

Name \_\_\_\_\_

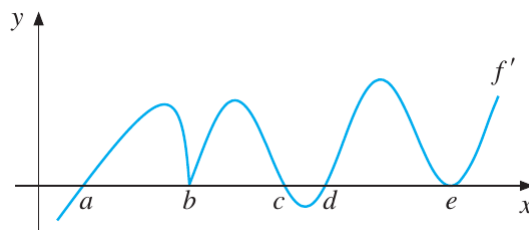
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1. (3 points) A firm producing a single commodity wants to maximize profits. Because of technical limitations, the firm is constrained to produce output in the interval  $[0, 1000]$ . The total revenue generated in a certain period by producing and selling  $Q$  units is  $1840Q$  dollars while total costs are  $2Q^2 + 1940Q + 5000$  dollars. Find the profit-maximizing quantity.

2. Below you will find a plot of the derivative of some function  $f(x)$ . The intersection of the vertical and horizontal axes is the point  $(0, 0)$ . The domain of  $f$  is  $x > 0$ .



- (a) (1 point) Is the function  $f$  increasing or decreasing over the interval  $(c, d)$ ? Write a short reason why.

- (b) (1 point) Is  $x = e$  a local minimum point of  $f$ ? Write a short reason why.