

$$3. \quad \vec{r}(t) = 3 \cos t \vec{i} + 3 \sin t \vec{j} \quad (3, 0)$$

$$\vec{v}(t) = -3 \sin t \vec{i} + 3 \cos t \vec{j}$$

$$\vec{a}(t) = -3 \cos t \vec{i} - 3 \sin t \vec{j}$$

$$3 \cos t = 3 \quad 3 \sin t = 0$$

$$\cos t = 1 \quad \sin t = 0$$

$$t = 0$$

so

$$\vec{v}(0) = -3 \sin 0 \vec{i} + 3 \cos 0 \vec{j}$$

$$= 3 \vec{j}$$

$$\vec{a}(0) = -3 \cos 0 \vec{i} - 3 \sin 0 \vec{j}$$

$$= -3 \vec{i}$$

$$x = 3 \cos t \quad y = 3 \sin t$$

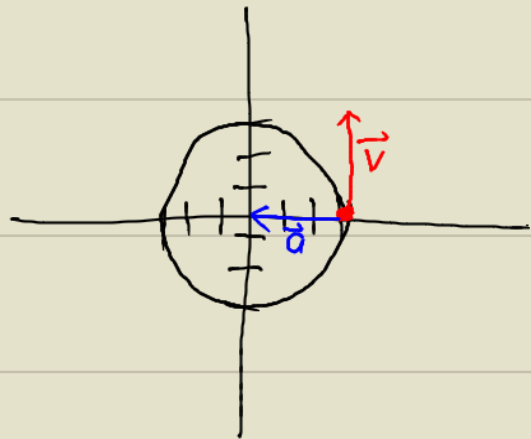
$$\frac{x}{3} = \cos t \quad \frac{y}{3} = \sin t$$

$$\frac{x^2}{9} = \cos^2 t \quad \frac{y^2}{9} = \sin^2 t$$

$$\frac{x^2}{9} + \frac{y^2}{9} = \cos^2 t + \sin^2 t$$

$$\frac{x^2}{9} + \frac{y^2}{9} = 1$$

$$x^2 + y^2 = 9$$



$$4. \quad \vec{r}(t) = 4t \vec{i} + 2t \vec{j} + t \vec{k}$$

$$\vec{v}(t) = \vec{r}'(t) = (4\vec{i} + 2\vec{j} + \vec{k})$$

$$\vec{a}(t) = \vec{r}''(t) = \vec{0} = \langle 0, 0, 0 \rangle$$

$$\text{SPEED} = \|\vec{r}'(t)\| = \sqrt{4^2 + 2^2 + 1^2}$$

$$= \sqrt{16 + 4 + 1}$$

$$= \sqrt{21}$$