Prepa Tec
Calculus I 2nd partial
Quiz # 1A

Name Isabella Ruiz Ordóñez Mat. A01570125

I. Circle the right answer. (5 point each)

1) Find the slope for $f(x) = -5x^2$ at $x = 3$

A) 30 B) – 75 C) – 45 D) -30

2) What is the equation of the tangent line for the curve $y = x^3+2$ at the point (-1,1)

A) $y = -3x + 4$ B) $y = 3x - 4$ C) $y = 3x + 4$ D) $y = -3x - 4$

3) The following functions is not differentiable at $x = -4$

a) $f(x) = |x+4|$ b) $f(x) = x^2 - 4$ c) $f(x) = \frac{x+2}{x-4}$ $f(x) = \sqrt{-x} + 4$

4) The following function is not differentiable at $x = 1$

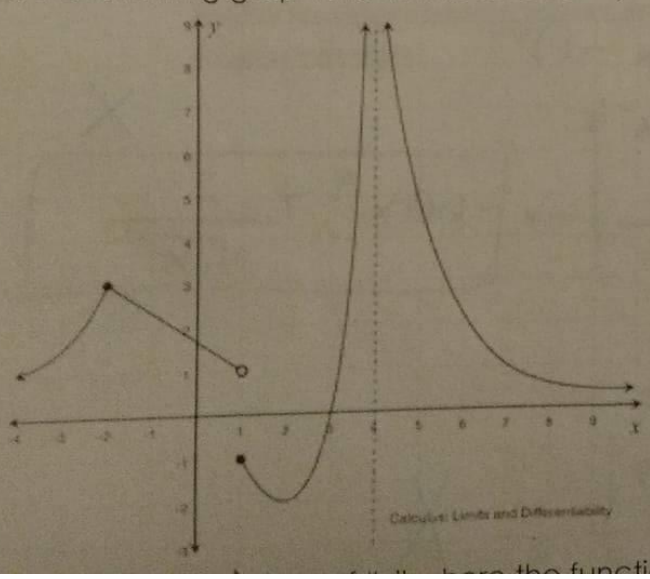
a) $f(x) = \frac{1}{x+1}$ b) $y = (x-1)^3$ c) $f(x) = |x+1|$ d) $f(x) = \sqrt[3]{x-1}$

II. Answer the following questions.

1. The position of an object, s, at any time, t, is given by: (15 points)
$s(t) = -18t^3 + 15t + 8$ where s is measured in feet and t is measured in seconds.
Find the equation of acceleration at any time $a(t)$.

$a(t) = -54t^2 + 15$

2. The following graph shows the function $y = f(x)$ (20 points)



Calculus: Limits and Differentiability

the function is not continuous

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Derivada de LOGARITMO con BASE

Si $f(x) = \log_a x$ con base positiva distinta de uno, entonces

$f'(x) = \frac{1}{x \cdot \ln a}$, o con las otras notaciones;

$$\frac{d \log_a x}{dx} = \frac{1}{x \cdot \ln a} \quad o \quad D_x(\log_a x) = \frac{1}{x \cdot \ln a}$$

Si $f(x) = \log_a u$, donde "a" es un núm. positivo distinto de 1 y "u" es una función derivable de "x", entonces

$$\frac{d \log_a u}{dx} = \left(\frac{d \log_a u}{du}\right)\left(\frac{du}{dx}\right) = \left(\frac{1}{u \cdot \ln a}\right)\left(\frac{du}{dx}\right)$$

EJEMPLO:

$f(x) = \log_3 x^6$

$$f'(x) = \frac{6x^5}{x^6} \cdot \log_3 e = \frac{6}{x} \cdot \log_3 e$$

$$f'(x) = \frac{6x^5}{x^6} \cdot \frac{1}{\ln 3} = \boxed{\frac{6}{x} \cdot \frac{1}{\ln 3}}$$

Prepa Tec
Calculus I 2nd partial
Quiz # 2A

Name Isabella Ruiz Ordóñez Mat. A01570125

I. Determine if true or false for each of the following statements (5 points each)

1. F The derivative of $y = 6 - e^{+x}$ is $y' = e^{-x}$

2. F The derivative of $y = Ln(x-4)^{3/2}$ is $y = \frac{3}{2} Ln(x-4)^{1/2}$

3. T If $s(t)$ is the function of position of an object in motion, then $a(t) = s''(t)$ is equal to the function of the acceleration of the object.

4. T If the velocity of the car is a function of time, then the derivative of this function with respect to time, describes the acceleration of the car.

