

Advanced Placement Calculus

Name _____

Copy original problem.

Per _____

Date _____

Convince *me* that **you** understand the concept!

Chapter 5 Exam

I Evaluate the following. No decimals. (12 pts ea)

a) $y = \tan^{-1} \sqrt{1 + x^2}$
Find $y'(1)$

b) $y = (x + 1)^{(x+1)}$
Find $y'(1)$

c) $y = (\ln x)^x$
Find $y'(e^2)$

d) $y = \left(\frac{2x}{1-x} + \frac{2}{x-1} \right)^e$
Find $y'(2)$

e) $y = \ln \left[\frac{\sqrt{2x+1} \sqrt[3]{3x+2}}{(x^2+1)^5} \right]$
Find $y'(1)$

II Derivatives of the inverse trig functions. (tot 40 pts)

a) Prove: $\sin(\cos^{-1} x) = \sqrt{1-x^2}$

b) Prove: $\frac{d(\cos^{-1} x)}{dx} = \frac{-1}{\sqrt{1-x^2}}$

c) Compute $\text{nDeriv}(\sin(2 \cos^{-1} x), x, .5)$ where “nDeriv(” is under the “math” menu.

d) Given: $f(x) = \sin(2 \cos^{-1} x)$

- 1) First simplify the function using the “sine add” formula then find the derivative of the result. Evaluate your derivative at $x = .5$.
- 2) Using the chain rule, find the derivative of $f(x)$ as it stands. Evaluate your derivative at $x = .5$.

Extra Credit ----- 5 pts -----Given: $p(x)$ is a non-zero odd function; $q(x)$ is a non-zero even functionWhich of these must be odd: I. $q(p(x))$ II. $p(q(x))$ III. $p(x)q(x)$.

- A) I B) II C) III D) I and II E) none of these