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 $(-2, 3)$ and $(3, -12)$. Then, find the equation of the line l' that is perpendicular to l and passes through $(5, 10)$.

2. Find the domain of the function $f(x) = \sqrt{\frac{2x-7}{x-4}}$.

3. Find the following limits

   (a) $\lim_{x\to 3} \sqrt{\frac{-12x+4}{x-5}}$

   (b) $\lim_{x\to -2} \frac{x^2+7x-18}{x^2-2x-8}$

   (c) $\lim_{x\to -1} f(x)$, where $f(x) = \begin{cases} x^2-3, & \text{if } x < -1 \\ 5, & \text{if } x = -1 \\ 2x-2, & \text{if } x > -1 \end{cases}$

4. Discuss the continuity of $f(x) = \begin{cases} \frac{x^2-3x+2}{x^2-4x+3}, & \text{if } x \neq 1, 3 \\ \frac{1}{2}, & \text{if } x = 1 \end{cases}$

5. Use the limit definition to find the derivative of $f(x) = \sqrt{x-3}$ at $x = 7$.

6. Find the equation of the tangent line to the graph of $f(x) = x^3 - 2x^2 + 4x - 1$ at the point $(2, 7)$.