Consider the curve defined by \(-8x^2 + 5xy + y^3 = -149\).

(a) Find \(\frac{dy}{dx}\).

(b) Write an equation for the line tangent to the curve at the point \((4, -1)\).

(c) There is a number \(k\) so that the point \((4.2, k)\) is on the curve. Using the tangent line found in part (b), approximate the value of \(k\).

(d) Write an equation that can be solved to find the actual value of \(k\) so that the point \((4.2, k)\) is on the curve.

(e) Solve the equation found in part (d) for the value of \(k\).

1991 AB4

Let \(f\) be the function given by \(f(x) = \frac{|x| - 2}{x - 2}\).

(a) Find all the zeros of \(f\).

(b) Find \(f'(1)\).

(c) Find \(f'(-1)\).

(d) Find the range of \(f\).
Let $f$ be the function given by $f(x) = \frac{x}{\sqrt{x^2 - 4}}$.

(a) Find the domain of $f$.

(b) Write an equation for each vertical asymptote to the graph of $f$.

(c) Write an equation for each horizontal asymptote to the graph of $f$.

(d) Find $f''(x)$.

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**1992 AB4/BC1**

Consider the curve defined by the equation $y + \cos y = x + 1$ for $0 \leq y \leq 2\pi$.

(a) Find $\frac{dy}{dx}$ in terms of $y$.

(b) Write an equation for each vertical tangent to the curve.

(c) Find $\frac{d^2y}{dx^2}$ in terms of $y$. 

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