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TEAM DIESEL

Practice Test #1 4/5/10

$$\lim_{x\to 0} \frac{\sin x}{\cos x - 1} = \frac{0}{0} \overset{L'H}{=} \lim_{x\to 0} \frac{\cos x}{-\sin x} = \frac{\cos(0)}{-\sin(0)} = \frac{1}{0} \text{ UND}$$

$$\lim_{x\to 0} \frac{5x - x^2}{3x^2} = \frac{0}{0} \quad \underline{L'H} \quad \lim_{x\to 0} \frac{5-2x}{6x} \overset{\text{Plug 0 for } x}{=} \frac{5}{0} \text{ UND}$$

$$\lim_{x\to 0} \left(\frac{1}{x^2+x}\right)^4 - \left(\frac{3}{4x}\right)^{x+1} = \lim_{x\to 0} \frac{4}{4x^2+4x} - \frac{3x+3}{4x^2+4x}$$ ~~Plug 0 for x~~

$$\lim_{x\to 0} \frac{-3x+1}{4x^2+4x}$$ Plug 0 for x $\frac{1}{0}$ UND

$$\lim_{x\to 0} 6x \ln x = 6 \cdot \frac{1}{x} = \frac{6}{x} = \frac{6}{0} \text{ UND}$$

$$\lim_{x\to 0} x^{2x} = e^{\lim_{x\to 0} x^{2x}} = e^{\lim_{x\to 0} 2x \ln x}$$

$$= e^{2 \lim_{x\to 0} \frac{\ln x}{\frac{1}{x}}} = e\,\frac{0}{0} = e^0 \text{ UND}$$

W.W.V.

Letice
Wilgen
Viviene.

1. Evaluate

$\lim_{x\to 0} \frac{\sin x}{\cos x - 1}$

$\lim_{x\to 0} \frac{\sin x}{\cos x - 1} = \frac{0}{0}$ (use l'hopitals rule)

$= \lim_{x\to 0} \frac{\cos x}{\sin x} = \frac{1}{0} = \infty$

$\lim_{x\to 0} \frac{5x - x^2}{3x^2}$

$\lim_{x\to 0} \frac{5x - x^2}{3x^2} = \frac{0}{0}$ (use l'hopitals rule)

$\lim_{x\to 0} \frac{5-2x}{6x} = \frac{5}{0} = \infty$

$\lim_{x\to 0} \frac{1}{x^2+x} - \frac{3}{4x}$

$\lim_{x\to 0} \frac{1}{x^2+x} - \frac{3}{4x} = \infty - \infty$

$\lim_{x\to 0} \frac{4}{4(x^2+x)} - \frac{3(x+1)}{4x(x+1)}$

$\lim_{x\to 0} \frac{1-3x}{4(x^2+x)} = \infty$

$\lim_{x\to 0} 6x\ln x$

$\lim_{x\to 0} 6x\ln x = 0 \times \infty$

$= \lim_{x\to 0} \frac{6\ln x}{x^{-1}} = \frac{\infty}{\infty}$ (use l'hopital rule)

$= \lim_{x\to 0} \frac{6x^{-1}}{-x^{-2}}$ ~~lim~~

$= \lim_{x\to 0} -6x = 0$

$\lim_{x\to 0} x^{2x}$

$\lim_{x\to 0} x^{2x} = e^{\ln\left(\lim_{x\to 0} x^{2x}\right)}$

$= e^{\left(\lim_{x\to 0} \ln x^{2x}\right)}$

$= e^{\left(\lim_{x\to 0} 2x\ln x\right)}$

$= e^{\left(\lim_{x\to 0} \frac{2\ln x}{x^{-1}}\right)}$

$= e^{\left(\lim_{x\to 0} \frac{2\ln x}{x^{-1}} = \frac{\infty}{\infty}\right)}$

$= e^{\left(\lim_{x\to 0} \frac{2x^{-1}}{-x^{-2}}\right)}$

$= e^0 = 1$

Review

SB and Pythagorus

2. $2x^3 - 6x^2 - 18x + 3$ $\quad f(x) = x^3 - 12x$

(a) $f'(x) = 6x^2 - 12x - 18$
$= 6(x^2 - 2x - 3)$
$= 6(x-3)(x+1) = 0$ $\quad \therefore x = 3, -1$

(b) $f'' = 12x - 12$
$f''(3) = 36 - 12 = 24.$ $\quad x = 3 \text{ min}$
$f''(-1) = -12 - 12 = -24$ $\quad x = -1 \text{ max}$

(c) $f(2) = -41$ min $\quad f(-1) = 13$ max
$f(-2) = -1$

(d) $f' > 0$ when $6(x-3)(x+1) > 0$ $\quad x < -1$
$x > 3$

(e) $f'' > 0$ when $12x - 12 > 0$ when $x > 1$

(f) $f''(x) = 12x - 12$
$f''(3) = 24$ min
$f''(-1) = -24$ max

(g) $f'' = 0$ when $12x - 12 = 0$ or when $x = 1$

We Love Math

Stephania
Krystina
Jessica.

