

Exam 2 Nov. 10, 2005
Math 25 Calculus I

SHOW ALL WORK
Either circle your answers or place on answer line.

[16] 1.) If $f'(x) = 3x^4 + 2 + 4x^{-1}$ and $f(1) = 8$, find f

Answer 1.) _____

[16] 2.) $\lim_{x \rightarrow 0^+} [x^{x^3}] =$ _____

[10] 3a.) Given $x^2 + 2xy + y^3 - x - 3 = 0$, then $y' =$ _____

[6] 3b.) Find the equation of the tangent line to the curve $x^2 + 2xy + y^3 - x - 3 = 0$, at the point $(-2, 1)$.

Answer 3b.) _____

[16] 4.) If $g(3) = 4$ and $g'(x) \leq 2$, how large can $g(8)$ be? _____

[16] 5.) A tank is in the form of an inverted cone having a height of 16m and a diameter at the top of 8 m. Water is flowing into the tank at the rate of $2 \text{ m}^3/\text{min}$. How fast is the water level rising when the water is 5m deep? (Volume of cone = $\frac{1}{3}\pi r^2 h$)

Answer 5.) _____

6.) Find the following for $f(x) = \frac{x}{(x-1)^2}$ (if they exist; if they don't exist, state so). Use this information to graph f .

Note $f'(x) = \frac{-x-1}{(x-1)^3}$ and $f''(x) = \frac{2(x+2)}{(x-1)^4}$

[1] 6a.) critical numbers: _____

[1.5] 6b.) local maximum(s) occur at $x =$ _____

[1.5] 6c.) local minimum(s) occur at $x =$ _____

[1.5] 6d.) The global maximum of f on the interval $[0, 5]$ is _____ and occurs at $x =$ _____

[1.5] 6e.) The global minimum of f on the interval $[0, 5]$ is _____ and occurs at $x =$ _____

[1.5] 6f.) Inflection point(s) occur at $x =$ _____

[1] 6g.) f increasing on the intervals _____

[1] 6h.) f decreasing on the intervals _____

[1.5] 6i.) f is concave up on the intervals _____

[1.5] 6j.) f is concave down on the intervals _____

[1.5] 6k.) Equation(s) of vertical asymptote(s) _____

[4] 6l.) Equation(s) of horizontal and/or slant asymptote(s) _____

[4] 6m.) Graph f

