The following are the verbal remarks that were made at the beginning of the exam:

For problem 3, find the vertical and horizontal asymptotes using limits and show all steps. The answer alone does not give full credit. For problem 6, you should write down the unit of the rate of the increase given that the unit of radius is cm.

Exam 1 Oct. 6, 2005 SHOW ALL WORK

Math 25 Calculus I Either circle your answers or place on answer line.

Find the following derivatives:

[15] 1.) $\frac{d}{dx}[3x \cdot cos(x) \cdot sin(2x)]$

Answer 1.) ______________________________

[15] 2.) $\frac{d}{dx}[cos(\sqrt{e^{x^2+1}})]$

Answer 2.) ______________________________

3.) Find the equations of all vertical and horizontal asymptotes for $f(x) = \frac{-5(x^2-4)(2x-9)}{(x-2)(x-3)^2}$.
Show ALL steps.

[15] horizontal asymptotes) ______________________________

[15] vertical asymptotes) ______________________________

[13] 4.) Find the derivative of $f(x) = \frac{1}{x}$ by using the definition of derivative.

$f'(x) =$ ________________

[12] 5.) Find the exact value of the following expression (SIMPLIFY your answer):

$$log_4 10 + 3log_4 2 - log_4 5 + 4^{log_4 3} + log_4 1 = \_\_\_\_\_\_\_\_\_\_\_\_$$

[7] 6.) A spherical balloon is being inflated. Find the rate of increase of the surface area ($S = 4\pi r^2$) with respect to the radius r when r is 10cm. (note your answer should include units). Find the average rate of increase of the surface area with respect to radius as r increases from 10cm to 12cm.

rate of increast at $r = 10\text{cm} =$ ______________

average rate of increast as r increase from 10cm to 12cm = ______________

[8] 7.) Draw the graph of a function with the following properties:
domain = $[-5, 7]$, range = $[-4, 6]$,
$f(-4) = 5$ $f'(x) = -2$ if $-3 < x < -1$,
f is continuous, but not differentiable at 0,
f is not continuous at 2
$f'(4) = 0$