SPRING 2008 — MA 227-7 B — TEST 1

Name: _____

1. PART I

There are 6 problems in Part 1, each worth 4 points. Place your answer on the line to the right of the question. Only your answer on the answer line will be graded.

(1) Find the cross product of the vectors $\langle 2, 2, 1 \rangle$ and $\langle 0, 1, 1 \rangle$.

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(2) Find the dot product of the vectors $\langle 1, -3, 1 \rangle$ and $\langle -2, 1, 3 \rangle$.   _____

(3) Find the derivative of the vector function $\langle \cos(2t), \sin(t), t^2 \rangle$.

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(4) Find the angle between the two vectors $\langle 1, 1 \rangle$ and $\langle -1, 1 \rangle$.

_____

(5) Find a vector function representing the line segment passing through the points $P(2, 0, 3)$ and $Q(0, 3, 2)$.

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(6) Find the vector equation that represents the curve of intersection of the cylinder $x^2 + y^2 = 1$ and the plane $z = 5$.

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2. Part II

There are 3 problems in Part 2, each worth 12 points. On Part 2 problems partial credit is awarded where appropriate. Your solution must include enough detail to justify any conclusions you reach in answering the question.

(1) A ball is thrown horizontally from a tower of height $5m$. It lands $10m$ away from the tower.
  (a) Find the vectors of acceleration, velocity, and position.
  (b) What is the initial speed?
  (c) Find the angle of the tangent at which the ball touches ground?
  Use $g = 10m/s^2$.

(2) Find the parametric equations for the tangent line to the curve $r(t) = \langle t, 3t^2, t^3 - 1 \rangle$ at the point $(1, 3, 0)$.

(3) Find an equation of the plane passing through $A(0, 1, -0)$, $B(2, 1, 1)$, and $C(0, -1, 1)$. What is the angle between this plane and the xy-plane?