2 a. $f(x) = 2x^3 - 6x^2 - 18x + 3$

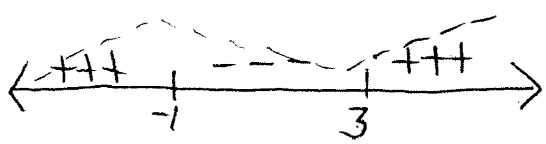
$f'(x) = 6x^2 - 12x - 18$

$6(x^2 - 2x - 3) = 0$

$6(x+1)(x-3) = 0$

$x = -1 \quad x = 3$

b.



Max $= -1$

Min $= 3$

c. $2x^3 - 6x^2 - 18x + 3$

$2(2)^3 - 6(2)^2 - 18(2) + 3$

-41

$2(-2)^3 - 6(-2)^2 - 18(-2) + 3$

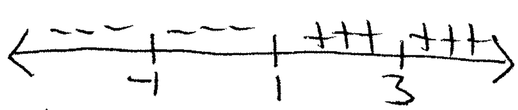
-1

$2(-1)^3 - 6(-1)^2 - 18(-1) + 3$

d. $(-\infty, -1)(3, \infty)$

$f''(x) = 12x - 12$

e.



$(1, \infty)$

f. $12x - 12$

$12(-1) - 12 = -24$ Max

$12(3) - 12 = 24$ Min

g. $12x - 12 = 0$

$12x = 12$

$x = 1$

Jalisha
Kristian
Melva

Save The Polar Bears

Newton's Method

$F(x) = 3x^3 - 8x^2 + 1000$ guess $x = 50$

50 stor $\rightarrow$ X

$x - y_1 / \text{nDeriv}(y_1, x, x) = 33.59$

33.59 stor $\rightarrow$ X

$x - y_1 / \text{nDeriv}(y_1, x, x) \rightarrow x$

$x_1 = 50$

$x_2 = 33.59447\ldots$

$x_3 = 22.60521\ldots$

$x_4 = 15.15573\ldots$

$x = -6.14908\ldots$

Team Kickass

#4

$S(t) = -9t^2 + 10t + 50$ $\quad$ $S(t)' = -18t + 10$

1. What is the velocity at $t=2$?

$S'(2) = -18(2) + 10 = -26$

2. What is the acceleration at $t=2$?

$A(t) = -18$, $A(2) = -18$

Verify that there must be a time between $t=0$ and $t=2$ where the speed is 8 mph.

$S(0) = 50$
$S(2) = -36 + 70 = 34$

$S(0) - S(2) = 34 - 50 = \frac{-16}{2} = -8$

At what time did that occur?

$$
\begin{aligned}
-8 &= -18t + 10 \\
-10 & \qquad\;\; -10 \\
\hline
\frac{-18}{-18} &= \frac{-18t}{-18} \\
\boxed{1 = t}
\end{aligned}
$$

Suppose that during a trip, the distance traveled away from home S miles at time t hours has velocity function $V(t) = -9t + 50$ and $S(0) = 10$

a. Find s(t)?

$s(t) = -4.5t^2 + 50t + C$ $\quad 10 = 0 + C$

$s(0) = 10$ $\quad 10 = C$

$\boxed{s(t) = 4.5t^2 + 50 + 10}$

b. What is the acceleration at $t = 2$?

$a(t) = v'(t)$

$= -9$

$a(2) = -9$

Bianca
Stan
Max

CIVARC

4 a) $s(t) = -9t^2 + 10t^2 + 50$

$s'(t) = -18t + 10$

$s'(2) = -26$

b) $s''(t) = -18$

c) $s(0) = 50$

$s(2) = 34$

$$\frac{34 - 50}{2 - 0} = -8$$

d) $-8 = -18t + 10$

$t = 1$

a) $s(t) = -9t + 50$

$s(0) = 10$

$$s(t) = \frac{-9t^2}{2} + 50t + c$$

$s(0) = 0 + 0 + c = 10$

$c = 10$

b) $s'(t) = -9$

MAT151... Team α — 5/5/10

CALC FINALS PRE-TEST: #5. — Jonathan Chen

5.) 1a.) $S(p) = 300 + 20p - p^2$

$R(p) = pS(p) = 300p + 20p^2 - p^3$

$R(p) = 300p + 20p^2 - p^3$

1a.) [2nd] + [CALC] : "#4 max" : [left bound = 15   right bound = 19]

