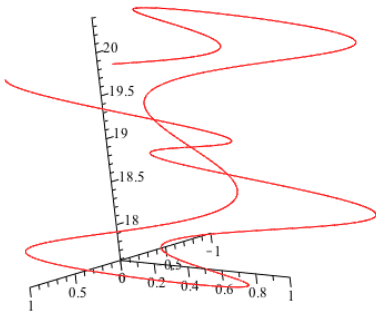The position of a cow in a tornado is given by

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

for $0 \le t \le 6$ where t is measured in seconds after 12:00 noon on July 3, and distance is measured in meters.

Find when the cow is traveling horizontally and locate the points on the graph. In what direction is the cow moving at each of these times?