

PRACTICE EXAM 1 - MATH 151

DUE DATE: Friday, January 30

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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. Consider the functions $f(x) = \frac{x-2}{x+3}$ and $g(x) = \ln x - 2$. Find the domain of f , the domain of g , the formula giving $(g \circ f)(x)$ and the domain of $g \circ f$.
2. Find the equation of the line that is parallel to the line passing through $(3, 1)$ and $(-2, 11)$ and has y -intercept $(0, 2004)$.
3. Find (showing all the work needed) the limits

(a) $\lim_{x \rightarrow 2} \frac{x^2 - 3x + 1}{x^2 - 7}$

(b) $\lim_{x \rightarrow 3} \frac{\sqrt{x+1} - 2}{x-3}$

(c) $\lim_{x \rightarrow 3} f(x)$, where $f(x) = \begin{cases} \frac{x^2 - 10x + 21}{x^2 - 9}, & \text{if } x < 3 \\ -\frac{2}{9}x, & \text{if } x \geq 3 \end{cases}$

4. Find the following limits showing all the work needed:

(a) $\lim_{x \rightarrow -\infty} \frac{x^2 + 7x + 1}{\sqrt{x^2 - 5}}$

(b) $\lim_{x \rightarrow -\infty} \frac{7x - 1}{2x - 11}$

(c) $\lim_{x \rightarrow +\infty} \frac{\sqrt{x^5 + 8}}{x^2 - 8x + 2}$

5. Study with respect to continuity the function

$$f(x) = \begin{cases} \frac{x^2 - 4}{x + 2}, & \text{if } x < -2 \\ x + 1, & \text{if } -2 \leq x \leq 3 \\ -x^3 + 31, & \text{if } x > 7 \end{cases}$$

6. Find a value for the constant k , if possible, so that the function f is continuous everywhere. $f(x) = \begin{cases} 3kx^2 + 2k, & \text{if } x \leq 1 \\ -4x + k, & \text{if } x > 1 \end{cases}$