Math127 Final 2012 Special Code: 121412

HAND IN THE ENTIRE BOOKLET FOR THE FINAL

Name _____

Signature _____

Student ID Number (all 8 digits) ____ ____ ____ ____ ____ ____ ____ ____

Please shut off all cell phones, ear phones, computers, beepers, etc…

Please put everything away except a #2 pencil and a calculator that is not attached to a cell phone. You will have 2 hours to complete the thirty multiple choice questions on this exam. If you need more paper or have a question during the exam, please raise your hand and we will come to you. It is very important that you fill in your answers (the "bubbles") on the answer sheet correctly so that the grading machine reads your answers correctly. Please be conscientious in filling out the bubble sheet.

1. Please fill in the information at the top of this page.
2. On the bubble sheet where it says "Name," please print your last name, leave a space, and then print your first name in the rectangles. Then fill in the bubbles underneath.
3. On the bubble sheet, where it says "Identification Number," please **CAREFULLY** write your entire Student ID number in the rectangles and fill in the bubbles underneath. ***Please double check to make sure you bubbled in your ID # correctly.***
4. On the bubble sheet, where it says "Special Code" please write the number **121412** in the rectangles and fill in the bubbles underneath.
5. On the bubble sheet, where it says "Grade" or "Educ" bubble in your section number
Cook 9:05 (1)
Burrell 8:00 [2]
Calden 9:30 [3]
Burrell 1:00 [4]
Calden 11:15[5]
Cook 12:20 (6)
6. Lastly ***do not*** write anything in the sections labeled "Sex" or "Birth date"

Please double check that you bubbled your answers correctly on the bubble sheet. When you are finished, quietly gather your belongings and come to the front of the room. Have your student ID card ready to show us.

Grades will be posted on your MOODLE page just as soon as they are done. Please do not call or email asking for your grade. We cannot give grades out by phone or email.

GOOD LUCK!!

1.) An object is moving along a straight-line path. The table gives the position of the object (in feet, measured from some reference point) as a function of time (in seconds).

t	0	2	4	6	8	10
S(t)	0	0.5	1.8	3.8	6.5	15.8

What is the average velocity of the object over the interval from t=6 to t=10 seconds?

(A) 12 ft/sec
(B) 3 ft/sec
(C) 1 ft/sec
(D) 6 ft/sec

2.) Let f(x) = sin(x) and g(x) = π ln(x). Which of the following does not equal 0?

(A) f(g(e))
(B) g(f(e))
(C) f(g(1))
(D) g(f($\frac{\pi}{2}$))

3.) Let g(t) = sin(t). Use a Δt value of 0.1 (to the right) to estimate g'(2) by using the difference quotient. Carefully round your answer to 2 decimal places.

(A) -1
(B) 1
(C) .5
(D) -.5

4.) Approximate $\lim_{x\to 0} \frac{5^x-1}{x}$ to 2 decimal places:

(A) The limit does not exist
(B) 1.61
(C) 2.98
(D) 1.1

5.) Find the equation of the line tangent to the graph of $y=x^3 - 3x^2 - 5x + 2$ at x=2.

(A) y=-5x-2
(B) y=6x-16
(C) y=5x-26
(D) y=-5x-6

6.) If a ball is dropped from the top of a 100 meter tall building, the height, s, of the ball t seconds after it is dropped can be found with the function $(t) = 100 - 4.9t^2$. Which of the following is true about the expression $s'(5.001)$?

(a) It represents the average velocity of the ball between 5 seconds and 5.001 seconds.
(b) It represents the instantaneous height at 5.001 seconds.
(c) It represents the instantaneous velocity at 5.001 seconds.
(d) It represents the distance travelled by the ball at 5.001 seconds.

