

Name \_\_\_\_\_

KEY

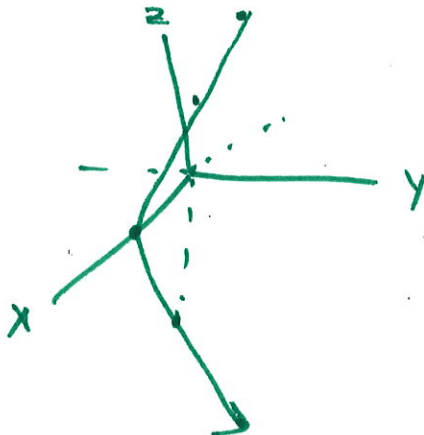
Math 254, Quiz #1, Summer 2012

**Instructions:** Show all work. Give answers in exact form unless the problem begins with decimals.

1. Find the domain of the vector-valued function  $\vec{r}(t) = \sqrt{4-t^2}\vec{i} + t^2\vec{j} - 6t\vec{k}$ . Find  $\|\vec{r}(t)\|$ . Sketch the curve, and note its orientation.

$$t \in [-2, 2] \text{ domain}$$

$$\|\vec{r}(t)\| = \sqrt{4-t^2 + t^4 + 36t^2} = \sqrt{t^4 + 35t^2 + 4}$$



t	x	y	z
-2	0	4	12
-1	$\sqrt{3}$	1	6
0	2	0	0
1	$\sqrt{3}$	1	-6
2	0	4	-12

2. Find the parametric form of the graph  $4x^2 + 3y^2 + 2z^2 = 12, x = z^2$   $z = t$  given the proposed parameter.

$$z = t$$

$$x = t^2$$

$$4t^4 + 3y^2 + 2t^2 = 12$$

$$3y^2 = 12 - 2t^2 - 4t^4$$

$$y = \pm \frac{1}{\sqrt{3}} \sqrt{12 - 2t^2 - 4t^4}$$

assuming top half

$$\vec{r}(t) = t^2 \vec{i} + \frac{1}{\sqrt{3}} \sqrt{12 - 2t^2 - 4t^4} \vec{j} + t \vec{k}$$