

2. A new company produces and sells socks. By far their most successful item is the business sock (that's why they call them business socks), and the company hires a young consultant to assess the impact of advertising this popular product. Let S denote the yearly sales revenue, in thousands of dollars, and a denote the annual advertising expenditure, also in thousands of dollars. The company assumes that sales revenue will depend on advertising, so we write $S = f(a)$.

(a) (2 points) What does the company hope is true about the sign of f' ? Explain.

(b) (2 points) The consultant suggests that $\lim_{a \rightarrow \infty} f'(a) = 0$. Is this reasonable? Why or why not?

(c) The consultant makes the following statements. Interpret her observations in practical terms. Do not use the word "rate"!

i. (3 points) $f(0) = 3$

ii. (3 points) $f'(0) = 4$

iii. (3 points) $f^{-1}(6.6) = 1$

iv. (3 points) $(f^{-1})'(6.6) = 0.31$