Math 126 C - Spring 2008
Mid-Term Exam Number Two
May 22, 2008

Name: _____ Section: _____

1	10	
2	10	
3	10	
4	10	
5	10	
6	10	
Total	60	

- Complete all questions.
- You may use a scientific, non-graphing calculator during this examination. Other electronic devices are not allowed, and should be turned off for the duration of the exam.
- If you use a trial-and-error or guess-and-check method, or read a numerical solution from a graph on your calculator, when an algebraic method is available, you will not receive full credit.
- You may use one hand-written 8.5 by 11 inch page of notes.
- Show all work for full credit.
- You have 50 minutes to complete the exam.

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1. Find the equation of the plane through the points $(0, 1, 2)$, $(1, 3, 4)$, and $(5, 5, 5)$.

2. Let L be the line

$$x = 1 + 2t, y = 2 + t, z = 3 + 3t.$$

(a) Find the point of intersection of L with the line

$$x = 19 + t, y = 13 - \frac{1}{2}t, z = 43 - 5t.$$

(b) For what value of a will the plane

$$ax + 6y - 7z = 2$$

not intersect the line L?

3. Consider the 3D curve defined by the position function

$$\vec{r}(t) = \langle t, 4 - t^2, \ln t \rangle.$$

(a) Find the point on the curve at which the tangent vector is parallel to the vector $\langle 2, -1, 8 \rangle$.

(b) Find the parametric equations of the tangent line at the point you found in part (a).

4. A particle is moving so that its position function is

$$\vec{r}(t) = \langle t, t^2, \frac{1}{t^3} \rangle$$

Find all times t at which the tangential component of the particle's acceleration vector is equal to zero.

5. Find and classify all critical points of the surface

$$z = f(x, y) = xy^2 + y - x.$$

6. Find the points of maximum curvature on the curve $y = x^3$.