


MATH 1080 SPRING 2004 UNIFORM FINAL

FILE COPY

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Name: _____

Circle your section number:

001	002	003	004	005	OL1
Fisher	Shepherd	Barnhart	Mardones		Butler
MW 10:00-11:15	MW 4:00-5:15	TR 8:30-9:45	TR 2:30-3:45	TR 11:30-12:45	N/A

Instructions:

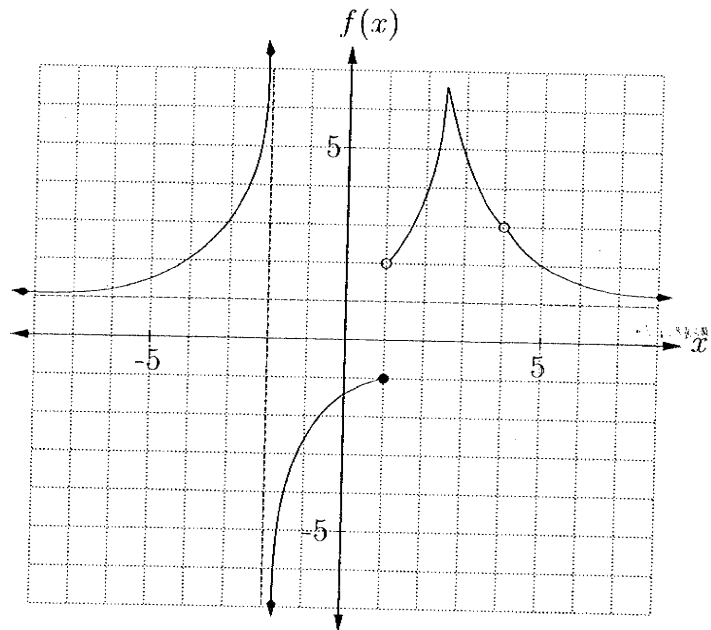
- . Put your name on this page and on the next page.
- . Circle your section number above.
- . A note sheet is provided with the final exam with some formulas. No other note sheets are allowed.
- . If you are unclear what a problem is asking, then talk to your instructor for clarification. You may not ask for hints, verification of formulas, or if you have done the problem correctly. This exam is over what YOU know to date.
- . Be neat. If the grader cannot understand what you have recorded, you will not get credit.

DO NOT WRITE BELOW THIS LINE

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Page 5: (8)	Page 6: (20)	Page 7: (10)	Page 8: (10)
Total (100):			

Part I: Each question is worth 2 points. Just record your final answer.
 In problems 1-7, answer the questions using the graph of $f(x)$. Use ∞ or $-\infty$ or DNE (does not exist) where appropriate.



1. $\lim_{x \rightarrow 1^-} f(x) =$ _____ 2. $\lim_{x \rightarrow 1^+} f(x) =$ _____

3. $\lim_{x \rightarrow 1} f(x) =$ _____ 4. $\lim_{x \rightarrow -2^-} f(x) =$ _____

5. $\lim_{x \rightarrow \infty} f(x) =$ _____ 6. $\lim_{x \rightarrow 4} f(x) =$ _____

