

MATH 75

Test 2

June 16, 2005

Name: _____

- No books, notes, or calculators are allowed.
- Please show all your work.
- Please simplify your answers.

Multiple choice questions: circle the correct answer

1. Find the derivative of $f(x) = \sin(4x^2)$.

- A. $\cos(4x^2)$ B. $\cos(8x^2)$ C. $8x \cos(4x^2)$ D. $-4x^2 \cos(8x)$ E. $-\cos(x)(4x^2)$

2. Find the vertical asymptotes of $f(x) = \frac{1-x^2}{x^2-4x}$.

- A. $x = 0$ B. $x = 4$ C. $x = 0$ and $x = 4$ D. $y = -1$ E. $y = -4$

3. Evaluate the limit: $\lim_{x \rightarrow -\infty} \frac{x^2 + 10}{x^3 - 3}$.

- A. 0 B. 1 C. $-\frac{10}{3}$ D. ∞ E. $-\infty$

4. If $f(t) = \frac{1}{x^2}$, find $f''(-1)$.

- A. -6 B. -2 C. 0 D. 2 E. 6

5. How many inflection points does the function $y = x + \frac{1}{x}$ have?

- A. 0 B. 1 C. 2 D. 3 E. infinitely many

6. Find the local minimum of $y = x + \frac{1}{x}$.

- A. $x = -2$ B. $x = -1$ C. $x = 0$ D. $x = 1$ E. $x = 2$

Regular problems: show all your work

7. Show that the equation $x^7 + x^3 + x + 2 = 0$ has exactly one real root.

8. Find the linear approximation of the function $f(x) = \cos(x)$ at $a = \frac{\pi}{2}$.

9. Find the intervals of increase and decrease of the function $f(x) = x^4 - 4x^3 + 5$.

10. Find the slope of the tangent line to the curve $x \cos y + xy^2 - 3y = 0$ at the point $(0, 0)$.

11. At noon, ship A is 120 km east of ship B. Ship A is sailing west at 20 km/h and ship B is sailing south at 30 km/h. How fast is the distance between the ships changing at 2:00 PM?

12. Find the absolute maximum and minimum values of $f(x) = x^4 - 4x^3 + 5$ on the interval $[-1, 5]$.

Please do not write anything on this page

Problem	Value	Score
1	3	
2	3	
3	3	
4	3	
5	3	
6	3	
7	5	
8	5	
9	5	
10	5	
11	6	
12	6	
Total	50	

	Your scores so far	Out of
Homework		117
Quizzes (lowest score dropped)		35
Test 1		50
Test 2		50
Total		252
Grade		

This page may be used as scratch paper