**Assessment Evaluation - POST Math Prefresher - 9/2021 33 possible points**
We've just spent a magical week together. This is to see how much stuck from the course and to help you identify areas that could use more attention and development. Do your best. **Note: THERE ARE TWO PAGES!**

**Background questions:**
Name, discipline and subfield?

**Questions**

1. Basics
   (a) Explain the significance or use of the following symbols:
      i. $\Sigma$
   (b) Solve: (no need to simplify but show steps/work if possible)
      i. $5 \leq x - 3$
      ii. $-9x - 2 > 3$
      iii. $|x - 2| \leq 3$
      iv. $2e^{6x} = 18$
      v. $e^{x^4} = 1$
      vi. $ln(x^2) = 5$
      vii. $\sum_{n=1}^{10} 2 + 5n$
      viii. $5!$
      ix. $(\frac{x^6 y^{-3}}{x^2 y^3})^3$
   (c) Factor
      i. $m^2 + 3m - 4$
      ii. $x^2 + 6x + 9$
      iii. $2x^4 - 4x^2$
2. Set Theory
   (a) Explain the meaning of the following symbols:
      i. $\in$
      ii. $\forall$
   (b) Suppose $A = \{3, 6, 12\}$, $B = \{$hat, bulldozer, forklift$\}$ and $C = \{x | x$ is a natural number$| x > 3$ and $x < 11\}$
      i. What is $A \cup B$?
      ii. Write the elements of C
      iii. What is $A \cap C$?

iv. What is $A \setminus C$?

3. Functions & Pre-Calculus

   (a) What is a continuous function?

   (b) Draw an increasing function.

   (c) What is a tangent line? What does it do?

   (d) What is a derivative?

4. Matrix Algebra

   (a) Give an example of a $3 \times 4$ matrix

   (b) Consider the following matrices:

$$\mathbf{A} = \begin{bmatrix} 3 & 4 & 1 \\ 0 & 2 & 1 \end{bmatrix} \mathbf{B} = \begin{bmatrix} 0 & 1 & 1 \\ 1 & 2 & 4 \end{bmatrix} \mathbf{C} = \begin{bmatrix} 1 & 4 & 1 \\ 0 & 2 & 1 \\ 6 & 2 & 9 \end{bmatrix}$$

      i. Which matrices can be added together? Why?

      ii. Add the matrices from the above response.

      iii. Which matrices can be multiplied together? Why?

      iv. Multiply the matrices from the above response.

5. Calculus

   (a) what is the derivative of $4$?

   (b) what is the derivative of $2x$?

   (c) find the derivative of $7m^2 - m + 2$

   (d) calculate the integral $\int_0^5 (x^3 + 0.5x^2 + 5x)dx$

   (e) calculate the integral $\int e^x dx$