

OPPORTUNITY TO EXCELL # 1
MATH 142
Business Calculus - Fall 2001
Patrice Poage
VERSION A

NAME:

SS #:

SECTION #:

ROW # YOU *NORMALLY* SIT IN:

SEAT # YOU ARE IN RIGHT NOW:

- Check to see that you have 6 pages including the cover page. The five questions above are worth one point each.
- The first 8 problems are to be done on scantron and will be graded at 5 points each with no partial credit. You will NOT be getting your scantron back, so please mark you answers on your test as well....for YOUR benefit.
- The last 7 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.*

Points Missed:	Mult. Choice	
	Work Out	
	Grade:	

BOX YOUR FINAL ANSWERS!!!

1. The set of data below is best modeled by a logistic function. What is the limiting capacity (maximum) of this model?

x	0	12	24	36	48
y	2.3	7.8	16.9	35.7	48.6

- (a) 25.29 (b) 58.69 (c) 100.6 (d) 69.25 (e) none of these
2. The sales price for a particular item is best represented by the function: $p = -21.34x + 72.358$. What is the maximum *revenue* produced by this particular item?
- (a) \$62.12 (b) \$64.42 (c) \$61.34 (d) \$63.37 (e) none of these
3. Which of the following would be accurate in describing how the *original* graph, $h(x)$ below was shifted into the *new* graph below?

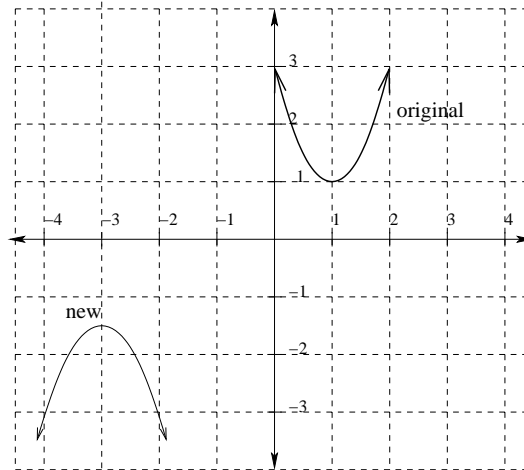
a) $-h(x + 4) - 2.5$

b) $-h(x + 4) - 0.5$

c) $-h(x - 4) - 2.5$

d) $h(x - 4) + 2.5$

e) none of these



4. Tracey and Erin decide to manufacture a new type of electronic-note-taker since they like to talk in class, but need to take notes too! The fixed costs for this escapade is \$5,000. It will cost them \$10 to produce each electronic-note-taker, but they plan to sell them at \$35 each. If they manufacture and sell exactly 3,134 electronic-note-takers, how much of a profit/loss could they expect?

(a) \$136,030

(b) \$146,030

(c) \$73,350

(d) \$83,350

(e) none of the above

5. Lauren purchased a computer in 1999 at a price of \$1450. She was told that the computer would linearly depreciate to a scrap value of \$200 just 6 years after she purchased it. What is the computer worth now (in 2001)? *Hint: Let $t=0$ represent 1999*
- (a) \$1866.67
(b) \$1,085.33
(c) \$967.33
(d) \$1,033.33
(e) none of the above
6. The demand equation for a certain quantity is $3.5x + p - 1250.4 = 0$ and the supply equation is $-300.4x + p + 2445.7 = 0$. What is the market equilibrium price?
- (a) \$12.16
(b) \$1207.83
(c) \$12.25
(d) \$1201.18
(e) none of the above
7. Given $\log_a 2 = 0.2789$, $\log_a 3 = 0.4421$, and $\log_a 7 = 0.5231$, find $\log_a \left(\frac{14}{3a^2} \right)$.
- (a) -1.6401 (b) 1.3599 (c) -0.6401 (d) 2.3599 (e) none of these
8. Which of the following equations is *NOT* a polynomial?
- (a) $f(x) = 3x^4 - \frac{3}{2}x^3 + 5$
(b) $G(x) = -8x^2 + 4x^5 - \pi$
(c) $H(X) = -2x^3 - \sqrt{5}x + e$
(d) $g(x) = 6x + x^7 - 4\sqrt{x}$
(e) they are all polynomials

9. (6 pts) Becky has \$250 she wants to deposit into an account and plans to leave it there 10 years. Would it be better for Becky to deposit her money into Account A, which is compounded daily at 7.8% or in Account B, which is compounded continuously at 7.5%? SHOW WHY!

10. (5 pts) If $f(x) = 3\sqrt{x+2}$ and $g(x) = 2x^2 + 4x - 5$, find $(g \circ f)(x)$ and *simplify completely*.

11. (4 pts) What is the domain of $f(x) = \frac{\sqrt{x+2}}{7-3x}$

12. Solve each of the following for x (leave as a fraction or round to 3 decimal places):

(a) (4 pts) Solve: $3 \cdot 3^{2x} = \frac{1}{3^x}$

(b) (5 pts) Solve: $4^{2x-7} = 5$

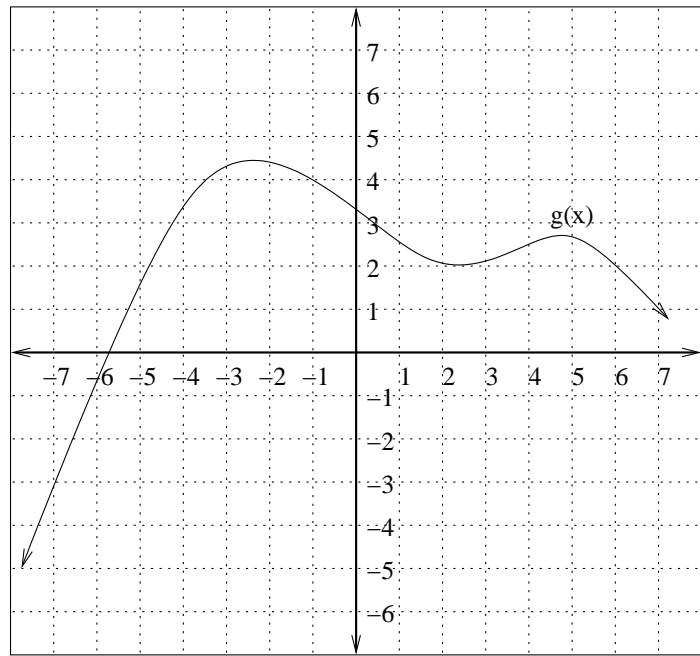
(c) (5 pts) Solve: $4 \log_5(3x + 2) - 8 = 0$

13. Given x = the number of items produced, and y = the total costs of production, answer the following 3 questions: ***round your answers to three correct decimal places!***

x	1	5	17	32	47	63
y	71	75	260	901	3125	10836

- (a) (4 pts) The data above is best modeled which of the following functions:
Linear Cubic Power Exponential
- (b) (4 pts) Using the model you chose, what y -value corresponds with $x=70$?
- (c) (4 pts) Using the model you chose, what x -value corresponds with $y=300$?

14. Use the graph of $g(x)$ to the right to answer the following questions.
- (2 pts) What is the minimum degree of $g(x)$?
 - (2 pts) What is the range of $g(x)$?
 - (2 pts) Approximately on what interval(s) is $g(x)$ increasing?
 - (2 pts) Estimate $(g \circ g)(-7)$



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15. (6 pts) Let $q(x) = x^2 - 6\alpha x + \beta$. Determine the values for α and β so that the graph of the quadratic has a vertex at $(-3, -5)$.