II. Circle the right answer. (10 point each)

1. (C) The derivative for $y = 2e^{3/x}$ is:

A) $y' = 2e^{3/x}$ B) $y' = 2e^{3}$ C) $y' = -\frac{6e^{3/x}}{x^2}$ D) $y' = 6x^2 e^{3/x}$

2. (C) The derivative for $y = Ln\sqrt{2x-4}$ is:

A) $y' = \frac{1}{2x-4}$ B) $y' = \frac{1}{2} Ln(2x-4)^{-1/2}$

C) $y' = \frac{1}{2} Ln \frac{2}{\sqrt{2x-4}}$ D) $y' = \frac{1}{x-2}$

3. (C) If the equation that gives the velocity of an object is $v(t) = 2t^3 e^{6t}$, then the equation tha gives the acceleration is:

A) $a(t) = 6t^2 e^{6t}(2t+1)$ B) $a(t) = 6t^2 e^{6t}$

C) $a(t) = 36t^2 e^{6t}$ D) $a(t) = 12t^3 e^{6t}$

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5/6

$y=(-5x^3-3)^3$

$3(-5x^3-3)^2\cdot(-5x^2)$

$f'(x)=-15x^2(-5x^3-3)$

$y=(5x^2+3)^4$

$=4(5x^2+3)^3(10x)$

$f'(x)=40x(5x^2+3)^3$

$f(x)=\sqrt[4]{-3x^4-2}$

$=(-3x^4-2)^{1/4}$

$=\frac{1}{4}(-3x^4-2)^{-3/4}(-12x^3$

$=\frac{-3x^3}{(-3x^4-2)^{3/4}}$

$f(x)=\sqrt{-2x^2+1}$

$=(-2x^2+1)^{1/2}$

$\frac{1}{2}(-2x^2+1)^{1/2}(-4x)$

$2x(-2x^2+1)^{-1/2}$

$f'(x)=\frac{2x}{(-2x^2+1)^{1/2}}$

$f(x)=\sqrt[3]{-2x^4+5}$

$(-2x^4+5)^{1/3}$

$=\frac{1}{3}(-2x^4+5)^{-2/3}\cdot(-8x^3)$

$f'(x)=\frac{-8}{3(-2x^4+5)^{2/3}}$

$y=(-x^9-3)^{-2}$

Reglas de derivación- Regla de la cadena
Por: Ing. Ziad Najjar

Nombre : Isabella Ruiz Matricula: A01570125 Fecha:

Encuentra la derivada de las siguientes funciones

1) $f(x)=(4x-2)^4$

$4(4x-2)^3(4)$

$16(4x-2)^3$

2) $f(x)=(1-3x)^5$

$5(1-3x)^4(-3)$

$-15(1-3x)^4$

3) $f(x)=(x^2+x)^3$

$3(x^2+x)^2(2x+1)$

4) $f(x)=\dfrac{1}{(2x+1)^4}$

$1\cdot(2x+1)^{-4}$

$-4(2x+1)^{-5}(2)$

$-8(2x+1)^{-5}$

5) $f(x)=3(1-3x^2)^5+6x^2$

$f'(x)=15(1-3x^2)^4(-6x)+12x$

$=-90x(1-3x^2)^4+12x$

6) $f(x)=\sqrt{3x^2-2x}$

$\frac{1}{2}(3x^2-2x)^{-1/2}(6x-2)$

7) $f(x)=-\dfrac{1}{2}(3-4x)^3$

$\frac{-3}{2}(3-4x)^2(-4)$

$6(3-4x^2)$

8) $f(x)=\dfrac{3}{(x^2-x)^3}$

$f'(x)=9(x^2-x)^{-4}(2x-1)$

$f'(x)=\dfrac{-9(2x-1)}{(x^2-x)^4}=\dfrac{-18x+}{(x^2-x}$

9) $f(x)=-(x^3-4x)^3$

$-3(x^3-4x)^2(3x^2-4)$

10) $f(x)=-2\sqrt{(4-x)^3}$

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

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

Actividad Integradora de Límites
Por: *Ziad Najjar*

Tecnológico de Monterrey Preparatoria

Nombre: Isabella Ruiz Grupo: 101 Fecha Sept 5

1) Evalúa los siguiente límites **usando el método numérico**:

$\lim_{x\to -3}\left(\frac{x^2+0.5x-7.5}{x+3}\right)=$ $\frac{(x+3)(x-2.5)}{x+3}$ $= -3 - 2.5 = 5.5$

