**Math Path 5C test 2 – Chapter 13**
**Sample – In class portion**

50 points Name: _____

(1) Find the length of the curve $\vec{r}(t) = \left\langle 2t^{3/2}, \cos 2t, \sin 2t \right\rangle$ for $0 \le t \le 4$.

(2) Find the point of intersection, if any, of the helix $\mathbf{r}_1(t) = \langle \cos t, \sin t, t \rangle$ and the curve $\mathbf{r}_2(t) = \langle 1+t, t^2, t^3 \rangle$. Find the equations of the tangent lines to each of the curves at this point.

(3) Sketch the graph of $\vec{r}(t) = \left\langle \cos t, 3\sin t, -t \right\rangle$, and show direction of increasing t. Give the equation of a surface on which this curve lies and show this surface on your sketch.

*(10 points)*

(4) Let C be the curve with equations $x = t^2 - 2$, $y = -\ln t$, $z = \cos(\pi t/2)$. Find the point where C intersects the xz plane and find the equation of the normal plane to C at that point. *(10 points)*

From 14.1 and 14.2

(1) The following limit exists. Find the value:

$$\lim_{(x,y)\to(1,4)} \frac{4x-y}{16x^2-y^2}$$ ----------

(2) For the function $f(x,y) = \frac{x^3y}{3x^6+y^2}$ ,

(a) Find $\lim_{(x,y)\to(0,0)} f(x,y)$ approaching along any straight line y = mx.( $m \neq 0$) _____

(b) Find $\lim_{(x,y)\to(0,0)} f(x,y)$ along the curve $y=x^2$._____

(c) Find $\lim_{(x,y)\to(0,0)} f(x,y)$ along the curve $y = x^3$._____

(d) What can be said about $\lim_{(x,y)\to(0,0)} f(x,y)$?

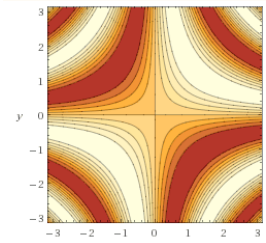
---

(3) Match the following functions with their level curves (a-d) and their graphs (1-4):

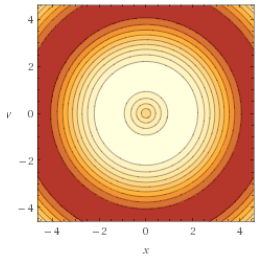
f(x,y) = sin( $\sqrt{x^2+y^2}$ ) _____ ____ f(x,y) = sin(xy) _____ _____

f(x,y) = | x+ y | ____ _____ f(x,y) = |xy| _____ _____

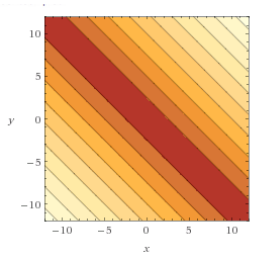
a)



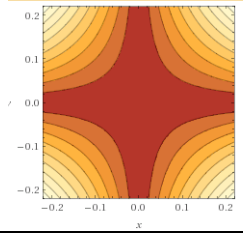
b)



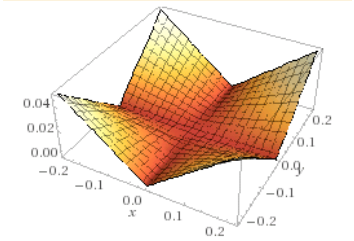
c)



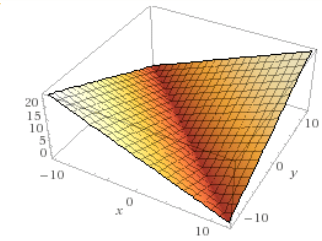
d)



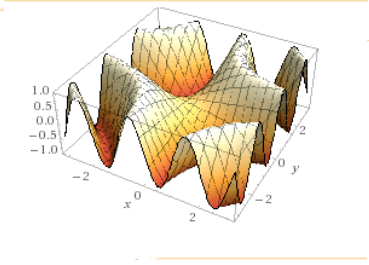
(1)



(2)



(3)




(4)