

OPPORTUNITY TO EXCELL # 1
MATH 131
Applied Calculus Spring-2000
Patrice Poage
VERSION A

NAME:

SS #:

SECTION #:

ROW # YOU *NORMALLY* SIT IN:

SEAT # YOU ARE IN RIGHT NOW:

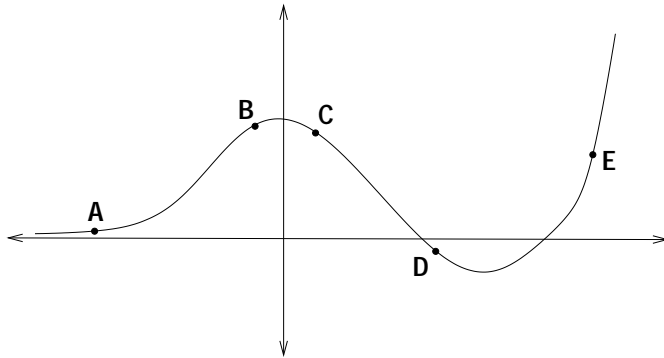
- The above five questions are worth one point each.
- Check to see that you have 8 pages including the cover page.
- The first 13 problems are to be done on scantron and will be graded with no partial credit. You will NOT be getting scantron back, so please mark you answers on your test as well...for YOUR benefit.
- The last 6 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:	

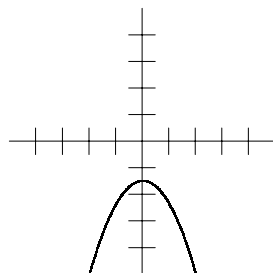
All multiple choice problems are worth 5 points each.

The first problem deals with the function $f(x)$ in the figure below.

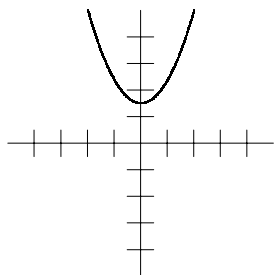


1. At what point, if any, is the above graph of $f(x)$ concave down AND decreasing?
a) B b) C c) D d) E e) none of the above
2. For the equation $y = -(x - 1)^3 - 2x^2 + 3$, what is the x-intercept and y-intercept respectively (IN THAT ORDER)?
a) 3.5, 1 b) 1.106, 3 c) 4, 1 d) 1.222, 4 e) none of the above
3. For the function $y = 3x + 25$, find the average rate of change between $x = 0$ and $x = 12$.
a) 3 b) 5.08 c) 61 d) 36 e) none of the above
4. Convert the function $P = 5.23(.2)^t$ into the form $P = P_0e^{kt}$.
a) $P = 5.23e^{2t}$
b) $P = 5.23e^{-1.609t}$
c) $P = 5.23e^{-1.221t}$
d) $P = 5.23e^{.331t}$
e) none of the above

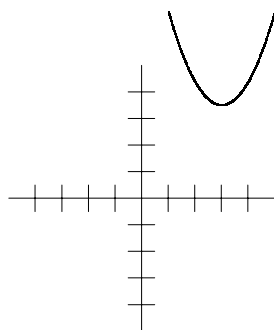
5. Which of the following graphs represents the function $f(x - 3) + 2$ if the graph of $f(x)$ looks like:



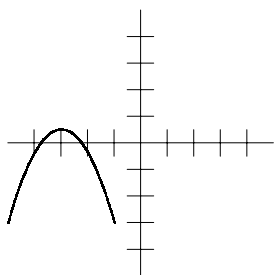
a.



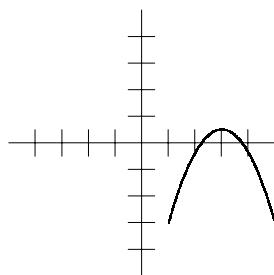
b.



c.



d.



e. none of these

6. Which of the following would be a possible formula for the graph below:

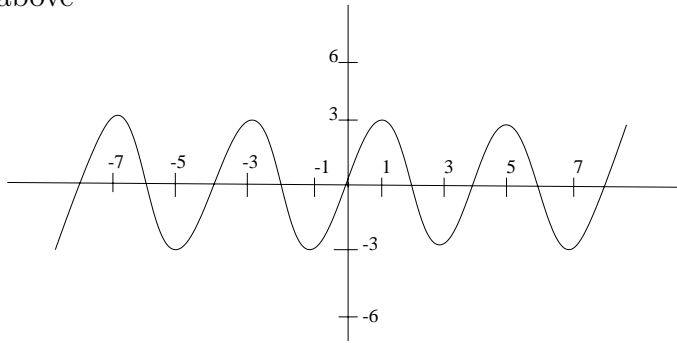
a) $y = \sin 4x$

b) $y = 3 \sin \frac{\pi}{2}x$

c) $y = 6 \sin \frac{\pi}{2}x$

d) $y = 3 \sin 2x$

e) none of the above



7. Suppose N is the number of species on a planet that has an area of A and an average temperature of T . Observations have shown that the number of species is directly proportional to the cube root of the area and is inversely proportional to the temperature squared. Which formula represents this?

