

2. [12 points] Angelica Neiring and Simona Koloji decide to enjoy the fall weather by racing each other from the brass block “M” in the center of the Diag along a 2.5 kilometer (2500 meter) route to the Huron River inside the Arb. Let $A(t)$ (respectively $S(t)$) be Angelica’s (respectively Simona’s) distance along the route (in meters) t seconds after they start racing. Angelica and Simona are both wearing GPS watches that record data about their race. The table of values for the functions A and S below shows some of the resulting data, rounded to the nearest meter. Note that the data is not always recorded at regular intervals.

t	0	30	60	66	72	105	114	120	135	168	180	198	300
$A(t)$	0	55	119	137	156	226	249	265	302	384	415	463	737
$S(t)$	0	57	120	137	156	225	248	264	303	389	422	473	768

Use the data above to answer the questions below. Remember to show your work.

- a. [2 points] Estimate Angelica’s instantaneous velocity 3 minutes into the race.
Include units.

Answer: _____

- b. [2 points] Estimate $S'(120)$.

Answer: _____

- c. [2 points] In the context of this problem, what are the units on the quantity $(A^{-1})'(150)$?

Answer: _____

For questions **d.** and **e.** below, circle the one best answer or circle CANNOT BE DETERMINED if there is not enough information to definitely determine the answer. You do not need to show your work or provide justification for your answers for these questions.

- d. [1 point] Who was ahead 5 minutes into the race?

Angelica Simona CANNOT BE DETERMINED

- e. [1 point] Who was running faster exactly one minute into the race?

Angelica Simona CANNOT BE DETERMINED

- f. [4 points] In describing the race later, Simona says that her average velocity during the entire race was 2.8 meters per second while Angelica says that after the first 5 minutes, her average velocity for the rest of the race was 3.1 meters per second.

Assuming their statements and the table of values above are accurate, who won the race? Or is there not enough information to decide? Explain your reasoning.

Answer: (Circle one.) Angelica Simona Not enough information

Explanation: