**8.** (16 pts.) The function $f(t)$ represents the velocity (in meters per second) of a charged particle in a variable electromagnetic field, t seconds after the beginning of an experiment. Positive velocity represents travel away from the positively charged plate used in the experiment. The graph of f is shown below. The areas between the graph of f and the horizontal axis are also indicated.
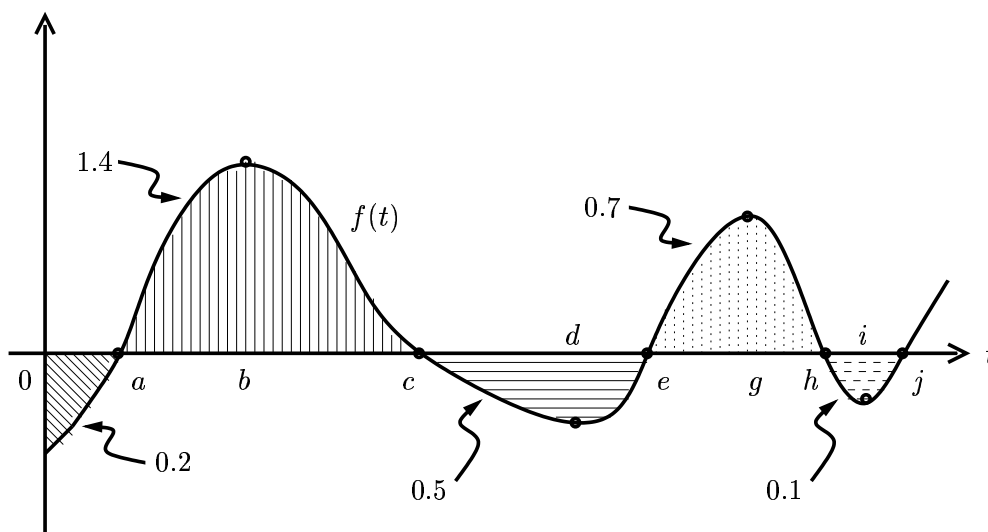
(a) In the context of the question, briefly explain the meaning of the integral $\int_c^h f(t)\,dt$.

(b) At which time(s) between $t = 0$ and $t = j$ is the particle furthest from the positively charged plate? How do you know this?

(c) What is the distance between the position of the particle at time $t = 0$ and its position at time $t = e$. Be sure to show the calculations used to obtain your answer.

(d) What is the total distance travelled by the particle in the first e seconds? Be sure to show your calculation.