Exam 1 Oct. 6, 2005

## SHOW ALL WORK

Math 25 Calculus I Either circle your answers or place on answer line.
3.) Find the equations of all vertical and horizontal asymptotes for $f(x)=\frac{-5\left(x^{2}-4\right)(2 x-9)}{(x-2)(x-3)^{2}}$. Show ALL steps.
[15] horizontal asymptotes)
[15] vertical asymptotes)

Find the following derivatives:
[15] 1.) $\frac{d}{d x}[3 x \cdot \cos (x) \cdot \sin (2 x)]$

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

Answer 2.)
[13] 4.) Find the derivative of $f(x)=\frac{1}{x}$ by using the definition of derivative.

$$
f^{\prime}(x)=
$$

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

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

[7] 6.) A spherical balloon is being inflated. Find the rate of increase of the surface area $\left(S=4 \pi r^{2}\right)$ with respect to the radius $r$ when $r$ is 10 cm . (note your answer should include units). Find the average rate of increase of the surface area with respect to radius as $r$ increases from 10 cm to 12 cm .
rate of increast at $r=10 \mathrm{~cm}=$ $\qquad$
average rate of increast as $r$ increase from 10 cm to $12 \mathrm{~cm}=$ $\qquad$
[8] 7.) Draw the graph of a function with the following properties:
domain $=[-5,7]$, range $=[-4,6]$,
$f(-4)=5 f^{\prime}(x)=-2$ if $-3<x<-1$,
$f$ is continuous, but not differentiable at 0 ,
$f$ is not continuous at 2
$f^{\prime}(4)=0$


