

Name: _____

Please show all work and justify your answers. Supply brief narration with your solutions and draw conclusions.

1. Find a parametrization for the line of intersection of the planes $x + 2y + 3z = 6$ and $x - y = 0$. Sketch.
2. The curves $t\hat{i} + t^2\hat{j} + t^3\hat{k}$ and $\sin(t)\hat{i} + \sin(2t)\hat{j} + t\hat{k}$ intersect at the origin. Find the angle of intersection.
3. Find the limit of $xy^3/(x^4 + 2y^4)$ as $(x, y) \rightarrow (0, 0)$ or show that the limit fails to exist.
4. Suppose f is a differentiable function of x and y and $g(u, v) = f(e^u + \sin v, e^u + \cos v)$. Use the table of values to find the directional derivative of g at the origin along the main diagonal.

(x, y)	f	g	f_x	f_y
(0,0)	2	3	4	5
(1,2)	6	7	8	9

5. Integrate $x/(1 + xy)$ over the unit square $[0, 1] \times [0, 1]$.

1	2	3	4	5	total (50)	%

Prelim. course grade: %