

Math 126, Midterm #1, 10/27/05

Name: _____
Section: _____

Write your final answer to each question in the space provided to the right. Partial credit will be awarded except where otherwise indicated. You must **show your work** to receive credit for a correct answer to partial credit problems.

You may use a non-graphing calculator and one 8 1/2 x 11 sheet of **handwritten** notes.

1. Compute the *first non-zero term* of the Taylor series expansion about $x = 0$ for the function

$$f(x) = \tan(2x).$$

_____ (5)
No partial credit

2. Let

$$\mathbf{c} = \mathbf{b} \times (\mathbf{a} \times (\mathbf{a} \times \mathbf{b}))$$

and assume that $\mathbf{c} \neq 0$. To which of the following vectors is \mathbf{c} parallel?

- \mathbf{a} ?
- \mathbf{b} ?
- $\mathbf{a} \times \mathbf{b}$?
- $\mathbf{a} \times (\mathbf{a} \times \mathbf{b})$?
- none of the above?

_____ (5)
No partial credit

3. Estimate the value of the following definite integral by employing a Taylor series approximation for the integrand *valid to two non-zero terms*.

$$I = \int_0^1 \sin(x^2) dx.$$

_____ (10)

4. Use a quadratic approximation to the function

$$f(x) = \ln x$$

derived from its Taylor series to approximate the value of $\ln(6/5)$.

_____ (10)

5. Find an equation for the plane that passes through the point $(1, -1, 3)$ and is parallel to the plane $3x + y + z = 7$.

_____ (10)

6. Find an equation for the plane that passes through the point $(-2, 8, 10)$ and is perpendicular to the line $x = 1 + t$, $y = 2t$ and $z = 4 - 3t$.

_____ (10)