

Problem Set 2 - PS & SOC Math Prefresher Can do all work/responses on this sheet of paper.
Due start of class – day 3.

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 $A = \{\text{soup}, 8\}$ and $B = \{x, \text{soup}\}$ 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?