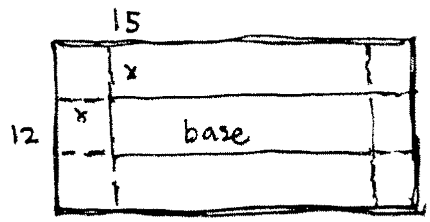
$\boxed{x = 18.685}$

1b.) [2nd] + [CALC] : "#3 min" : [left bound = 25   right bound = 30] for 1

$x = 30$

[2nd] + [CALC] : "#1 value" : $x = 0.01$

$\boxed{\therefore x = 0.01, 30}$



2a.) $V = lwh$

$= (15-2x)(12-2x)x$ *

$= 180x - 54x^2 + 4x^3$

$V' = 180 - 108x + 12x^2 \Rightarrow 12(x^2 + 9x - 15)$

$\therefore V = (15 - 2(2.2))(12 - 2(2.2))(2.2)$

$\boxed{= 177.23 \text{ max volume}}$

* graph [y=] : "$y_1 = V$"
[window] : Xmin = 0 / Xmax = 10
ymin = −15.22 / ymax = 400
[2nd] + [CALC] : "#4 max" [LB: 1.7 / RB: 2.2]
ans: max @ 2.2

(2c.) $V_1 = (150 - 2(22))(120 - 2(22))(22)$

$\boxed{= 20416.0 \text{ max volume}}$

★ for 2b.)

[y=] : "$y_1 = V$" [window : xmin = 2.5 / xmax = 3.0] "x = 2.5" (value)

local max @ 175.00

for 2d.)

[y=] : "$y_1 = V_1$" (window : xmin = 25 / xmax = 30] "~~x =~~ 25" (value)

abs. max @ 175,000

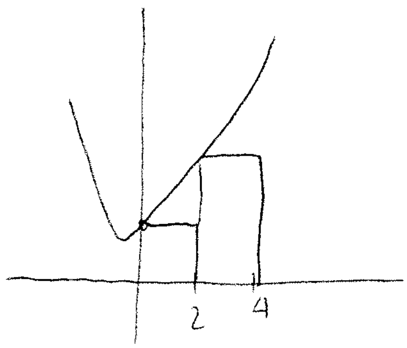
min @ 162,000

#6

FRSCH

$$y = x(x+1) + 2$$

$$= x^2 + x + 2$$



$x = 0 \Rightarrow y = 2$

$x = 2 \Rightarrow y = 8$

- Left End:

$$A = 2 \times 2 + 2 \times 8 = 20$$

- Calculator: $\boxed{\text{2nd}}$ $\boxed{\text{Trace}}$ 7

Lower Limit : 0

Upper Limit : 4

$A = 37.333\ldots$

- Definite Integral:

$$\int_0^4 (x^2 + x + 2)\,dx = \frac{x^3}{3} + \frac{x^2}{2} + 2x \Big|_0^4$$

$$= \frac{4^3}{3} + \frac{4^2}{2} + 2 \times 4 - 0$$

$$= \frac{112}{3} = 37.333\ldots$$

8) Evaluate the integral

GRUNDLE Pumpkins

A) $\int(2e^{x}+\sin x+x^{-1})\,dx$

$(2e^{x}-\cos(x)+\ln|x|+C$

B) Which substitution would you use to solve the integral?

$u=\sin x$, $u=\ln x$, or $u=2x$

$$\int\frac{\sin(\ln(x))}{2x}\,dx$$

$$=\frac{\sin(u)}{2x}\,dx$$

$$=\frac{-\cos(u)}{2}+C$$

$$=\frac{-\cos(\ln(x))}{2}+C$$

Yves Masoda

Abraham Eapen

Test #3:

THE GROUP

#8 a. $\int (2e^{x} + \sin x + x^{-1})\,dx$

$$\boxed{= (2e^{x} - \cos x + \ln|x|) + C}$$

b. $\int \frac{\sin(\ln|x|)}{2x}\,dx$ $\boxed{\text{let } u = \ln x}$

Empire #9

Laquan Drummer

$$\int_0^B \sin(x)\,dx$$

$$F(B)-F(0)$$

$$-\cos(B)-(-\cos(0))$$

$$-\cos(B)+1$$

$$\int_0^3 x\sin(x^2)\,dx$$

$u=x^2$

$du=2x\,dx$

$\frac{du}{2}=x\,dx$

$$\int_0^9 \sin(u)\frac{du}{2}$$

$$\frac{1}{2}\int \sin(x^2)$$

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

$.95556$

TEAM: C·A·M·

C: ASANDRA
A: USS
M: AYA

10

(A) $\int_{-2}^{3} x\sqrt{x+7}\,dx$

$u = x + 7$

$x = u - 7$

$du = dx$

$\int_{5}^{10} (u-7)\sqrt{u}\,du = \int_{5}^{10} (u^{3/2} - 7u^{1/2})\,du$

$= \left.\dfrac{u^{5/2}}{5/2} - 7 \cdot \dfrac{u^{3/2}}{3/2}\right|_{5}^{10} \approx 8.72$

(B) Average value $[-2, 3]$

$\dfrac{\text{area under curve}}{\text{length}} \approx 1.746..$

$\boxed{Y=}$ $x\sqrt{x+7}$

$\boxed{2nd}$ $\boxed{trace}$ 7: $\int f(x)\,dx$

lower limit -2 upper limit 3

(C) $x\sin(x^2)$ $[0, 3]$ Area $.95556513$

Ave. value $= .3185217103$

(D) $\int_{0}^{3} \dfrac{f(x)}{3-0}$ Average value of a continuous function from 0 to 3