

OPPORTUNITY TO EXCELL # 2
MATH 131
Applied Calculus Summer-2000
Patrice Poage
VERSION B

NAME:

SS #:

SECTION #:

ROW # YOU *NORMALLY* SIT IN:

SEAT # YOU ARE IN RIGHT NOW:

- Check to see that you have 8 pages including the cover page.
- The first 10 problems are to be done on scantron and will be graded with no partial credit. You will NOT be getting scantron back, so please mark you answers on your test as well....for YOUR benefit.
- The next 8 problems are to be done on the test paper. You *must show work* to receive full credit on a problem. Include any intermediate steps and programs/functions you use on your calculator.
- *SCHOLASTIC DISHONESTY WILL NOT BE TOLERATED.*

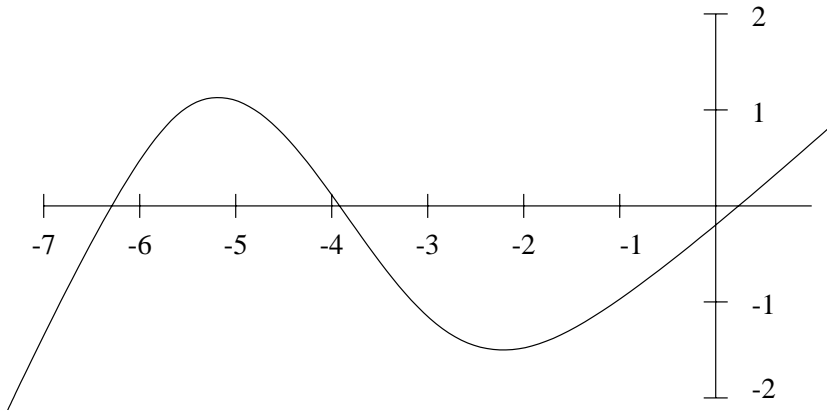
GOOD LUCK!

Points Missed:

Mult. Choice	
Work Out	
Grade:	

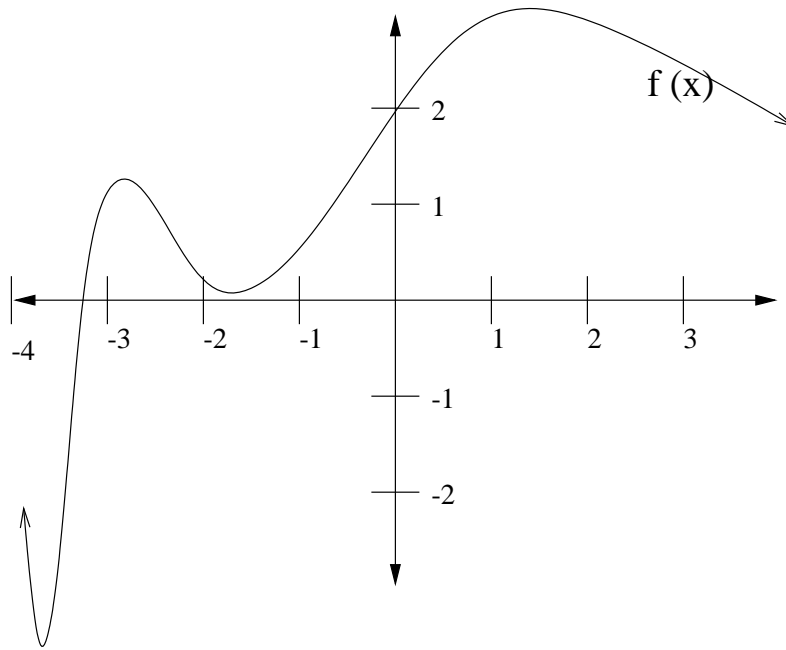
All multiple choice problems are worth 5 points each.

