

Name: _____

Math 126E Midterm 1

19 April 2006

Instructions: You may use one two-sided sheet of notes on this exam. Scientific calculators are allowed, but not graphing calculators. Please turn off all cell phones and pagers. Show all work except where told otherwise.

1. Let $\vec{u} = \langle 1, 3, 5 \rangle$ and $\vec{v} = \langle -2, 0, 4 \rangle$.

(3) (a) Compute $2\vec{u} - 3\vec{v}$.

(3) (b) Compute $\vec{u} \cdot \vec{v}$.

(3) (c) Compute $\vec{u} \times \vec{v}$.

- (8) 2. Find an equation of the plane containing the three points $(2, 1, 0)$, $(0, 0, 1)$, and $(3, -4, 1)$.

- (8) 3. Find a number c such that the function $f(x) = e^{2x} + \sin(cx)$ has as its first Taylor polynomial $T_1(x) = 1 + 5x$ (centered at $b = 0$.)

- (8) 4. Let \vec{u} and \vec{v} be vectors. Assume that neither \vec{u} nor \vec{v} is the zero vector. Show that if $\text{proj}_{\vec{u}}\vec{v}$ equals $\vec{0}$, then $\text{proj}_{\vec{v}}\vec{u}$ also equals $\vec{0}$.

5. Set $f(x) = \sin(x) \cos(x)$.

(5) (a) Find the third Taylor polynomial $T_3(x)$ centered at $b = 0$.

(7) (b) Calculate a bound for the error $|f(x) - T_3(x)|$ on the interval $[-2, 2]$.