7.) Consider the following 2 statements:

I. $\sin\left(x + \frac{\pi}{2}\right)$ is sin(x) shifted $\frac{\pi}{2}$ to the left
II. -cos(x) is cos(x) rotated around the x-axis

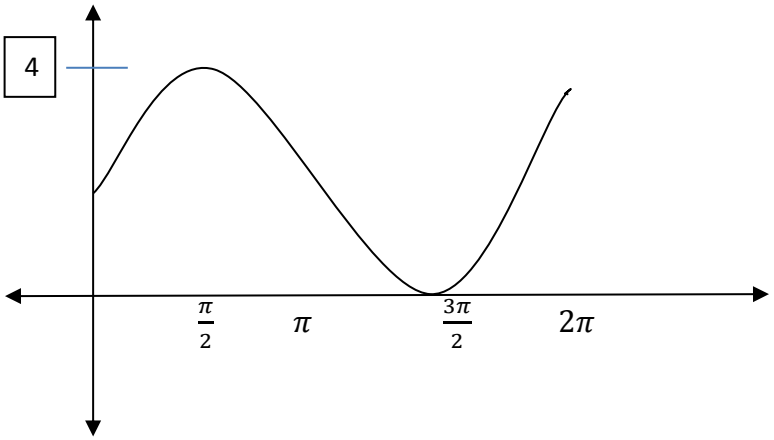
Which of the following is correct?

(a) Only I is true for all x
(b) Only II is true for all x
(c) Both I and II are true for all x
(d) Neither I or II is true for all x

8.) Suppose f(x) is a differentiable function and we know that $f(3) = 3$ and $f'(3) = -1$. Use local linear approximation to estimate the value for $f(3.5)$.

(a) 2.5
(b) 2.25
(c) 3.25
(d) 3.5

9.) Using the sine function, write a formula for the graph:



(a)$y = 8\sin(x)+4$
(b) $y = 4\sin(x)+2$
(c) $y = 2\sin(x)+4$
(d) $y = 2\sin(x)+2$

10. The instantaneous rate of change of a function f at x=a is:

(A) The slope of a secant line connecting (a,f(a)) to another point on the graph.
(B) The change in the function value between (a,f(a)) and (b,f(b)).
(C) $\lim_{h\to 0} \frac{f(a+h)-f(a)}{h}$
(D) A local maximum or minimum value of f, if the rate of change equals 0.

11.) If $f(x) = \sin(x)cos(x)$ then $f'\left(\frac{\pi}{4}\right) =$

(A)$\frac{1}{2}$
(B) 0
(C) -1
(D) -2

12.) Let $f(x) = x^3 + 7$ and $g(x) = e^x$. If $h(x) = g\big(f(x)\big)$ calculate h'(x).

(A) $e^{3x} + 7$
(B) $3e^{3x} + 7$
(C) e^{x^3+7}
(D) $3x^2e^{x^3+7}$

13.) For what values of a and b does the graph of $f(x) = a(x + bln(x))$ have a local maximum at the point (4,2) ?

(A) $a = \frac{1}{4-4\ln(4)}$ and $b = 4$
(B) $a = \frac{1}{1-\ln(4)}$ and $b = -4$
(C) $a = \frac{1}{2-2\ln(4)}$ and $b = -4$
(D) $a = \frac{1}{\ln(2)}$ and $b = 2$

14.) Find a value of x where $f(x) = 5xe^{-5x}$ has a global maximum:

(A) 0
(B) .1
(C) .2
(D) .5

15.) The speed of a car, in feet per second, at a given time t (in seconds) is given by the table below. What is the <u>best</u> estimate of how far the car travels from t = 0 to t = 10 seconds.

t	0	2	4	6	8	10
$v(t)$	60	40	30	20	40	45

(A) 470 ft
(B) 460 ft
(C) 365 ft
(D) 450 ft

16.) The table below gives some values for $f'(x)$. Assuming $f(x)$ is a continuous function, which statement is true?

x	1	2	3	4	5	6
$f'(x)$	-4	-1	2	3	-4	-7

(A) There is a local maximum between x=2 and x=3
(B) There is a local minimum between x=1 and x=2
(C) There is a local maximum between x=4 and x=5
(D) There is a local minimum between x=4 and x=5

17.) Which of the following is always concave down on its domain?

(A) $x^3 + 9000$
(B) $\ln(x)$
(C) e^{-x}
(D) $\cos(x)$

18.) An apartment complex has 600 apartments to rent. If they rent x apartments, then their monthly income, in dollars, can be modeled by $P(x) = -10x^2 + 8000x - 49000$. How many apartments should the complex rent to maximize profit?

