you struggled with on yesterday's assignment.
   (f) What is your plan for improving the items listed above?