

STUDENT'S NAME: _____

STUDENT'S NUMBER: _____

INSTRUCTOR: _____

DAWSON COLLEGE – DEPARTMENT OF MATHEMATICS
CALCULUS I (201-NYA-05/Com/IBS !"#%&'1&'1('15'1) *
FINAL E+AM
D! " ! m, ! - 1. ' 200/ (/0&01m-120&02m*
INSTRUCTORS0 A3 4IMENE5' M3 MARCHANT' S3 MUISE

INSTRUCTIONS:

T6\$! 71m 61 10 218! 3

No \$%9o-m1#\$o% 6!!# \$ 2-o: \$; ! ;

M1<! =-! >NOW? #61# 1@@ #6! 218! 1-! \$%"@=; ! ; A\$#6 Bo=- ! 71m3 I9 #61#
\$ %o# #6! "1 !' %o#\$9B Bo=- #! 1"6! - \$mm! ; \$1#! @B

Do %o# ; ! #1"6 1%B 218! 9-om #6\$; o"=m! %#3 l# 6o=@, ! -! #=-%! ; >AS
IS?3

U ! >ONLY? #6! 21"! 2-o: \$; ! ; 9o- ! 1"6 o%! o9 #6! ; ! #1\$@! ; 1% A! - 3 I9
1; ; \$#\$o%1@ 21"! \$ -! C=\$-! ; 9o- 1% 1% A! - = ! #6! , 1"< o9 #6! 6!!# 1% ;
"@! 1-@B \$%; \$"1#! \$# "o--! 2o%; \$%8 C=! # \$o%

NO MARDS 1-! 8\$: ! % 9o- m\$ \$%8 o- \$m2-o2! -@B @1, ! @! ; 1% A! -

C@! 1-@B A-\$#! Bo=- %1m! 1%; #=; ! %# \$; \$% #6! 21"! 2-o: \$; ! ; 9o- #6\$ 1#
#6! #o2 o9 #6\$ 218! 3

T6\$! 71m 61 12 C=! # \$o% 9o- 1 #o#1@ o9 100 m1-< 3

T6\$! 71m \$ Ao-#6 50E o9 Bo=- 9\$%1@ 8-1; !' #61# \$ ' 50 m1-<

GOOD LUCDF

13* T! "6%\$C=! 9o- ! : 1@=1#\$\$8 @m\$#

(G M1-< *

Calculate the value of the following limit ! Show all the wo"#

a\$

23* Co%#\$%=\$#B
 () M1-< *

/in0 all the value) \$ of (whe"e the following function i Oi continuou

$$f(x) = \begin{cases} \frac{x+1}{x-1} & x < 1 \\ x & x = 1 \\ x+1 & x > 1 \end{cases}$$

9(7* \$; \$ "o%#\$%=o= A6! % 7H -2 1%; 7 H 2
 \$%"!'

$$x-1=2 \text{ HI } (-x)(+x)=2 \text{ HI } =-x \text{ 1%; } =x \text{ (} \frac{1}{x} \text{) } 0 -2 \text{ J } \& \text{ 1%; } 2 \text{ J } \&^*$$

9(7* \$; \$ "o%#\$%=o= A6! % 7H&
 \$%"!'

$$\lim_{x \rightarrow 3} f(x) = \lim_{x \rightarrow 3} (x+1) = 4$$

&3*

Write the equation of the tangent line to $f(x)$ that passes through the point

53* Ho-\$Lo%#1@ #1%8! %# @\$%!

(. M1-< *

/in0 the value of (whe"e the tangent to the following function i ho"i<ontal

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

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

$$\frac{2(1 - x^2)}{(x^2 + 1)^2} = 0 \implies 1 - x^2 = 0 \implies x^2 = 1 \implies x = \pm 1$$

) 3* M1-8\$%1@ 9=%" # \$o% I% E" o%om\$"

(11 M1-< *

If the demand function is given by:

$$D(x) = -2x^2 + 22$$

and the cost function is given by:

$$C(x) = 2x^2 + 22$$

a) Write the marginal average cost function

)& Ma"# \$

$$AC(x) = \frac{C(x)}{x} = \frac{2x^2 + 22}{x} = 2x + \frac{22}{x}$$

$$AC'(x) = \frac{-22}{x^2}$$

+ \$ Write the marginal profit function

)& Ma"# \$

$$P(x) = R(x) - C(x) = (-2x^2 + 22) - (2x^2 + 22) = -4x^2$$

$$P'(x) = -8x = -8(1) = -8$$

$$P''(x) = -8$$

c\$ Calculate the marginal cost of producing the 200th unit)& Ma"# \$

() = 22 the "efo"e

(%22) = 22

O\$ 5"ite the E)4\$ function); Ma"# \$

$$= -2!21 (+: 22 * = 2!21 (=: 22- * = \frac{: 22-}{2!21} * = () = 2222 - &; 4$$

$$() = - \frac{()}{()} * \frac{- &; 4^{\&}}{\&2222 - &; 4} * \frac{\&}{: 22-}$$

G3* Im2@ "\$# ; \$99! -! %#\$1# \$o%

() M1 - < *

Calculate the first derivative of 9) that is \$ im4licitl98

$$\sqrt{\quad} = \& + \&$$

$$\left[\frac{\%}{\&} \right] \frac{\%}{\&} + \frac{\%}{\&} \left[\frac{\%}{\&} \right] = \& (+ [] \& + [\&]$$

$$\frac{\sqrt{\quad}}{\&\sqrt{\quad}} + \frac{\sqrt{\quad}}{\&\sqrt{\quad}} = \& (+ \& + \&(99$$

$$\left(\frac{\sqrt{\quad}}{\&\sqrt{\quad}} - \&(9) \right) = \& (+ \& - \frac{\sqrt{\quad}}{\&\sqrt{\quad}} \quad \text{HI} \quad = \frac{\& (+ \& - \frac{\sqrt{\quad}}{\&\sqrt{\quad}}}{\frac{\sqrt{\quad}}{\&\sqrt{\quad}} - \&(9)}$$

/3* O2#\$m\$L1#o% I

() M1-< *

/in0 the a+ olute e(t"ema of the function on the clo e0 inte"val B?%8%C

103* O2#\$m\$L1#o% II

(. M1-< *

MINIMIEIN@ COST: /o" it +eef teM Qecdm!an%u Ec ValuNO ScraE SDO2i\$ab but87oa/hBINCa4%oa

containe" with a ca4acit9)volume\$ of ' . cu+ic inche) ' \$! /inO the "aOiu

)" \$ an0 height) h \$ of the containe" that can +e con t"ucteO u ing the lea t

amount of metal

Fint : The volume of a c9linO"ical containe" i given +9 =π & an0 it u"face

a"ea i given +9 =&π

123* I%; ! 9\$%\$#! I%#! 8-1@
 () M1-< *
 /in0 the following integ"al

a\$ $\int (\sqrt{x} + \frac{1}{x}) dx$)' Ma"# \$

* $\int \frac{1}{x^2 + 1} dx = \frac{1}{x} + \ln| x - 1 | +$

+\$ $\int (x + 2)(x - 3) dx$)' Ma"# \$

$\int \frac{1}{x^2 - 4} dx = \frac{1}{4} \ln| \frac{x-2}{x+2} | + C$ * $\int \frac{1}{x^2 + 4} dx = \frac{1}{4} \ln| x^2 + 4 | + C$ * $\int \frac{1}{x^2 - 4} dx = \frac{1}{4} \ln| \frac{x-2}{x+2} | + C$