2) Evalúa los siguientes límites usando **método algebraico** :

a) $\lim_{x\to -3}\left(\frac{2x^2+5x-3}{x+3}\right)=$

$\frac{(2x+1)(x+3)}{x+3}$

$-6+1$

$=-5$

b) $\lim_{x\to 0}\left(\frac{x^2+x}{x}\right)=$

$\frac{x(x+1)}{x} = 0+1$

$= 1$

3) Evalúe los siguientes límites, mostrando el procedimiento:
*** en problemas de límites infinitos especifica si la función se aproxima $-\infty$ **ó** $+\infty$

3) $\lim_{x\to 2}(3+2x+x^2)=$

11

4) $\lim_{x\to \infty}\left(\frac{5-4x}{2x+3}\right)=$

$\left(\frac{5-4x}{2x+3}\right) = \frac{-4x}{2x} = -2$

5) $\lim_{x\to 3^+}\left(\frac{x+1}{x-3}\right)=$

$\frac{(x+1)}{x-3} = \infty$

6) $\lim_{x\to 3^-}\left(\frac{x+1}{x-3}\right)=$

7) $\lim_{x\to \infty}\left(\frac{4x-2}{x^3+5x}\right)=$

$\left(\frac{x+1}{x-3}\right) = -\infty$

100

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(a) $x^2 - 2x = \boxed{2x - 2}$ ✓

(b) $2x - 2$
$2(1) - 2 = 0$ ✓
$m = 0$

(c) $y - 1 = 0(x - 1)$
$\boxed{y = -1}$ ✓

(2) $f(x) = 4x^3 - x$ $P(2, 30)$

a) $12x^2 - 1$ ✓

b) $12(2)^2 - 1$
$m = 47$ ✓

c) $y - 30 = 47(x - 2)$
$y = 47x - 94 + 30$
$\boxed{y = 47x - 64}$ ✓

(3) $f(x) = 3x^2 - x^3 \rightarrow f(x) = -x^3 + 3x^2$ $P(2, 4)$

a) $-3x^2 + 6x$ ✓

b) $-3(2)^2 + 6(2)$
$m = 0$ ✓

c) $y - 4 = 0(x - 2)$
$y = 0 + 4$
$\boxed{y = 4}$ ✓

Prepa Tec
Calculus I 3rd partial
Quiz # 1A

Name Isabella Ruiz Ordóñez Mat. A01570125

I. Determine if true or false for each of the following statements (10 points each)

1. T The second derivative of $y = 2e^{x^3}$ is $\frac{d^2y}{dx^2} = 6xe^{x^3}(2+3x^3)$

2. F The derivative of $6x - 4x^2y = 2y^2 + 1$ is $\frac{dy}{dx} = \frac{-6}{8x+4y}$

3. T The derivative of $y = x^{2x}$ is $y' = 2x^{2x}(\ln(x)+1)$

4. F A spherical balloon is being inflated with a gas at a rate of 6 cm³ per second. Then the rate at which its radius is changing when its radius measures 8 cm is $\frac{dr}{dt} = \frac{3\pi}{128}[\frac{cm}{sec}]$. (Hint: $V = \frac{4}{3}\pi r^3$)

II. Answer the following problem. (10 points each letter)

A dynamite charge blows a rock up with a velocity of 160 ft/s. The height of the rock is given by the function $h(t) = 160t - 16t^2$ where "h" is measured in feet and "t" in seconds. Find the following:

posicion ↓ velocidad ↓ aceleracion

(16)(2) = 32t + 160

a) The equation that gives the velocity of the rock at any time.

$v(t) = -32t + 160$

b) The time when velocity is zero (that is the time to reach the maximum height)

$v(0) = -32t + 160$

$-32t + 160 = 0$

$-32t = -160$

$t = \frac{-160}{-32}$

$t = 5$

c) The maximum height of the rock (that is when velocity is zero)

$h(5) = 160(5) - 16(5)^2$

$5h = 800 - 400$

$5h = 400$

$h = \frac{400}{5}$

$h = 80$ ✗

$h(t) = 160t - 16t^2$

$h = 800 - 400$

$[h = 400]$

d) The times (on the way up and on the way down) when the height is at 256 feet.

$256(t) = 160t - 16t^2$

$t = \frac{160t - 16t^2}{256}$ →

$256 = 160t$

$256 = -16t$

$\frac{80t - 8t^2}{128}$ → $16t$

$-16t^2 + 160t - 256 = 0$

$-16 \quad 128 \quad 32$

$1 \quad 32 \quad -8$

16

$(-16$

$(t$

e) The velocities of the rock when the height is 256 feet.

$v\left(\frac{10t - t^2}{16}\right) = -32\left(\frac{10t - t^2}{16}\right) + 160$ ✗

f) The equation that gives the acceleration of the rock at any time.

-32

$160t - 16t^2$

↓

$-32t + 160$

↓

-32