Math 243 **Weekly Assignment 5** **DUE 10/14/2016**

Name: _____

Answer the questions on the worksheet and not on a separate sheet of paper. Please circle your answers and justify your work for full credit.

True/False

_____ 1. Consider the following statement:

If a path $\mathbf{r}(t)$ remains at constant distance from the origin,
then the velocity of $\mathbf{r}(t)$ is perpendicular to $\mathbf{r}(t)$.

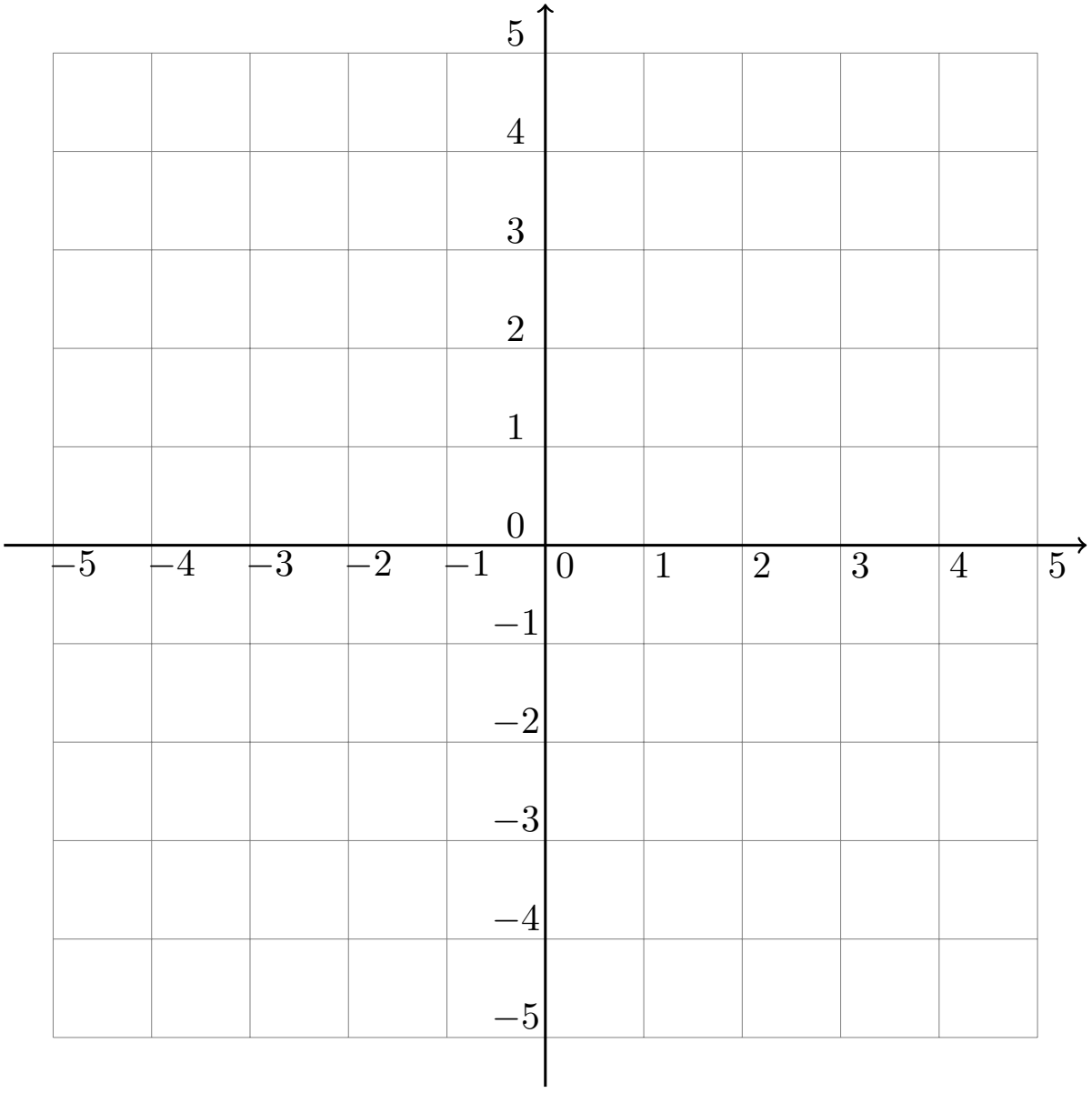
Is this statement True or False? If the statement is True, give a brief reason. If the statement is False, give a counterexample, and explain how you could make a minimal change to the statement so that it is True (other than negating the statement).

Draw a Picture:

2. Consider the vector function

$$\vec{r}(t) = \langle t^3 - 3t, t^4 - 4t^2 \rangle$$

Graph this function on the interval $0 \leq t \leq 2$, and draw the vectors $\vec{v}$, $\vec{a}$, $\vec{T}$, and $\vec{N}$ for $t = 1$.



Matching

3. Below shows the plots of three paths $\mathbf{x}$ in $\mathbb{R}^3$. Match each parametric description with the correct graph, and give a brief explanation how you know which equation corresponds to which graph.

    1. $\mathbf{x}(t) = \langle 15\cos(t), 23\sin(t), 4t\rangle$
    2. $\mathbf{x}(t) = \langle \cos(3t), \cos(5t), \sin(4t)\rangle$
    3. $\mathbf{x}(t) = \langle 2t\cos(t), 2t\sin(t), 4t\rangle$