Board Problems for Day 9 for Real Analysis and Trigonometry

INSTRUCTIONS: Work these problems with several other people at your desks. After a while, we shall discuss them.

1. Shetch the area represented by $g(x)$, where

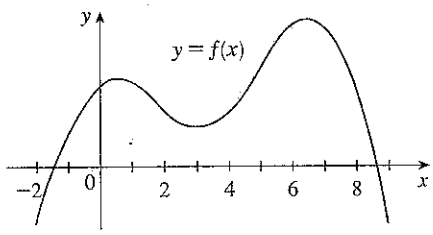
$$g(x) = \int_0^x (1 + t^2)\, dt.$$

Then find $g'(x)$ in two ways: (a) By using Part I of the Fundamental Theorem of Calculus, and (b) By evaluating the integral and then differentiating.

2. Use the Fundamental Theorem of Calculus to find the derivative of

$$f(x) = \int_2^x t^2 \sin(t)\, dt.$$

3. Use the given graph of f to estimate the intervals on which the derivative f' is increasing or decreasing.

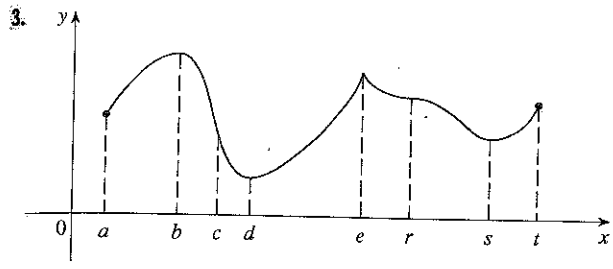


4. (a) Sketch a curve whose slope is always positive and increasing.
(b) Sketch a curve whose slope is always positive and decreasing.
(c) Give equations for curves with these properties.

5. The president announces that the national deficit is increasing, but at a decreasing rate. Interpret this statement in terms of a function and its derivatives.

3–4 ■ For each of the numbers a, b, c, d, e, r, s, and t, state whether the function whose graph is shown has an absolute maximum or minimum, a local maximum or minimum, or neither a maximum nor a minimum.

3.



4.