MATH 161 EXAM 2, Spring 2021

Name:

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1. Let $f(x) = x^3 - 3x + 1$. Find:

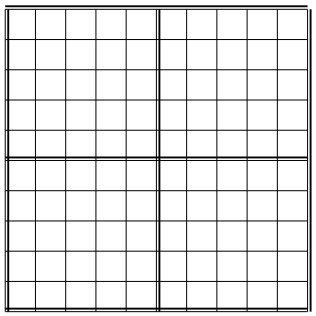
a) The critical values.

Ans:_____.

b) The relative maxima.

Ans:_____.

2. Sketch the graph of $y = 8xe^{-x/2}$. Show everything (ie: Max, min, IP's, asymptotes.)



Max:_____Min: _____.

IP's:_____Asymp: _____.

3. Use implicit differentiation to find dy/dx:

$x^2y^2 + x\sin y = 1$

Ans:_____.

4. Differentiatate the functions

a) $f(x) = \sinh^{-1}\sqrt{x}$

Ans:_____.

b) $y = x^{\ln x}$

Ans:_____.

5. The position of a particle is given by $s(t) = \sin(2\pi t)$. Find:

a) The velocity at $t = 1/8$.

Ans:_____.

b) The acceleration at $t = 1/8$.

Ans:_____.

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6. If a snowball melts so that its surface area ($S = 4\pi r^2$) decreases at a rate of 4 cm^2/min, find the rate at which the diameter decreases when the diameter is 12 cm.

Ans:_____.

7 Let $y = f(x)$ be defined implicitly by the equation $x^4 + y^4 + 4y = 6$.

a) Find dy.

Ans:_____.

b) Find the linearization of $f(x)$ at $(1, 1)$.

Ans:_____.

9. Find the absolute maximum and minimum of $f(x) = x^{1/3}$ in the interval $[-1, 8]$.

f_{max}=_____.

f_{min}=_____.

9 The position of a particle in the interval $[1, 3]$ is given by $s(t) = t^2 + t - 4$.

a) Find the average velocity in this interval.

Ans:_____.

b) Find a "c" satisfying the MVT on $I = [1, 3]$.

Ans:_____.

10 Use l'Hôpital's rule to find:

a) $\lim_{x\to 0} \dfrac{1 - \cos x}{5x^2}$.

Ans:_____.

b) $\lim_{x\to \infty} \dfrac{\ln(x^3)}{x}$.

Ans:_____.

Extra space