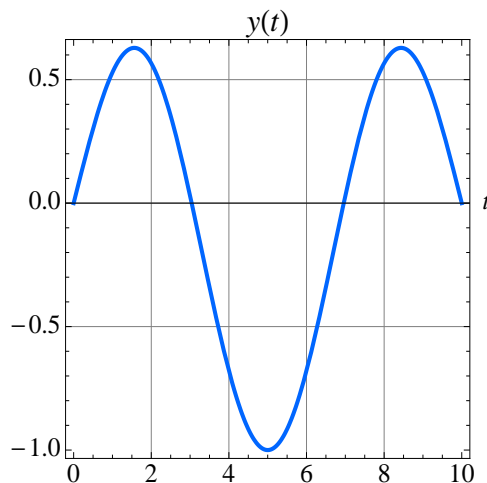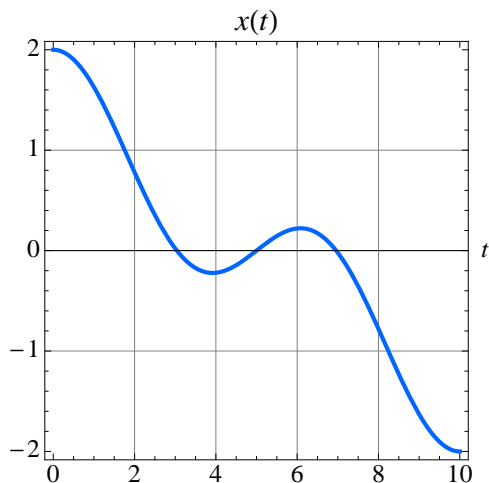**4.** [11 points] A particle is moving in the x-y plane according to the parametric equations $(x(t), y(t))$ for $0 \leq t \leq 10$. The graph of these functions are shown below.

a. [2 points] What are the starting and ending points of the particle?

Solution: Starting point $(2, 0)$ and ending point $(-2, 0)$.

b. [3 points] At which values of $0 < t < 10$ is the particle moving horizontally straight to the right or to the left?

Solution: Right: $t = 5$.
Left: $t = 2$ and $t = 8.5$.

c. [2 points] At which values of $0 < t < 10$ is the particle moving straight up or down?

Solution: Up: $t = 6$
Down: $t = 4$.

d. [2 points] At which values of t is the particle at the origin?

Solution: $t = 3$ and $t = 7$.

e. [2 points] If $v(t)$ is the speed of the particle at time t, which one is larger $v(2)$ or $v(5)$? Explain.

Solution: $v(5) < v(2)$ since the horizontal and vertical velocities satisfy $v_x(5)^2 < v_x(2)^2$ and $v_y(5)^2 < v_y(2)^2$.