Math 1A (9:30am - 10:20am)

Ouiz 6

Fri Feb 20, 2009

DUE MON FEB 23, 2009 IN CLASS

SCORE: ___ / 20 POINTS

What month is your birthday?

What are the first 2 digits of your address?

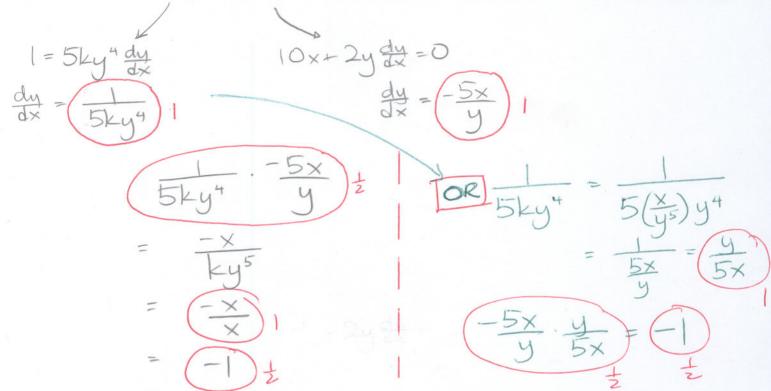
What are the last 2 digits of your zip code?

What are the last 2 digits of your social security number?

IF YOU DO NOT HAVE A SOCIAL SECURITY NUMBER, USE YOUR STUDENT ID NUMBER

Show that the families of curves $x = ky^5$ and $5x^2 + y^2 = c$ are orthogonal for all constants k and c.

SCORE: /4 POINTS



Determine if each statement below is true or false (circle TRUE or FALSE), and give a brief explanation. You will receive 0 credit if you circle TRUE or FALSE but you do not give an explanation.

SCORE: /8 POINTS

TRUE (FALSE The Mean Value Theorem applies to the

function
$$f(x) = \sqrt[3]{x}$$
 on the interval $[-1, 1]$.

$$f$$
 NOT DIFF AT $x=0$

SINCE $f'=\frac{1}{3}x^{-\frac{2}{3}}=\frac{1}{3\sqrt[3]{x^2}}$

TRUE (FALSE Rolle's Theorem applies to the function

$$f(x) = \frac{1}{x^2}$$
 on the interval $[-2, 2]$.

TRUE (FALSE) Rolle's Theorem applies to the function

$$f(x) = x^3$$
 on the interval $[-2, 2]$.

$$f(-2) = -8$$

 $f(2) = 8$
 $f(-2) \neq f(2)$

TRUE FALSE The Mean Value Theorem applies to the

function
$$f(x) = \tan x$$
 on the interval $\left[-\frac{\pi}{4}, \frac{\pi}{4} \right]$.

AND OIFF. ON (-]]

$$\frac{1}{f(x)} f(x) = \frac{1}{smx \ln sec x} + cos x = \frac{1}{secx} secx + tan x$$

$$= \frac{-smx \ln sec x + sin x}{1 + sec x} = \frac{1}{secx} secx + tan x$$

$$= \frac{1}{smx \ln sec x} + sin x = \frac{1}{secx} secx + tan x$$

$$= \frac{1}{smx \ln sec x} + cos x = \frac{1}{secx} secx + tan x$$

$$= \frac{1}{secx} secx + tan x$$

Prove that $f(x) = x^4 + 4x^2 - 4$ has exactly 2 zeros.

You must provide a logical and fully justified argument to receive full credit.

SCORE: ___/ 5 POINTS

SINCE f IS A POLYNOMIAL,

THEREFORE , F IS CONTINUOUS AND DIFFERENTIABLE EVERY WHERE,

SINCE f(-1)=1 AND f(0)=-4 AND f(1)=1

50 f(0) < O < f(-1) AND f(0) < O < f(1)

SO BY IVT, THERE ARE AT LEAST 2 ZEROS,

ONE IN (-1,0) AND ONE IN (0,1)

SUPPOSE & HAS AT LEAST 3 ZEROS,

THEN BY TH'M 9.3 F' HAS AT LEAST 2 ZEROS

BUT f'(x)=4x3+8x = 4x(x2+2)=0 ONLY WHEN X=0

SO & DOES NOT HAVE AT 3 ZEROS,

SO f MUST HAVE EXACTLY 2 ZEROS

1 POINT BACH