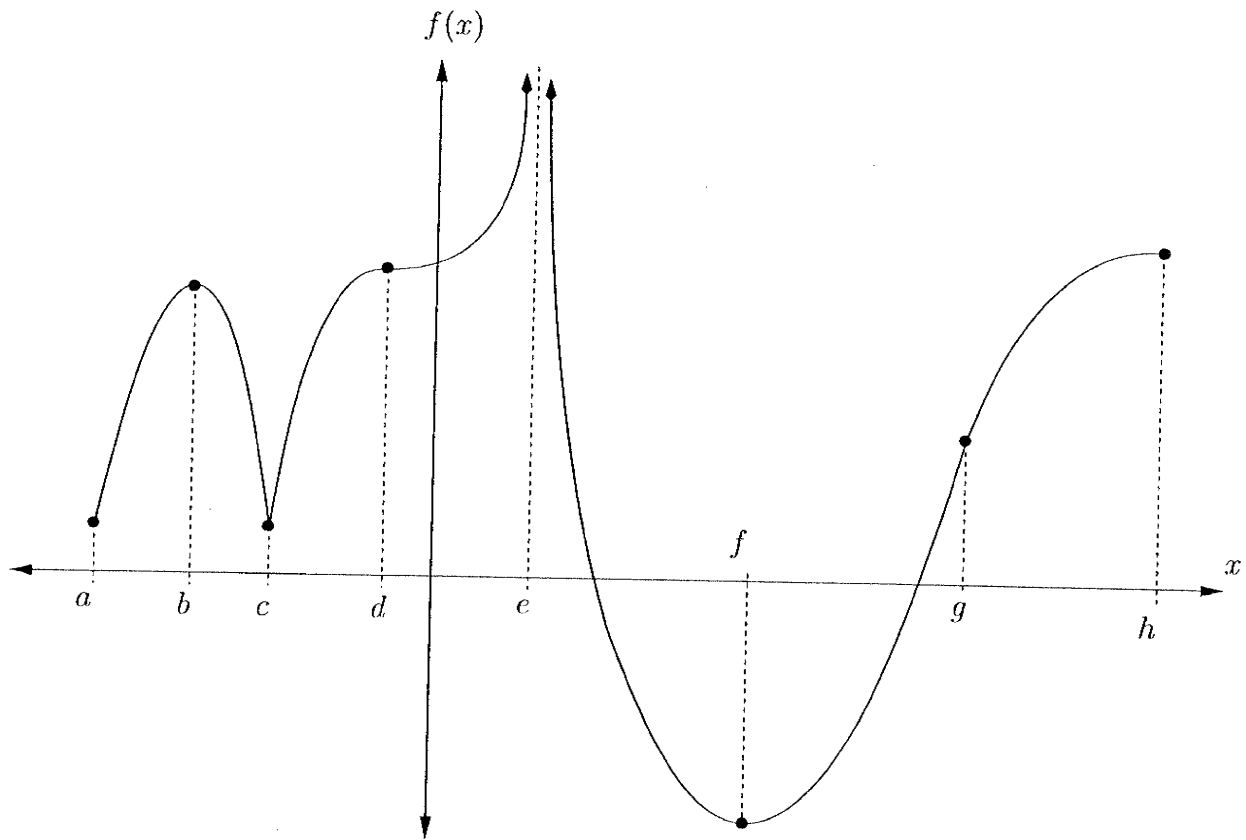
7. For what values of x is $f(x)$ not continuous? _____

In problems 8 and 9, evaluate the derivative.

8. If $f(x) = -3x^4 + 2x^2 - x + 5$ then $f'(x) =$ _____

9. $\frac{d}{dx} e^{5x} =$ _____

For problems 10-15, refer to the graph below. Write intervals in interval notation, (a, b) .



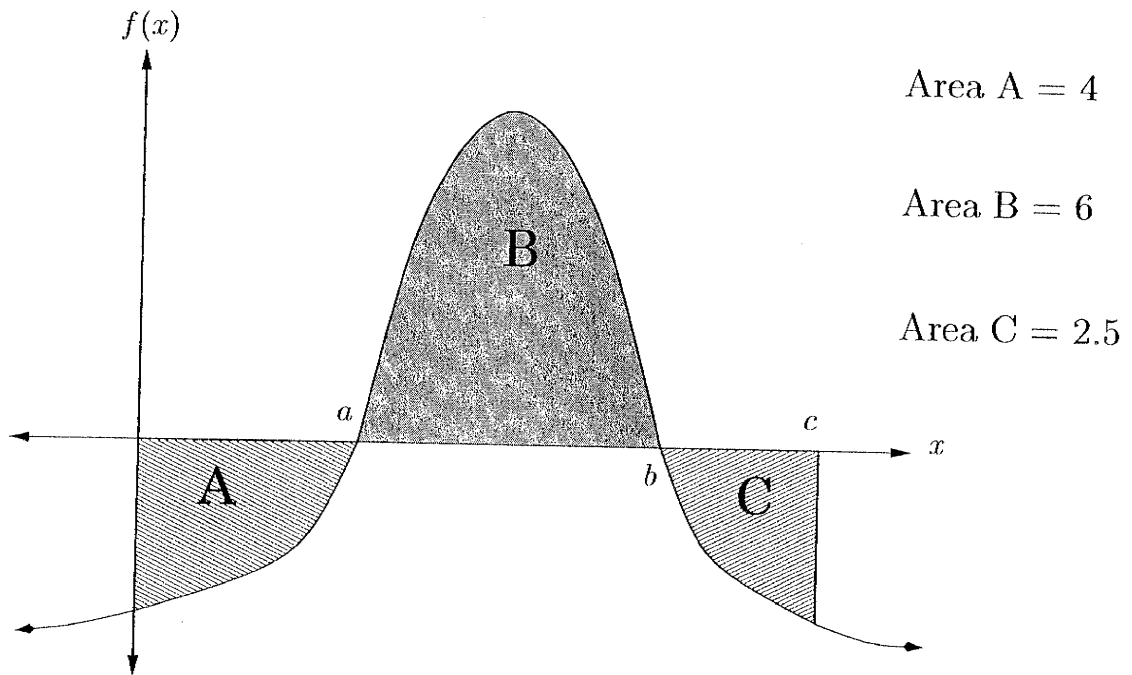
10. Identify intervals over which $f(x)$ is decreasing. _____
11. Identify intervals over which $f'(x) > 0$. _____
12. Identify intervals over which the graph of f is concave downward. _____
13. Identify intervals over which $f''(x) > 0$. _____
14. Identify x coordinates of inflection points. _____
15. Write the equation of the vertical asymptote. _____

In problems 16 and 17, evaluate the integrals.

