Final Exam
Math 1710
Fall 2011
Name:______________________________ **Sec.:** ____________

Last , First

PRINT YOUR NAME ON THIS EXAM AND THE SCANTRON SHEET

- ☐ Turn off all cell phones and any other electronic messaging devices.
- ☐ You are allowed to use an approved calculator on this exam, but you may NOT use any extra programs or information stored in it. If you have programs stored in your calculator, show them to me prior to the exam so that I know they are not related to this material.
- ☐ Do not have any extra/scratch paper. There is sufficient room on the exam for all work.
- ☐ Do not share any material during an exam.
- ☐ No notes or other aides. You may use your own brain.
- ☐ Even though this exam has a multiple-choice, you are expected to **show all work clearly and neatly as necessary.**
- ☐ I reserve the right to check the work of any/all problems from this section and adjust the grade accordingly.
- ☐ Clearly mark your answer choice on your scantron form.
- ☐ Be careful when you transfer your answers because the answers on your scantron are considered your final answers.
- ☐ Make sure all erasures on the scantron complete.

Multiple-choice #1 — 14	3 × ______ (# correct)	= ________ (earned points)	/42
Essay Problems: #15+ # 16	______ + ______	= ________ (earned points)	/20
#17 + # 18	______ + ______	= ________ (earned points)	/20
#19+ #20	______ + ______	= ________ (earned points)	/20
Total		= ________ (earned points)	/102

Before you proceed with the exam, PRINT your name (as it appears on the official university roster) on your scantron sheet. No name, no credit.

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Find the limit, if it exists.

1) $\lim_{x \to 0} \frac{x^3 + 12x^2 - 5x}{5x}$ 1) ______

A) 0 B) -1 C) 5 D) Does not exist

Divide numerator and denominator by the highest power of x in the denominator to find the limit.

2) $\lim_{x \to -\infty} \frac{\sqrt[3]{x} - 3x - 5}{5x + x^{2/3} + 2}$ 2) ______

A) 0 B) $-\frac{5}{3}$ C) $-\infty$ D) $-\frac{3}{5}$

Provide an appropriate response.

3) The inequality $1 - \frac{x^2}{2} < \frac{\sin x}{x} < 1$ holds when x is measured in radians and $|x| < 1$. 3) ______

Find $\lim_{x \to 0} \frac{\sin x}{x}$ if it exists.

A) 1 B) 0.0007 C) does not exist D) 0

Find all vertical asymptotes of the given function.

4) $R(x) = \frac{-3x^2}{x^2 + 2x - 35}$ 4) ______

A) $x = -7, x = 5$ B) $x = 7, x = -5$
C) $x = -35$ D) $x = -7, x = 5, x = -3$

Find the derivative.

5) $y = \frac{10}{x} + 5 \sec x$ 5) ______

A) $y' = -\frac{10}{x^2} + 5 \sec x \tan x$

B) $y' = -\frac{10}{x^2} - 5 \csc x$

C) $y' = -\frac{10}{x^2} + 5 \tan^2 x$

D) $y' = \frac{10}{x^2} - 5 \sec x \tan x$

Solve the problem.

6) Does the graph of the function $y = \tan x - x$ have any horizontal tangents in the interval $0 \le x \le 2\pi$? If so, where? 6) ______

A) Yes, at $x = \frac{\pi}{2}, x = \frac{3\pi}{2}$

B) Yes, at $x = 0, x = \pi, x = 2\pi$

C) Yes, at $x = \pi$

D) No

Find the derivative of the function.

7) $y = \frac{x^2 - 3x + 2}{x^7 - 2}$ 7) ______

A) $y' = \frac{-5x^8 + 18x^7 - 14x^6 - 3x + 6}{(x^7 - 2)^2}$

B) $y' = \frac{-5x^8 + 18x^7 - 13x^6 - 4x + 6}{(x^7 - 2)^2}$

C) $y' = \frac{-5x^8 + 18x^7 - 14x^6 - 4x + 6}{(x^7 - 2)^2}$

D) $y' = \frac{-5x^8 + 19x^7 - 14x^6 - 4x + 6}{(x^7 - 2)^2}$

Find the derivative.

8) $y = (\csc x + \cot x)(\csc x - \cot x)$ 8) ______

A) $y' = 1$

B) $y' = -\csc^2 x$

C) $y' = 0$

D) $y' = -\csc x \cot x$

Find the largest open interval where the function is changing as requested.

