Math 2440 – Spring 2017 **WS #5 – The Frenét Frame & Curvature** Name: _____

Consider the vector-valued function $\vec{r}(t) = \langle 4\cos t,\, 4\sin t,\, 3t \rangle$

1. What type of curve does this function describe in space? Be fairly specific.

2. Compute the velocity and acceleration vectors $\vec{v}(t)$ and $\vec{a}(t)$ for this space curve.

3. Compute the unit tangent vector $\vec{T}$ for this curve.

4. Compute the unit normal vector $\vec{N}$ for this curve.

5. Compute the unit binormal vector $\overrightarrow{B}$ for this curve.

6. Compute the arclength of this curve between the points corresponding to $t = 0$ and $t = 4\pi$.

7. Compute the curvature function $\kappa(t)$ for this curve.