Exam 1 March 2, 2006 SHOW ALL WORK
Math 25 Calculus I Either circle your answers or place on answer line.
No Calculators Allowed

[14] 1.) Find the derivative of the following function: $f(x) = \sqrt{x + \sqrt{x}}$

Answer 1.) $f'(x) =$ _____

[15] 2.) If $f(x) = \frac{4x^3+3e^x-10}{x-4} + \frac{1}{x}$, then $f'(2) =$ _____

[14] 3.) Find the equation(s) of the horizontial asymptote(s) of the following function. SHOW ALL STEPS.

$g(x) = \frac{x^2+4}{x^3+x}$

Answer 3.) _____

[12] 4.) Find the following limit.

$$lim_{x \to 3} \frac{-2(x-2)^3(x-8)^4}{(x-3)^8(x-10)^5} = \_\_\_\_\_$$

[14] 5.) Let $f(x) = x^2 - 5$. Use the limit definition of derivative to find $f'(3)$.

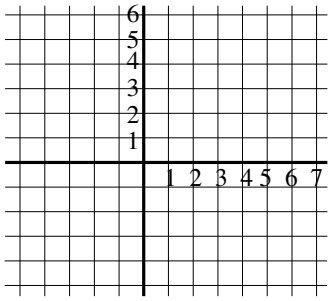
What is the slope of the tangent line at $x = 3$? _____

[12] 6.) Express the given quantity as a single logarithm (SIMPLIFY your answer):

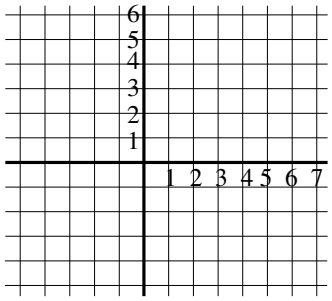
$$ln5 - 2ln3 + 4ln2 - 3ln1 = \_\_\_\_\_$$

[9] 7.) If $g(x) = 3x - 4$, then $g^{-1}(x) =$ _____.
Graph $y = g(x)$, $y = g^{-1}(x)$, $y = \frac{1}{g(x)}$

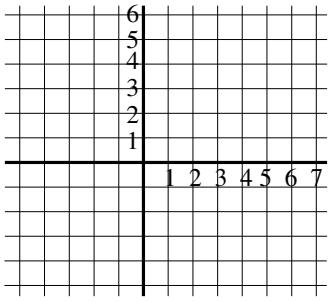
$y = g(x)$,



$y = g^{-1}(x)$,



$y = \frac{1}{g(x)}$



[10] 8.) Sketch the graph of an example of a function f that satisfies all of the given conditions:

Domain of $f = [-4, 6)$, range of $f = (-\infty, 5]$, not 1:1,

continuous everywhere except at $x = -2, 2$,

differentiable everywhere except at $x = -2, 2, 4$,

$lim_{x \to -2^-} f(x) = -\infty$, $lim_{x \to -2^+} f(x) = -\infty$, $lim_{x \to 3} f(x) = 4$

[3 pts extra credit if your function also satisfies $f'(1) = 0$, $f'(x) > 0$ for $x \in (1, 2)$, $f'(x) = 0$ for $x \in (0, 1)$]