- An above ground swimming pool is punctured and water starts leaking out with respect to time. The amount of water in the swimming pool t minutes after it is punctured is given by $S(t)$. Eleven minutes after the puncture, there are 520 gallons of water left in the pool and $Q'(11) = -5.224$. Estimate $Q(29)$.
 - 368.504 gallons
 - 170.72 gallons
 - 425.968 gallons
 - No water left in the pool
 - none of these
- Compute the definite integral, $\int_{2.1}^{2.9} \ln(t^2 + 3)e^{(x-5)} dt$
 - 1.535
 - .178
 - 22.487
 - .152
 - undefined
- Approximate the derivative for the function $f(x) = 1.2^x + 2x$ at $x = 3$.
 - ≈ 7.73
 - ≈ -4.27
 - ≈ 2.32
 - ≈ -1.68
 - $\approx .002$
- The algae in mg growing in my fish tank is given by $A(x)$, where x is the number of days from when I originally set up the fish tank. What is the meaning of $A'(123) = 42$?
 - At $x = 42$ days, the fish tank is growing algae at a rate of 123mg for every 42 days.
 - At $x = 123$ days, the fish tank is growing algae at a rate of 42mg for every 123 days.
 - At $x = 123$ days, the fish tank is growing algae at a rate of 42mg per day.
 - At $x = 42$ days, the fish tank is growing algae at a rate of 123mg per day.
 - none of the above



5. If the above graph is of the $f''(x)$, which of the following is true about the original function:
- $f(x)$ is increasing from about $(-6.2, -3.9)$
 - $f(x)$ is concave up around $x = -6.7$
 - $f(x)$ is concave down around $x = -2$
 - $f(x)$ is decreasing from about $(-5, -2.2)$
 - none of the above
6. Find the average rate of change for the function $f(x) = (x - 1)^3 - \pi x - 4$ between $x=0$ and $x=2$.
- 7.14
 - 2.14
 - 4.283
 - 0.467
 - none of these
7. If I threw an eraser across the room at a velocity of $v(t) = -t^2 + 7t + 5$ ft/sec where t is in seconds, give a **lower** estimate of the distance the eraser traveled between 0 and 3 seconds using $\Delta t = .5$
- ≈ 37.56
 - ≈ 31
 - ≈ 40.4
 - ≈ 34.4
 - none of these

The following graph will be used for the next 3 questions.



8. If the graph above is of $f(x)$, which of the following is the smallest?

- a) $f'(3)$ b) $f'(1.5)$ c) $f'(-3.5)$ d) $f'(0)$ e) $f'(-2.5)$

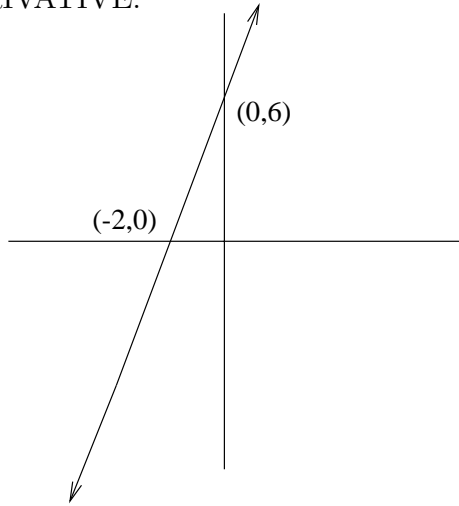
9. If the graph above is of $f(x)$, which of the following is the largest?

- a) $f'(3)$ b) $f'(1.5)$ c) $f'(-3.5)$ d) $f'(0)$ e) $f'(-2.5)$

10. If the graph above is of $f(x)$, which of the following choices have the same sign (both positive or both negative)?

- a) $f''(.5), f''(-3.6)$ b) $f'(2.5), f'(0)$ c) $f'(-3.8), f(2.5)$ d) $f(-3.8), f'(-2)$

