

■ 1. Compute the derivatives of  $f(x)$

$$f(x) = \frac{-7x^2+4x+1}{3x^2-5x+2}$$

$$f(x) = \frac{1}{(3x+5)^5}$$

$$f(x) = \sqrt{\frac{x}{x+1}}\left(x + \frac{1}{x}\right)$$

$$f(x) = \frac{\sqrt{x^3+x+1}}{3x^2-5x+2}$$

$$f(x) = \left(\frac{2x+1}{-5x+2}\right)^3$$

$$f(x) = \ln(x+9)\ln(e^{2x}+2x)$$

$$f(x) = (-x^2+8x)(1-x-x^4)^3$$

$$f(x) = \frac{\ln(1-3x)}{(3x+5)^2}$$

$$f(x) = (1-x-x^3)e^{\frac{2}{3x+5}}$$

$$f(x) = \ln\left(\frac{5x-x^3}{3}\right)e^{6x+9}$$

$$f(x) = \cos\left(\frac{x^3}{3}\right)\sin(e^{x^2-7x+9})$$

$$f(x) = (e^{2x})\ln(\ln(x+9))$$

$$f(x) = \frac{x}{(2x-1)^3}$$

$$f(x) = \arccos(2\sqrt{2x+3})$$

$$f(x) = x^3\arcsin\left(\frac{\sqrt{2x+3}}{x}\right)$$

$$f(x) = \frac{\arcsin(3x)}{\arctan(7x)}$$

■ 2. Compute the derivatives of  $f(x)$

$$f(x) = (x)^{x^{2017}}$$

$$f(x) = (x)^{\tan(3x+5)}$$

$$f(x) = (3+5x)^{\cos(x^2)}$$

$$f(x) = (3)^{x^2+\frac{2}{x}}$$

$$f(x) = (\sin(x))^{\ln(\cos(x))}$$

$$f(x) = (3x^2-x-5)^{\frac{3}{2x+1}}$$

$$f(x) = (\sin(x))^{\ln(\cos(x))}$$

■ 3. Compute the implicit derivatives

$$\frac{\sin(x+2y)}{xy} - 9\cos(yx) = \frac{21}{x+3}$$

$$\frac{2}{xy} + 11x\cos(y^2x) = 3x^3y$$

$$4xy + 5xe^y - 3\ln(3xy + 5y^3) = \frac{2y}{x^3}$$

$$\sin(x+2)\cos(yx) = \sqrt{-3x+y}$$

$$y^{-3} + (-17x+5)e^{-7y^3} - 3\ln(3xy) = \sqrt[3]{2x-1}$$

$$xy^3 + \ln(3xy) = \sqrt[3]{5y^2}$$

■ 4. Compute the equation of the tangent line at point value  $a = 1$

$$f(x) = \frac{4x+1}{3x^2+5x+2}$$

$$f(x) = \frac{-3x}{(3x+5)^3}$$

■ 5. Compute the linearization (linear approximation) of the given function  $f(x)$  at point value  $a = 1$

$$f(x) = \sqrt{3x-2}, \text{ and use it to estimate } \sqrt{1.1}$$

$$f(x) = \sqrt[3]{2x-1}, \text{ and use it to estimate } \sqrt[3]{1.1}$$

$$f(x) = \ln(2x-1), \text{ and use it to estimate } \ln\left(\frac{1}{2}\right)$$