

MA 125 CALCULUS I

Oct 19, 2011

Name (Print last name first):

Student Signature:

No calculators are allowed!

Part I consists of 10 questions (5 pts each). Show your work!

(1) Differentiate $y = \ln(x^4 - 2)$.

Answer:

(2) Differentiate $f(x) = e^{x^2+x}$.

Answer:

(3) Find $f'(x)$ if $y = f(x) = x^3 \cos^{-1}(x)$.

Answer:

(4) Find y' if $y = f(x) = \ln\left(\frac{e^{2x}+1}{e^x-1}\right)$.

Answer:

(5) Differentiate $y = f(x) = \arctan(\sqrt{x})$.

Answer:

(6) Use Newton's method to find the second approximate solution x_2 to the equation $\sqrt{x} - 3 = 0$ if $x_1 = 8$.

Answer:

(7) Evaluate $\sin(\cot^{-1}(x))$

Answer:

(8) Find the linearization of $f(x) = \cos(x)$ at $x = -\pi/2$

Answer:

(9) Evaluate $\lim_{x \rightarrow \infty} \frac{\ln(x^2)}{\sqrt{x}}$

Answer:

(10) Find y' if $y = \ln(\cot(x))$

Answer:

Part II consists of 4 problems. You must show your work on Problems 2-4 of this part to get full credit. Displaying only the final answer (even if correct) without the relevant steps will not get credit.

Problem 1[12pts]

What are the derivatives and ranges of:

$$\sin^{-1}(x)$$

$$\arccos(x)$$

$$\arctan(x)$$

$$\csc^{-1}(x)$$

$$\sec^{-1}(x)$$

$$\cot^{-1}(x)$$

Problem 2[13pts]

Find y' if $y = x^{x^2}$.

Problem 3[13pts]

Use a linearization of $f(x) = \sqrt{x}$ to find an approximation for $\sqrt{35.99}$.

Problem 4[12pts]

Find the limits

(a)

$$\lim_{x \rightarrow 0} \frac{1 - \cos(3x)}{x^2}$$

(b)

$$\lim_{x \rightarrow 0^+} (\sin(x))^x$$