Question

A ball moves in a vertical air tunnel in response to air flow in the tunnel. Suppose that y(t) represents the vertical position of the center of the ball above 'ground level'. (Note: It is possible for the ball to be below ground level.) Air is fed into the tunnel at varying rates beginning at t = -2 and ending at t = 14. Assume that it is known that y(0) = 10 and that the vertical velocity of the center of the ball is given by

$$v(t) = \begin{cases} t^2 - t - 6 & \text{if } 0 \le t \le 4\\ (26 - 2t)/3 & \text{if } 4 \le t \le 13 \end{cases}$$

- 1. Find y(2) and y(8).
- 2. From t = 0 to t = 13, at what instant of time does the ball reach the lowest point in its trajectory? At what instant does the ball reach the highest point in its trajectory?