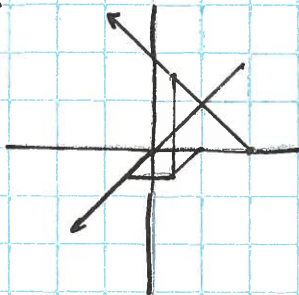
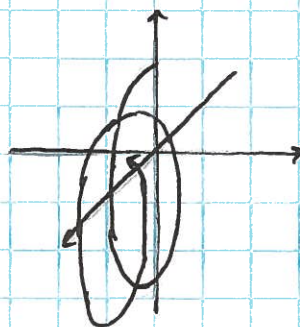
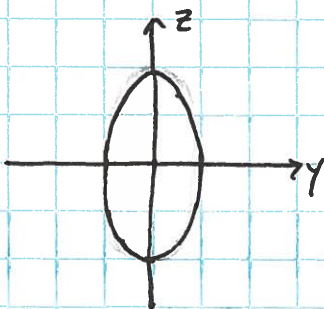
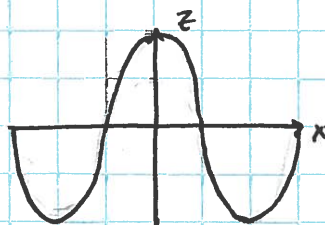
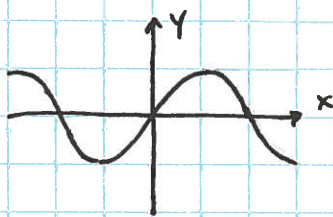


PROBLEM SET 8

1.



2.



3.  $R = (2, 0, 0) + \langle 4, 2, -2 \rangle t$

$$x = 2 + 4t$$

$$y = 2t$$

$$z = -2t$$

4.

$$\sqrt{x^2 + y^2} = 1 + y$$

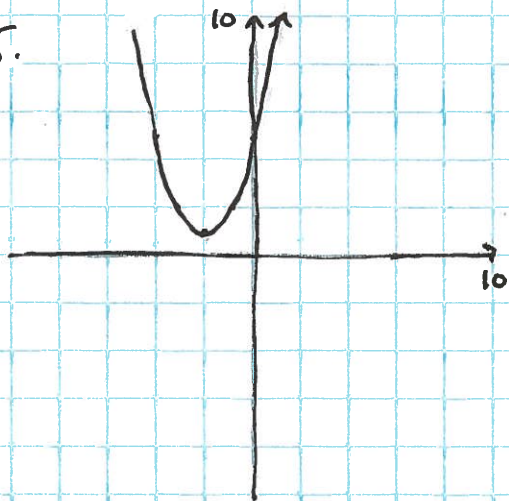
$$y = \frac{x^2 - 1}{2}$$

$$x = t$$

$$y = \frac{t^2 - 1}{2}$$

$$z = 1 + y = \frac{1}{2}t^2 + \frac{1}{2}$$

5.

At  $t = -1$ 

$$6. \mathbf{R}' = \langle t \cos(t) + \sin(t), 2t, \cos(2t) - 2t \cdot \sin(t) \rangle$$

$$7. \mathbf{R}' = \langle 3t^2 + 3, 2t, 3 \rangle$$

$$\mathbf{R}'(1) = \langle 6, 2, 3 \rangle$$

$$|\mathbf{R}'(1)| = 7$$

$$\vec{T}(1) = \frac{\mathbf{R}'}{|\mathbf{R}'|} = \left\langle \frac{6}{7}, \frac{2}{7}, \frac{3}{7} \right\rangle$$

$$8. \mathbf{R}' = \langle 1, 2t, 3t^2 \rangle$$

$$\vec{T}(1) = \frac{\mathbf{R}'}{|\mathbf{R}'|} = \left\langle \frac{1}{\sqrt{14}}, \frac{2}{\sqrt{14}}, \frac{3}{\sqrt{14}} \right\rangle$$

$$\mathbf{R}'' = \langle 0, 2, 6t \rangle$$

$$\mathbf{R}' \times \mathbf{R}'' = 6t^2 \hat{i} - 6t \hat{j} + 2 \hat{k}$$

$$9. \quad R' = \langle t^{-\frac{1}{2}}, 3t^2 - 1, 3t^2 + 1 \rangle$$

$$R'(1) = \langle 1, 2, 4 \rangle$$

$$x = 3 + t$$

$$y = 2t$$

$$z = 4t + 2$$

$$10. \quad \left. \frac{1}{2}t^2 \hat{i} - \frac{1}{4}t^4 \hat{j} + \frac{1}{2}t^6 \hat{k} \right]_0^2 = 2\hat{i} - 4\hat{j} + 32\hat{k}$$