$f(x) = 5x^3 - 3x^2 + 1$ $\qquad 15x^2 - 6x$

$f'(x) = 15x^2 - 6x$

$f(x) = \sqrt{x} + \sqrt[3]{x}$ $\qquad \frac{1}{x} \times \frac{x^2}{x}$

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

$= \frac{1}{2}x^{-\frac{1}{2}} + \frac{1}{3}x^{-\frac{2}{3}}$ $\qquad \frac{1}{2}\frac{1}{\sqrt{x}} + \frac{2}{\sqrt[3]{x} \cdot 3}$

$(x^a)' = ax^{a-1}$

$f(x) = (x^3+4)(x^5-2)$ $\qquad 8x^7 - 6x^2 + 20x^4$

$f'(x) = 3x^2(x^5-2) + (x^3+4)5x^4$

$[f(x)g(x)]' = f'(x)g(x) + f(x)g'(x)$

$f(x) = x\sin x - x^2\cos x$ $\qquad \sin x - x\cos x + x^2\sin x$

$f'(x) = \sin x + x\cos x - 2x\cos x + x^2\sin x =$

$= (1+x^2)\sin x - x\cos x$

$f(x) = \frac{x^2-1}{x+2}$ $\qquad \left[\frac{f(x)}{g(x)}\right]' = \frac{f'(x)g(x) - f(x)g'(x)}{g^2(x)}$

$f'(x) =$ $\qquad (x+2)^2 \neq x^2 + 4$

$= \frac{2x(x+2) - (x^2-1)1}{(x+2)^2} = \frac{2x^2+4x-x^2+1}{(x+2)^2} = \frac{x^2+4x+1}{(x+2)^2}$

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

$f'(x) = \left[(x^2+2x+3)^{\frac{1}{2}}\right]' =$ $\qquad [f(g(x))]' = f'(g(x)) \cdot g'(x)$

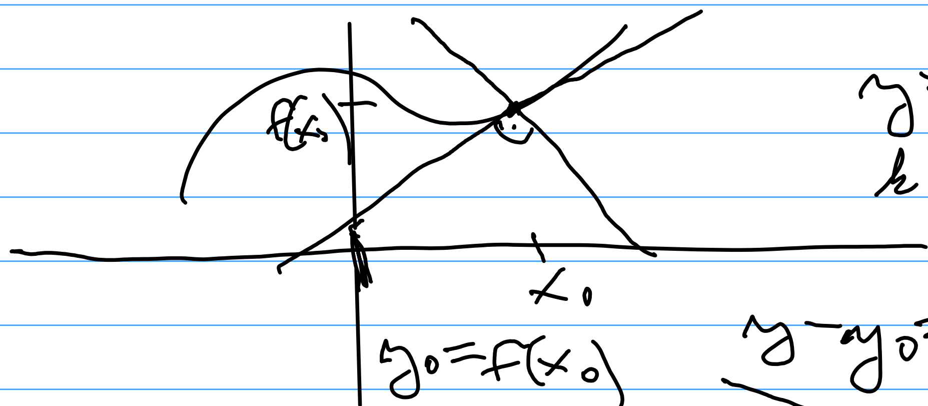
$= \frac{1}{2}(x^2+2x+3)^{-\frac{1}{2}} \cdot (2x+2) = (x^2+2x+3)^{-\frac{1}{2}}(x+1)$

$f(x) = \ln(\sin 2x + \sqrt{x})$

$f'(x) = \frac{1}{\sin 2x + \sqrt{x}}\left(\cos 2x \cdot 2 + \frac{1}{2}x^{-\frac{1}{2}}\right)$

$$f(x) = e^{3x^2 - \sin x}$$
$$e^{3x^2-\sin x}(6x-\cos x)$$
$$f'(x) = e^{3x^2-\sin x}(6x - \cos x)$$

$$f(x) = \ln\left(\operatorname{arctg}\frac{1}{\sqrt{x}}\right)$$
$$\frac{1}{\operatorname{arctg}\frac{1}{\sqrt{x}}} \cdot \frac{1}{1+\frac{1}{\sqrt{x}}}$$
$$f'(x) = \frac{1}{\operatorname{arctg}\frac{1}{\sqrt{x}}} \cdot \frac{1}{1+\left(\frac{1}{\sqrt{x}}\right)^2} \cdot \left(-\frac{1}{2}x^{-\frac{3}{2}}\right)$$



$$y = kx + q$$
$$k = f'(x_0)$$
$$y_0 = f(x_0)$$
$$\underline{y - y_0 = f'(x_0)(x - x_0)}$$

$f'(x_0)$

$$f(x) = x^2 + 3x + 7 \qquad A = [1, ?]$$
$$x_0 = 1 \qquad y_0 = f(x_0) = 11$$
$$f'(x) = 2x + 3 \qquad f'(x_0) = f'(1) = 5$$
$$y = kx + q$$

$$y - 11 = f'(1)(x-1)$$
$$y - 11 = 5(x-1)$$
$$y = 5x + 6$$

$$k' = -\frac{1}{k}$$
$$y - 11 = -\frac{1}{5}(x-1)$$

$$y - 11 = \underline{\underline{k'}}(x-1)$$
$$-\frac{1}{k}$$

$$x = 1{,}1$$
$$d(x, x_0) = f'(x_0)(x - x_0)$$
$$d(x, x_0) = 5(1{,}1 - 1) = 5 \cdot 0{,}1 = 0{,}5$$
$$f(x) \doteq f(x_0) + f'(x_0)(x - x_0) = 11 + 5 \cdot 0{,}1 = 11{,}5$$
$$f(x) = f(1{,}1) = 1{,}1^2 + 3 \cdot 1{,}1 + 7 = 11{,}51$$

$$x = 1{,}01$$

$f(x) = x^3 - x + 2$

$f'(x) = 3x^2 - 1$

$f'(x_0) = 2$

$3x^2 - 1 = 2$

$3x^2 = 3$

$x^2 = 1$

$x = \pm 1$

$k = 2$

$p: 2x - y + 3 = 0$

$p: y = 2x + 3$

$y = kx + q$

$A_1 = [1, 2] \rightarrow y - 2 = 2(x - 1)$

$A_2 = [-1, 2] \rightarrow y - 2 = 2(x + 1)$

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

$e^{x^2 + 3x} = 1 = e^0$

$x^2 + 3x = 0$

$x(x + 3) = 0$

$x \in \{0, -3\}$

$f'(x) = e^{x^2 + \cancel{x}}(2x + 3) =$

$A = [?, 1]$

$A_1 = [0, 1]$ $\quad y - 1 = 3(x - 0)$

$A_2 = [-3, 1]$ $\quad y - 1 = -3(x + 3)$

$f'(0) = 3$

$f(-3) = -3$