9) Increasing $f(x) = \frac{1}{4}x^2 - \frac{1}{2}x$ 9) ______

A) $(-1, 1)$ B) $(-\infty, \infty)$ C) $(1, \infty)$ D) $(-\infty, -1)$

Solve the problem.

10) Suppose that f and g are continuous and that $\int_2^6 f(x)\,dx = -5$ and $\int_2^6 g(x)\,dx = 7$. 10) ______

Find $\int_6^2 [g(x) - f(x)]\,dx$.

A) -12 B) -2 C) 2 D) 12

11) Suppose $c(x) = x^3 - 22x^2 + 30{,}000x$ is the cost of manufacturing x items. Find a production level that will minimize the average cost of making x items. 11) ______

A) 11 items B) 12 items C) 13 items D) 10 items

Evaluate the integral.

12) $\int_1^2 \left(t + \frac{1}{t}\right)^2 dx$ 12) ______

A) $\frac{15}{2}$ B) $\frac{5}{6}$ C) $\frac{29}{6}$ D) $\frac{37}{6}$

Find the intervals on which the function is continuous.

13) $y = \sqrt{x^2 - 2}$ 13) ______

A) continuous everywhere
B) continuous on the interval $[-\sqrt{2}, \sqrt{2}]$
C) continuous on the intervals $(-\infty, -\sqrt{2}]$ and $[\sqrt{2}, \infty)$
D) continuous on the interval $[\sqrt{2}, \infty)$

At the given point, find the slope of the curve or the line that is tangent to the curve, as requested.

14) $x^4y^4 = 16$, tangent at (2, 1) 14) ______

A) $y = \frac{1}{2}x$ B) $y = -8x + 1$ C) $y = 8x - 1$ D) $y = -\frac{1}{2}x + 2$

Write your answer in the space provided and show all your work to receive a credit.

Solve the problem.

15) A rectangular field is to be enclosed on four sides with a fence. Fencing costs $4 per foot for two opposite sides, and $7 per foot for the other two sides. Find the dimensions of the field of area 740 ft^2 that would be the cheapest to enclose.

Use a finite approximation to estimate the area under the graph of the given function on the stated interval as instructed.

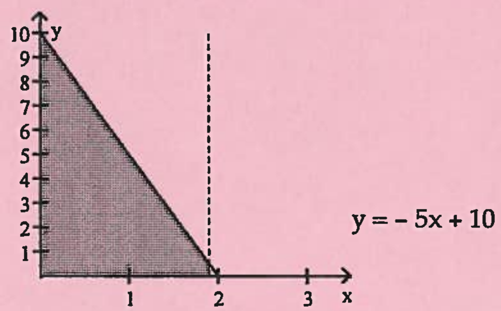
16) $f(x) = x^2$ between $x = 0$ and $x = 3$ using a left sum with two rectangles of equal width.

Find the area enclosed by the given curves.

17) $y = x^3, \ y = 4x$

Find the volume of the solid generated by revolving the shaded region about the given axis.

18) About the x-axis



Evaluate the integral using substitution.

19) $\int 12(4x - 3)^{-5} \, dx$

Provide an appropriate response.

20) Consider the trapezoid bounded by the line $y = 5 - 3t$ and the x-axias from $t = -2$ to $t = x$. The Area function

$A(x) = \int_{-2}^{x} f(t)\,dt$ gives the area of the trapezoid, for $x \geq -2$.

a) Evaluate $A(-2)$.

b) Evaluate $A(0)$.

c) Compute the derivative of A with respect to x.

Answer Key
Testname: CAL1 FINAL EXAM VERSION #2

1) B
2) D
3) A
4) A
5) A
6) B
7) C
8) C
9) C
10) A
11) A
12) C
13) C
14) D
15) 36 ft @ $4 by 20.6 ft @ $7
16) 3.375
17) 8
18) $\frac{200}{3}\pi$
19) $-\frac{3}{4}(4x-3)^{-4}+C$
20) a) $A(-2)=0$

b) $A(0)=\int_{-2}^{0}(5-3t)\,dt = \left[5t-\frac{3}{2}t^2\right]_{t=-2}^{t=0}$

$= 0-\left\{(-10)-\frac{3}{2}(4)\right\} = 16$

c) $A'(x)=\frac{d}{dx}\int_{-2}^{x} f(t)\,dt = f(x) = 5-3x.$