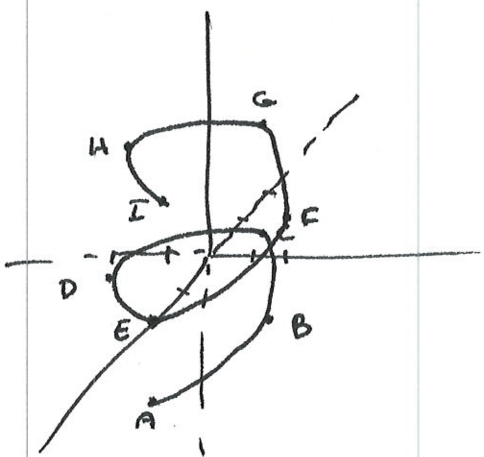
MTH 277, Quiz #3, Spring 2018 Name KEY

Instructions: Show all work. Use exact answers unless otherwise asked to round.

1. Sketch the graph of $\vec{r}(t) = 2\cos t\,\hat{\imath} + 2\sin t\,\hat{\jmath} + \frac{1}{2}t\hat{k}$ for two cycles.



	t	x	y	z
E	0	2	0	0
F	$\pi/2$	0	2	$\pi/4 \sim .75$
G	π	-2	0	$\pi/2 \sim 1.5$
H	$3\pi/2$	0	-2	$3\pi/4 \sim 2.3$
I	2π	2	0	$\pi \approx 3.14$
D	$-\pi/2$	0	-2	$-\pi/4 \sim -.75$
C	$-\pi$	-2	0	$-\pi/2 \sim -1.5$
B	$-3\pi/2$	0	2	$-3\pi/4 \sim -2.3$
A	-2π	2	0	$-\pi = -3.14$

2. Find $\vec{u}'(t)$ and $\int \vec{u}(t)\,dt$ for $\vec{u}(t) = \langle 4\sin t, -6\cos t, t^2 \rangle$.

$u'(t) = \langle 4\cos t,\ 6\sin t,\ 2t \rangle$

$\int \langle 4\sin t, -6\cos t, t^2 \rangle\, dt =$

$\langle -4\cos t + C_1,\ -6\sin t + C_2,\ \frac{1}{3}t^3 + C_3 \rangle$

3. Find the limits.

a. $\lim_{(x,y)\to(1,1)\to} \frac{x-y}{\sqrt{x}-\sqrt{y}}$ $\frac{\sqrt{x}+\sqrt{y}}{\sqrt{x}+\sqrt{y}}$ $= \lim_{(x,y)\to(1,1)} \frac{\cancel{(x-y)}(\sqrt{x}+\sqrt{y})}{\cancel{x-y}} = 2$

b. $\lim_{(x,y)\to(0,0)\to} \frac{x^2y-xy^2}{x^3+y^3}$

let $y = kx$

$$\lim_{x\to 0} \frac{x^2 \cdot kx - x(kx)^2}{x^3 + (kx)^3} = \lim_{x\to 0} \frac{x^3k - k^2x^3}{x^3 + k^3x^3} =$$

$$\lim_{x\to 0} \frac{\cancel{x^3}(k-k^2)}{\cancel{x^3}(1+k^3)} = \lim_{x\to 0} \frac{-k(k-1)}{1+k^3} \neq 0$$

value of this limit varies w/ value of k

therefore, DNE