

Math 142 1 Exam 1A

Math 142
Exam 1 VERSION A
February 12, 1997

Name _____
Roster Number _____
Section _____ SEAT _____

M.C.	
1 and 2	
3	
TOTAL	

The work on this exam is my own _____

(signature required)

Please read all directions. Be sure any written work to be read by me is legible. There are 3 pages with writing on both sides of every page. When you are done, turn in your exam and your scantron in the appropriate envelope. There is a five point deduction for any error in your name, roster number, section number or version letter (on your scantron). There is a 10 point deduction if I have to grade the scantron by hand.

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PUT YOUR NAME AND VERSION LETTER (A) ON YOUR SCANTRON! There are 11 multiple choice questions to answer on your scantron. There is no partial credit on this part. The scantrons will not be returned, so please mark your answers on the exam too.

1. What is the domain for the function

$$f(x) = \begin{cases} \sqrt{4-x} & x > 3 \\ \frac{\sqrt{x}}{x-2} & x < 2 \end{cases}$$

(A) $[0, 2) \cup (3, 4]$ (B) $[0, 2] \cup [3, 4]$ (C) $[0, 2) \cup (2, 4]$ (D) $x \neq 2$ (E) none of the above

2. A farmer wishes to fence an area that has one side bounded by a river. He has 1000 feet of fence available. How long should the side parallel to the river be?

(A) 250 (B) 500 (C) 125,000 (D) 125 (E) none of the above

3. Let $f(x) = 3x^3 + x$ and $g(x) = \sqrt{x-1}$ What is $(g \circ f)(2)$?

(A) 1 (B) 4 (C) 5 (D) 26 (E) none of the above

4. If $f(x) = \sqrt{x}$ and $g(x) = \frac{1}{1-x}$, what is the domain of $(f \circ g)$?

(A) $x \leq 1$ (B) $x \neq 1$ (C) $0 \leq x < 1$ (D) $x < 1$ (E) none of the above

5. What is the effective yield of a bank account paying 6% compounded quarterly?

(A) 1.5% (B) 6.00% (C) 6.14% (D) 26.2% (E) none of the above

6. Given that a certain isotope of gold (Au^{196}) has a half life of 6 days, and we have 1 gram of this isotope, how many grams do we have after one day?

(A) .50 (B) .89 (C) .83 (D) .17 (E) none of the above

7. We have a population of rats that increases 25% every month. If we have 10 rats to start with, in EXACTLY how many months will there be 100 rats?

(A) $1/\log 1.25$ (B) $\log 1.25$ (C) 10.31885 (D) 9.69100 (E) none of the above

8. A bank is paying 5.5% compounded continuously on an account with \$500. How much money is in the account after 6 months?

(A) \$1056.54 (B) \$528.27 (C) \$695.48 (D) \$513.94 (E) none of the above

9. What is $\lim_{x \rightarrow -2} \frac{x+2}{|x+2|}$?

- (A) 0 (B) -1 (C) DNE (D) 1 (E) -2

10. What is $\lim_{x \rightarrow \infty} \frac{2^x + 2^{-x}}{2^{-x} - 2^x}$?

- (A) 1 (B) -1 (C) 0 (D) 2 (E) -1/2

11. If our viewing window is $[-10,0]$ by $[0,10]$, which of the following points are in the window:

- (i) (9,-1) (ii) (0,0) (iii) (-1, -1) (iv) (-1,9)

- (A) (ii) (B) (i), (ii) (C) (ii), (iv) (D) all of them (E) none of them

_____SCRATCH PAPER OR WORKOUT PROBLEM SPACE _____

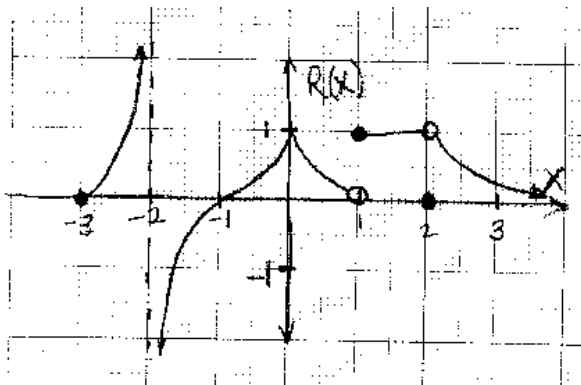
WORK-OUT PROBLEMS (credit as listed).

1. (10 points) For the functions given, find the parent function and explain how it has been modified (that is, any vertical or horizontal shifts, any expansion or contraction and any reflection)

(a) $f(x) = -3(x + 2)^3 + 1$

(b) $f(x) = 2e^{x-3}$

2. (15 points) Use the graph of the function $R(x)$ to answer the questions below. Any asymptotes should be given as the equation of a line.



(a) What (if any) are the horizontal asymptotes?

(b) What (if any) are the vertical asymptotes

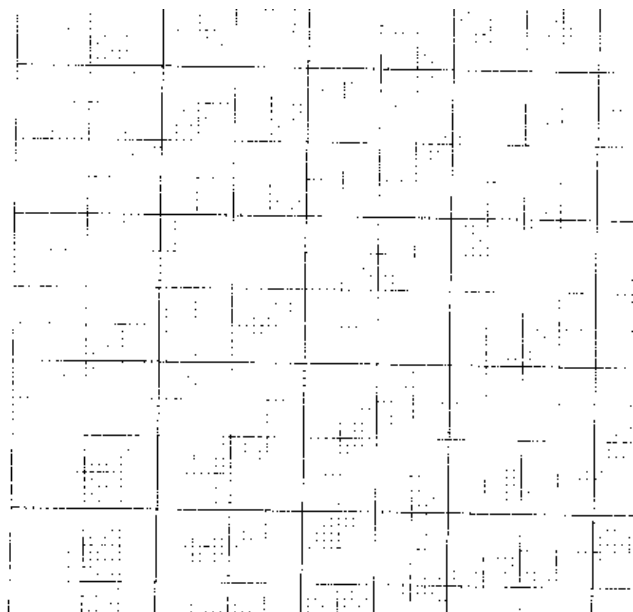
(c) Where (if anywhere!) is the function not continuous?

(d) What is $\lim_{x \rightarrow -2} R(x)$?

(e) What is $\lim_{x \rightarrow 1^-} R(x)$?

3. (20 points) A company manufactures gadgets. Their total cost to produce 200 gadgets is \$1200 and their fixed costs are \$800. When the gadgets are sold at \$5 each the company can sell 300 gadgets. When the selling price is decreased by a dollar, the company sells 50 more gadgets. (you may use the back of the page if you need more room)

- (a) What is the cost equation?
- (b) What is the revenue equation?
- (c) What is the profit equation? (I will sell you the profit equation for 4 points)
- (d) Graph the profit equation on the graph paper below.
- (e) How many should they sell to maximize profits?
- (f) What is the maximum profit?
- (g) What price should they sell the gadgets at?



SCRATCH PAPER OR WORKOUT PROBLEM SPACE