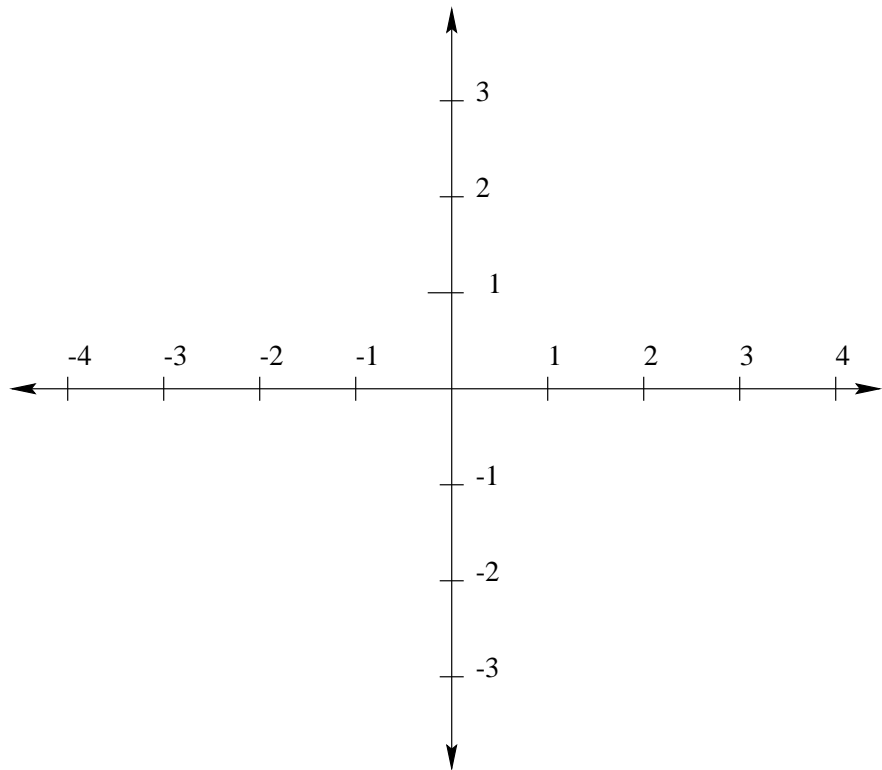
11. (8 pts) Sketch a possible graph of the 1st and 2nd derivatives of the function graphed below. BE SURE TO LABEL WHICH IS THE 1st DERIVATIVE AND WHICH IS THE 2nd DERIVATIVE.



12. (8 pts) For the functions $f(x) = 3x - 7$ and $g(x) = \frac{1}{2}e^{x-2}$
- Sketch a graph and shade the area bounded by the functions
 - Set up the integral(s) that represent this area (include the limits of integration)
 - Compute the shaded area (within 3 decimal places)

13. (9 pts) Sketch a possible graph of a function that has the following characteristics:

- horizontal intercept at -1.5 and 2
- vertical asymptote at -1
- $\lim_{x \rightarrow \infty} f(x) = \infty$
- $\lim_{x \rightarrow -\infty} f(x) = 0$
- $f'(-2.5) = 0$
- $f'(x) > 0$ on $(-2.5, -1)$ and $(-1, \infty)$
- $f'(x) < 0$ on $(-\infty, -2.5)$
- $f''(x) > 0$ on $(-3, -1)$ and $(2, \infty)$
- $f''(x) < 0$ on $(-\infty, -3)$ and $(-1, 2)$



14. (9 pts) For the function, $g(x) = \frac{3^x}{4} - 3$,

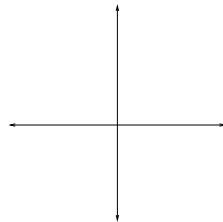
- Sketch a graph, labeling the x and y intercepts (within 3 decimal places).

- Compute the integral for the given limits of -1 to 5.

- Compute the area between the graph and the x-axis between $x=-1$ and $x=5$.

15. (4 pts) Sketch the graph of a function that has the following characteristics:

- The first AND second derivative are both negative everywhere.



(4 pts each) Draw the *first* derivatives on the same axis of each of the following functions respectively:

