Exam 1 Oct. 6, 2005 Math 25 Calculus I

## SHOW ALL WORK

Either circle your answers or place on answer line.

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)

Find the following derivatives:

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

Answer 1.)

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

[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 = 10cm = \_\_\_\_\_

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

