PRACTICE EXAM 1 - MATH 112

DATE: Friday, January 30
INSTRUCTOR: George Voutsadakis

Read each problem very carefully before starting to solve it. Each question is worth 3 points. It is necessary to show your work. Correct answers without explanations are worth 0 points.

GOOD LUCK!!

1. Find the slope of the line l that passes through the points $(-3, 4)$ and $(1, 12)$. Then, find the equation of the line l' that is parallel to l and passes through $(2, -10)$.

2. Find the domain of the function $f(x) = \sqrt{x^2 - 6x + 5}$.

3. Find the following limits

   (a) $\lim_{x \to 5} \sqrt{\frac{-3x+9}{x-7}}$

   (b) $\lim_{x \to 1} \frac{x^2-1}{x^2+7x-8}$

   (c) $\lim_{x \to 2} f(x)$, where $f(x) = \begin{cases} x^2 - 3, & \text{if } x \leq 2 \\ 2x + 1, & \text{if } x > 2 \end{cases}$

4. Discuss the continuity of $f(x) = \begin{cases} \frac{x^2-4}{x+2}, & \text{if } x < -2 \\ 3x + 2, & \text{if } x \geq -2 \end{cases}$

5. Use the limit definition to find the derivative of $f(x) = \frac{1}{x-3}$ at $x = 5$.

6. Find the equation of the tangent line to the graph of $f(x) = \sqrt{x^3}$ at the point $(4, 8)$.