16. $\int 3x^{-2} dx =$ _____

17. $\int (3e^x + \frac{1}{x}) dx =$ _____

Problems 18 and 19 refer to the following figure with the indicated areas:



18. $\int_0^c f(x) dx =$ _____ 19. $\int_a^c f(x) dx =$ _____

20. If $h(x) = \frac{3x^2}{x^2 + 2x - 3}$ then the horizontal asymptote(s) of $h(x)$ are: _____
(Your answer should be written as an equation.)

Part II: 4 points each. For credit, you must show all of your work. You do not need to algebraically simplify your answers.

21. Find $f'(x)$ for $f(x) = x^3e^{x^2}$.

22. Find $\frac{d}{dx} \frac{3x+2}{2x-x^2}$.

23. Use u substitution to find $\int xe^{3x^2} dx$.

A. $u =$

B. $du =$

C. Final answer (in terms of x).

24. Use u substitution to solve $\int x\sqrt[3]{x-4} dx =$.

A. $u =$

B. $du =$

C. $x =$

D. Final answer (in terms of x).

25. $\int_1^3 (x^4 - x^3) dx =$

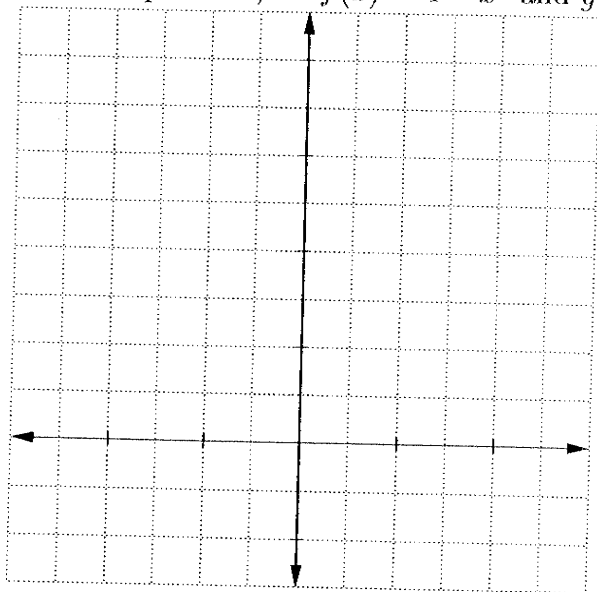
Part III: Each problem is worth 10 points. For credit, you must show all of your work.

26. The marginal profit function is given by $P'(x) = 3 - x + 3x^2$ where $P(0) = 500$.

A. Find the profit function, $P(x)$.

B. Evaluate $P(x)$ at $x = 2$.

27. For this problem, let $f(x) = 4 - x^2$ and $g(x) = x + 2$.



A. Graph $f(x)$ and $g(x)$.

B. Set up the integral for the area bounded by the graphs of f and g .

C. Evaluate the integral from part B.

28. Congratulations! You've been given your dream job in a major corporation. However, the higher-ups want to make sure you're made of the right stuff. You are given a small project to manage. From the accounting and marketing departments you ascertain the following information: the cost to produce x number of items is $C(x) = 650 + 20x$ (in millions of dollars) and the price-demand equation for x items is $p = 120 - x/12$, $0 \leq x \leq 1440$.

A. Find the function that describes the revenue, $R(x)$.

B. Find the number of items sold that will maximize the revenue. What is the revenue at this point?

C. Find the function that describes the profit, $P(x)$.

D. Find the maximum profit and verify that it is a maximum using the second derivative test.

29. Use the given information to sketch the graph of f . Assume that f is continuous on its domain and that the only x and y intercepts are those included in the given information. ND means 'Not Defined'.

x	-3	-2	-1	0	1	2	3
$f(x)$	0	ND	0	1	2	3	0

$f'(x)$	-	-	-	ND	+	+	+	+	0	+	+	+	+	0	-	-	-
x				-2				0						2			

$f''(x)$	-	-	-	ND	-	-	-	-	0	+	+	0	-	-	-	-	-
x				-2				0			1						

$$\lim_{x \rightarrow -2^-} f(x) = -\infty \text{ and } \lim_{x \rightarrow -2^+} f(x) = -\infty$$

