5. [12 points] A particle moves according to the following parametric equations

\[ x = x(t) \quad \text{and} \quad y = y(t) \quad \text{for} \quad -2 \leq t \leq 2, \]

where the graphs of \( x(t) \) and \( y(t) \) are shown below.

a. [2 points] Is there a value of \( t \) at which the particle is at the point \((0, 2)\)? If so, find the value of \( t \) where this happens.

\[ \text{Solution: } t = 1. \]

b. [3 points] At which value(s) of \( t \) is the particle on the \( x \)-axis?

\[ \text{Solution: } t = -2, 0, 2. \]

c. [4 points] At what points \((x, y)\) does the curve traveled by the particle have a horizontal tangent line? Include the times for each point.

\[ \text{Solution: } y'(t) = 0 \text{ when } t = 1, (x, y) = (0, 2) \text{ and } t = -1, (x, y) = (0, -2). \]

d. [3 points] For which of values of \( t \) is the slope of the tangent line to the curve positive?

\[ \text{Solution: } \text{Slope} = \frac{y'(t)}{x'(t)} > 0 \text{ if } x' \text{ and } y' \text{ have the same sign. This occurs at } (0, 1), (-1.5, -1) \text{ and } (1.5, 2). \]