This exam is closed book. You have 80 minutes. You may use one side of one \(8\frac{1}{2} \times 11\) sheet of handwritten notes. You may not share notes.

Only TI 30X calculators are allowed. You may not use cell phones during the exam.

Show your work. Do not do computations in your head. Instead, write them out on the exam paper.

Place a box around [YOUR FINAL ANSWER] to each question.

If you use a trial and error (or guess and check) method when an algebraic method is available, you will not receive full credit.

If you need more room, use the backs of the pages and indicate that you have done so.

If you are not sure what a question means, raise your hand and ask us.

The hints are suggestions only.
(15 points) Compute the following limits. Show your work.

(a) (6 points) \( \lim_{x \to 3} \frac{x^2 - 4x + 3}{x^2 + 4x - 21} \)

(b) (9 points) \( \lim_{x \to 2} \frac{\sqrt{x^2 + 4} - \sqrt{8}}{x^2 - 4} \)
(a) (10 points) Find the value of $x$ where the tangent line to $f(x) = \frac{e^x}{x^4}$ is horizontal. There is no tangent line at $x = 0$, so don’t consider this point.

(b) (10 points) Find the value of the constant $A$ so that

$$\lim_{x \to \infty} \left( \frac{x^2}{x - 1} - \frac{x^2}{x - A} \right) = 8$$
Find all the values of \( x \) where \( G \) is not continuous. I see 4 suspicious points at first glance. Tell me why \( G \) is or is not continuous at each of those points.
(15 points) Calculate the derivative of \( f(x) = 1 + \frac{1}{x + 5} \) at the point where \( x = 3 \) as a limit based on the definition of the derivative.
Find the two lines tangent to the parabola $y = x^2 + 8$ that pass thru the point $(1, 0)$. 

Write them in the form $Y = mX + b$. 
The height of an object is given by the formula:

\[ H(t) = A + (Bt + C)e^{-t} \]

At time \( t = 0 \), the height of the object is 10 meters, its velocity is 0 meters/second, and its acceleration is 4 meters/second\(^2\). Find the constants \( A, B, \) and \( C \).