a) $N = \frac{k\sqrt[3]{A}}{T^2}$ b) $N = \frac{k\sqrt[3]{A}}{\sqrt{T}}$ c) $N = \frac{kT^2}{A^3}$ d) $N = kA^3T^2$ e) none of these

x	5.0	5.5	6.0	6.5
f(x)	3.12	3.74	4.49	5.39

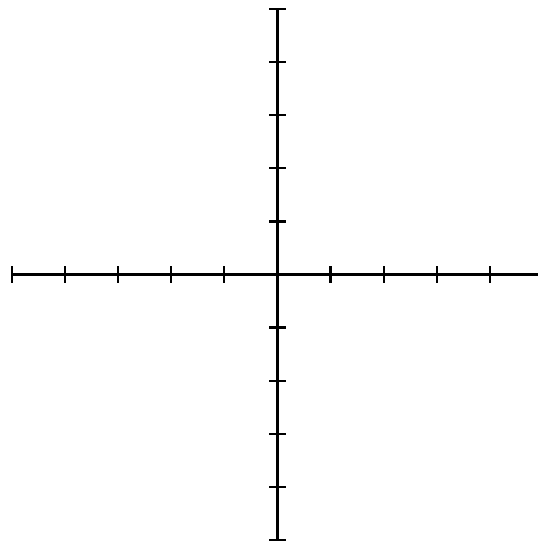
8. The above data represents which of the following functions?
- a) linear
 - b) exponential
 - c) sinusoidal
 - d) horizontal line
 - e) none of the above
9. If you deposit \$5000 in an account that is compounded annually at 8%, how much money will you have in 25 years?
- a) \$34,242.38
 - b) \$18,889.47
 - c) \$36,945.28
 - d) \$10,000
 - e) none of the above
10. Which one of the following is NOT a power function?
- a) $y = \frac{4}{7\sqrt{x}}$
 - b) $y = (12x)^3 4$
 - c) $y = (5 + 9)x^{(2+4)}$
 - d) $y = 14^x$
 - e) ALL of them are power functions

11. Solve $4^{2x+3} = 5$
- a) -1.767
 - b) $-.120$
 - c) $-.859$
 - d) $-.920$
 - e) none of the above
12. If $f(x) = x^2 + \sqrt{x} - 2$ and $g(x) = 2x - 4$, find $f \circ g$ and evaluate it at $x = 10$
- a) 19,827
 - b) 198
 - c) 258
 - d) 260
 - e) none of the above
13. While running, Laurie breathes in and out every half a second. The volume of intake of air in her lungs varies between a minimum of 5 liters and a maximum of 9 liters. Which of the following is the best formula for the volume of air in Laurie's lungs as a function of time?
- a) $y = 7 + 2 \sin\left(\frac{\pi}{2}t\right)$
 - b) $y = 5 + 4 \sin\left(\frac{\pi}{2}t\right)$
 - c) $y = 5 + 2 \sin(4\pi t)$
 - d) $y = 7 + 2 \sin(4\pi t)$
 - e) none of the above

j	7	10	13	16
k	22	29	36	43

14. (3 points) Write k as a linear function of j for the table above.
15. (3 points) Write j as a linear function of k for the table above.
16. (6 points) A chemical decays exponentially. After 5 days 75% of the chemical remains.
- What percent of the chemical will be left in 10 days?
 - How long until there is only half of the chemical left?
17. (4 points) Sketch a possible graph of $f(x)$ if you know that

$$\lim_{x \rightarrow \infty} f(x) = -\infty \text{ and } \lim_{x \rightarrow -\infty} f(x) = 3$$



18. (8 points) Pregnant women metabolize some drugs at a slower rate than the rest of the population. The half-life of caffeine is about 4 hours for most people. In pregnant women, it is 10 hours. If a pregnant woman and her husband each have a cup of coffee containing 100 mg of caffeine at 8am, how much caffeine does EACH have left in the body at 10pm?

19. (6 points) Supposing the function below is a polynomial,

- Is this polynomial odd or even?
- Is the polynomial positive or negative?
- What is the MINIMUM degree the polynomial could be?

