MATH-1020 F'14
Exam 3 Name: _____

Please write legibly and show all work. Do not use crib sheets, textbooks, calculators, phones, etc.

1. In this problem let $\mathbf{a} = \langle 1, 1, 1 \rangle$ and $\mathbf{b} = \langle -1, -1, 2 \rangle$.

a) Find the angle between $\mathbf{a}$ and $\mathbf{b}$.

b) Find a nonzero vector $\mathbf{c}$ that is orthogonal to $\mathbf{a}$ and $\mathbf{b}$.

2. Find an equation for the line tangent to the curve $x = 2t^2 + 1$, $y = t^3$ at $t = -1$.

3. Find the center and vertices for $x^2 + 2y^2 - 2x - 4y = -1$.

4. removed (not covered)

5. Find the velocity $\mathbf{v}(t)$ and position $\mathbf{r}(t)$ if the acceleration $\mathbf{a}(t) = -12t\mathbf{j}$, with $\mathbf{v}(0) = \mathbf{0}$ and $\mathbf{r}(0) = -2\mathbf{i}$.

6. Letting $f(x, y) = \sin(2x - 3y) + x^2 + y^3$.

a) Find $\dfrac{\partial f}{\partial x}$

b) Find $\dfrac{\partial^2 f}{\partial y \partial x}$

7. removed (not covered)