

MATH 75

Test 2

April 4, 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 $f(x) = \cos(2x^3)$.

- A. $\sin(2x^3)$ B. $\sin(6x^2)$ C. $-2x^3 \sin(2x^3)$ D. $-6x^2 \sin(2x^3)$ E. $-\sin(x)(6x^2)$

2. Find the vertical asymptotes of $f(x) = \frac{x^2}{x^2 - 3x}$.

- A. $x = 0$ B. $x = 3$ C. $x = 0$ and $x = 3$ D. $y = 1$ E. $y = 3$

3. Evaluate the limit: $\lim_{x \rightarrow -\infty} \frac{x^2 + 5}{x - 3}$.

- A. 0 B. 1 C. $-\frac{5}{3}$ D. ∞ E. $-\infty$

4. If $f(t) = \frac{8}{t}$, find $f'''(2)$.

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

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

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

6. Find the local maximum 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. Evaluate the limit: $\lim_{x \rightarrow \infty} \frac{\sqrt{x^2 + 3x - 4}}{5x - 6}$.

8. Find the linear approximation of the function $f(x) = x + \sin(x)$ at $a = 0$.

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 $x \tan y + xy + 3y = 0$ at the point $(0, 0)$.

11. At midnight, ship A is 170 km north of ship B. Ship A is sailing south at 30 km/h and ship B is sailing east at 20 km/h. How fast is the distance between the ships changing at 3:00 AM?

12. Find the absolute maximum and minimum values of $f(x) = x^4 + 4x^3 + 5$ on the interval $[-2, 0]$.

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		129
Quizzes (lowest score dropped)		35
Mathematica		20
Test 1		50
Test 2		50
Total		284
Grade		

This page may be used as scratch paper