Suppose the position of a cow in a tornado is given by

$$r(t) = \left\langle \cos(2t), \sin(3t)^3, \cos(3t) - \sin(3t) + 19 \right\rangle$$

for $0 \leq t \leq 5$ where t is measured in seconds after 12:00 noon on July 3, and distance is measured in meters.

1. Graph the path of the cow using Maple.
2. Find when the cow is traveling horizontally. Locate the points on your graph. What direction is the cow moving at each time?
3. Is there any time when the cow is traveling straight up or straight down?
4. What is the cow's maximum speed?