Tangent Lines and Linear Approximations

Tangent Line Problem

1a) Find the equation of the line tangent to the graph of

$$f(x) = \frac{3x-2}{2x+3} \text{ at } x = 1.$$

1b) Use the tangent line equation for f(x) to approximate f(1.1).

Tangent Line from symbols

- Let f be a differentiable function with f(4) = 2 and $f'(4) = 2$

  Use the tangent line at x = 4 to find an approximation for the zero of f.

Implicit Differentiation

A. In the xy-plane, what is the slope of the line tangent to the graph of $x^2 + xy + y^2 = 7$ at the point point (1,2).

Tangent Line from symbols

- Let f be a differentiable function with f(9) = 2 and $f'(9) = 1$

  let g(x) = $x^2 \cdot f(3x)$. Write the equation of the tangent line to the graph of g at the point where x = 3.

Set the derivative = and solve (Calculator OK)

- Find an equation of the line tangent to the graph of $f(x) = 2x^4 + 3x^2$ at the point where $f'(x) = 3$