

**MAT 267**

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**TEST 1 (Review)**

**Wednesday 2/8, 2012**

Honor Statement: By signing below you confirm that you have neither given nor received any unauthorized assistance on this exam. This includes any use of a graphing calculator beyond those authorized by the School of Mathematics and your instructor. Furthermore, you agree not to discuss this exam with anyone until the exam testing period is over and all tests have been returned. In addition, your calculator's program memory and menus may be checked at any time and cleared by any testing center proctor or instructor.

**NAME:** \_\_\_\_\_ **(PRINT!)**

**Signed:** \_\_\_\_\_

**DIRECTIONS**

1. This exam consists of 2 pages and 7 problems. Make sure your exam is complete before you begin.
2. No book or notes are allowed. No time limit.
3. SHOW ALL WORK in detail or your answer will not receive any credit.

**No Calculators that do symbolic algebra (e.g. TI-89, TI-92, CASIO FX2 or 9970Gs are allowed.**

1. Find the parametric equation of the straight line in  $R^3$  that meets the following two conditions:

(a) contains the point

$$(1, 1, 1)$$

(b) perpendicular to the plane

$$x_1 + 2x_2 - 3x_3 = 1.$$

2. Calculate the area of parallelogram (in  $R^4$ ) spanned by

$$\begin{aligned} &(1, -1, 0, 1) \\ &(1, 2, 4, 5) \end{aligned}$$

3. Find the volume of parallelepiped (in  $R^3$ ) defined by

$$\begin{aligned} &(1, 1, 1) \\ &(1, 2, 4) \\ &(1, -1, 1) \end{aligned}$$

4. Find the distance (in  $R^4$ ) between the point  $(1, 1, 1, 1)$  and the hyper-plane defined by points

$$\begin{aligned} &(1, 1, 1, 1) \\ &(0, 2, 0, 8) \\ &(1, -1, 1, -1) \\ &(1, 0, 4, 0) \end{aligned}$$

5. Write the scalar equation of the plane (in  $R^3$ ) defined by three points

$$\begin{aligned} &(1, 0, 1) \\ &(1, 2, 0) \\ &(0, -1, 1) \end{aligned}$$

6. Classify the following 2-nd order surface as elliptic, hyperbolic or parabolic.

$$x_1^2 + x_2^2 + x_3^2 - (x_1 \cdot x_2 + x_1 \cdot x_3 + x_2 \cdot x_3) + x_1 = 0$$

7. For the curve

$$\gamma = \{(e^t \cdot \cos(t), e^t \sin(t), e^t), 0 \leq t \leq 1\}$$

calculate its

velocity,

acceleration,

length,

natural parameterization,

curvature.