(A) 0
(B) 600
(C) 400
(D) 500

19.) Calculate the left hand sum and the right hand sum for the function $f(x) = 2x^2 + 6x$ for x=2 to x=10 using $\Delta x = 2$.

(A) The left hand sum is 720 , and the right hand sum is 960.
(B) The left hand sum is 360 , and the right hand sum is 960 .
(C) The left hand sum is 720 , and the right hand sum is 1200 .
(D) The left hand sum is 360 , and the right hand sum is 600 .

20.) Let π'(q) be the marginal profit function, in dollars per thousand phones, derived from the manufacture and sale of q (thousand) units of a type of cell phone. Find the units of the definite integral:

$$\int_{10}^{12} \pi'(q)dq$$

(A) phones
(B) profit
(C) dollars
(D) dollars per 1000 phones

21.)A marginal cost function is given by:

$$C'(q) = \sqrt{q} + 10 \text{ dollars per unit}$$

If the fixed cost is $1200, find the total cost of producing 36 units.

(A) $1704
(B) $504
(C) $1216
(D) $216

22.) Let $f(x) = 10\cos(2x) - e^{-x}$ .Find an antiderivative of $f(x)$ with an initial value of 10. That is, find F(*x*) such that F'(*x*)=*f(x)* and F(0)=10.

(A) $5\sin(2x) + e^{-x} + 9$
(B) $-2\sin(2x) + e^{-x} + 9$
(C) $-5\sin(2x) + e^{-x} + 11$
(D) $5\sin(2x) + e^{-x} + 11$

23.If you choose $w = \sqrt{t}$ in order to find the integral $\int \frac{e^{\sqrt{t}}}{\sqrt{t}} dt$ by the method of substitution, what would *dw* be?

(A) $t\sqrt{t}dt$
(B) $\frac{1}{2\sqrt{t}} dt$
(C) $\frac{dt}{\sqrt{t}}$
(D) $\sqrt{t}dt$

24. The integral $\int \frac{x}{e^x} dx$ can be found using an integration by parts. If you begin the substitution with *u=x*, what would *v* turn out to be?

(A) dx
(B) $e^{-x}dx$
(C) e^x
(D) $-e^{-x}$

25.) $\int x\sqrt{3x^2+1}\, dx$ =

(A) $\frac{3}{\sqrt{3x^2+1}} + C$

(B) $\frac{1}{9}(3x^2+1)^{\frac{3}{2}} + C$

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

(D) $\frac{2(3x^2+1)^{\frac{3}{2}}}{9}$ +C

26.) $\int (\sin(x))^2 \cos(x)\, dx$ =

(A) $\frac{(\sin(x))^3}{3}(\cos(x))^2$ + C
(B) 2sin(x)cos(x) +C
(C) $\frac{(\sin(x))^3}{3}$ + C
(D) None of these

27.) $\int \ln(2x)\, dx$ (hint: you will have to use integration by parts)

(A) $xln(2x) + C$
(B) $xln(2x) - 2x^2 + C$
(C) $2xln(2x) - 2x^2 + C$
(D) $xln(2x) - x + C$

28. $\int xsin(x)dx$

(A) $xcos(x) + \sin(x) + C$
(B) $-xcos(x) + \sin(x) + C$
(C) $xcos(x) - \sin(x) + C$
(D) $-xcos(x) - \sin(x) + C$

29. $\int (x^3 + e^{2x} - 6)dx$

(A) $x^4 + e^{3x} - 6x + C$
(B) $\frac{1}{4}x^4 + 2e^{2x} - 6 + C$
(C) $\frac{1}{4}x^4 + \frac{1}{2}e^{2x} + C$
(D) $\frac{1}{4}x^4 + \frac{1}{2}e^{2x} - 6x + C$

30.)Calculate $\int_1^2 (\frac{3x-1}{3x})dx$

(A) $\frac{3}{4}$
(B) $1 - ln(2)$
(C) $1 - \frac{1}{3}ln(2)$
(D) $-\frac{1}{3}ln(2)$