**No calculators, cell phones, computers, notes, etc.**

Circle your answer. Make your work correct, complete and coherent.

The quiz is worth 5 points. The solutions will be posted on my website later today.

**Quiz 5, October 24, 2017, 11:40 class**

The position vector of an object at time $t$ is $\vec{r}(t) = \cos(2t)\,\vec{i} - \sin(2t)\,\vec{j}$.

(a) Eliminate the parameter and give the path of the object.

Use the identity $\cos^2\theta + \sin^2\theta = 1$ to see that $x^2 + y^2 = \cos^2(2t) + \sin^2(2t) = 1$. The path of the object is $\boxed{x^2 + y^2 = 1}$.

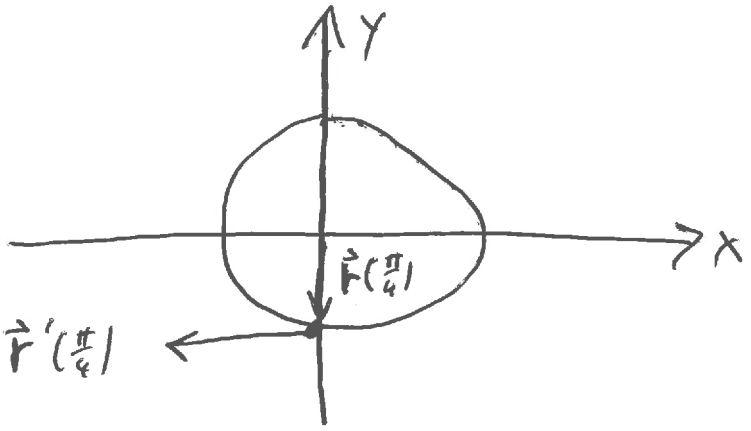
(b) Is the object moving clock-wise or counter clock-wise? (Please explain.)

At time zero the object is standing on $(0,0)$. At time $\frac{\pi}{4}$ the object is standing on $(0,-1)$. The object is moving $\boxed{\text{clock-wise}}$.

(c) What is the speed of the object at time $t$?

The speed at time $t$ is $|\vec{r}\,'(t)| = |-2\sin(2t)\,\vec{i} - 2\cos(2t)\,\vec{j}\,| = \sqrt{4\sin^2(2t) + 4\cos^2(2t)} =$ $\boxed{2}$

(d) Draw the velocity vector $\vec{r}\,'(\frac{\pi}{4})$ on a picture of the path of the object. Put the tail of the velocity vector on the position of the object at $t = \frac{\pi}{4}$.




$\vec{r}\,'(\frac{\pi}{4}) = -2\vec{i}$