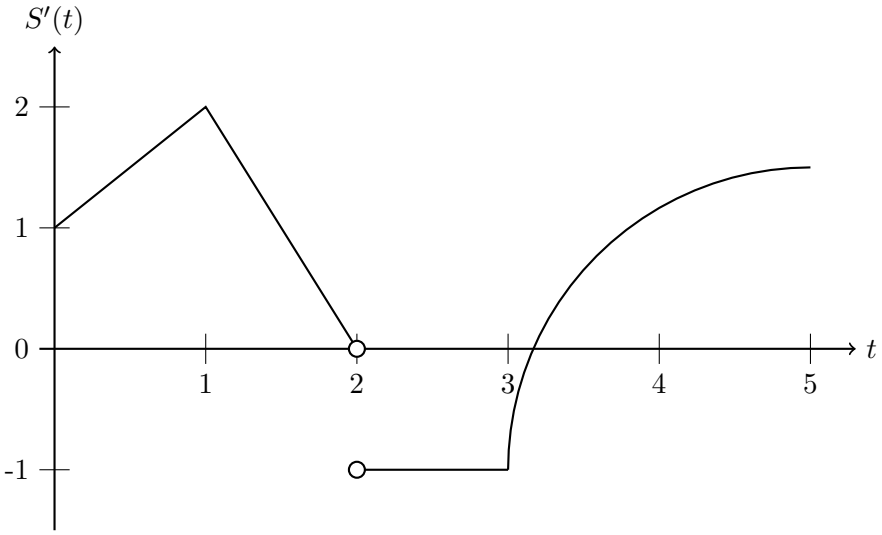
2. [16 points] The local sparrow population has been fluctuating unnaturally, and Raymond Green has five months of data to prove it. Let $S(t)$ denote the local sparrow population **in thousands**, t months after Green started collecting data. A graph of $S'(t)$, the rate of population growth, is below. Assume there are 2000 sparrows at $t = 1$.

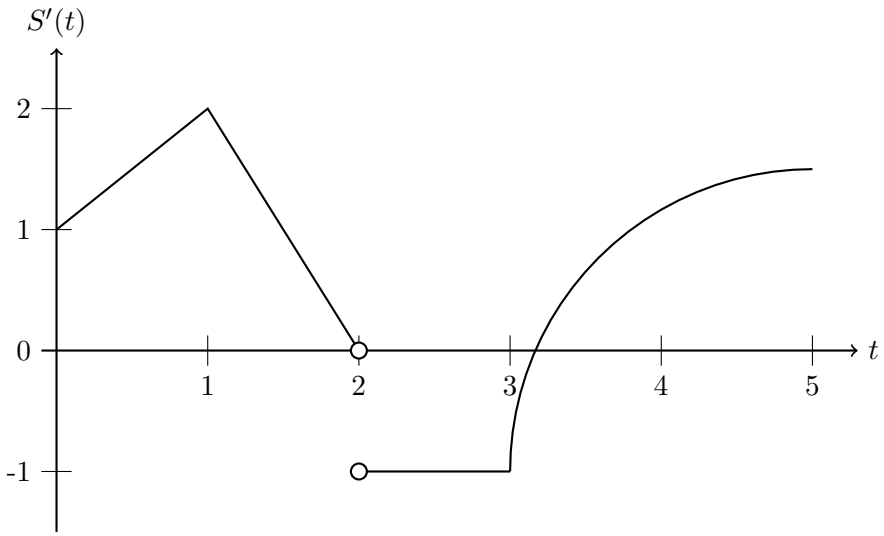


a. [1 point] At which t-value(s) is the sparrow population increasing the fastest?

b. [3 points] What is the local sparrow population at $t = 0$, $t = 2$ and $t = 3$?

c. [2 points] At which t-values is the population at its highest and lowest?

2 (continued). Recall that $S(t)$ is the local sparrow population **in thousands**, t months after Green began collecting data.



d. [10 points] Sketch a graph of $S(t)$ on the axes below, recalling that there are 2000 sparrows at $t = 1$. Label your vertical axis. Make sure that concavity and local extrema are clear.