An_5.5

piątek, 8 stycznia 2021 17:52

$f(x) = x^4 - 2x + 5$ $\qquad$ $y = \underbrace{2}x + 3$

$y = f'(x_0)(x - x_0) + f(x_0)$ $\qquad$ $a = 2 = f'(x_0)$

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

$4x_0^3 - 2 = 2$ $\qquad$ $4x_0^3 - 4 = 0$ $\qquad$ $x_0^3 = 1$

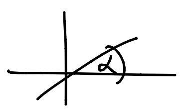
$4(x_0^3 - 1) = 0$ $\qquad$ $x_0 = 1$

$f'(1) = 4 - 2 = 2$

$y = 2(x-1) + 1 - 2 + 5$

$y = 2x + 2$

b) $f(x) = \sqrt{x}$



$\operatorname{tg}\alpha = a = f'(x_0)$

$f'(x_0) = \frac{1}{2\sqrt{x_0}} = 1$ $\qquad$ $f'(x_0) = \operatorname{tg}\frac{\pi}{4} = 1$

$\sqrt{x_0} = \frac{1}{2}$ $\qquad$ $x_0 = \frac{1}{4}$

$y = x - \frac{1}{4} + \frac{1}{2} = x + \frac{1}{4}$

c) $f(x) = x \ln x$ $\qquad$ $2x + 6y - 1 = 0$

$6y = -2x + 1$

$f'(x_0) = 3$ $\qquad$ $y = -\frac{1}{3}x + \frac{1}{6}$

$f'(x) = \ln x + 1$ $\qquad$ $a = 3$

$\ln x_0 = 2$

$x_0 = e^2$

$y = 3(x - e^2) + e^2 \ln e^2$

$y = 3x - 3e^2 + 2e^2 = 3x - e^2$

d) $f(x) = x \arctan\frac{1}{x}$ $\qquad$ $\pi x = 4y$ $\qquad$ $y = \frac{\pi}{4}x$

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$$\cancel{x} \arctan \frac{1}{x} = \frac{\pi}{4} \cancel{x}$$

$$\arctan \frac{1}{x} = \frac{\pi}{4}$$

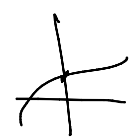
$$\tan \frac{\pi}{4} = \frac{1}{x} \qquad x_0 = 1$$

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

$$f'(1) = \arctan 1 - \frac{1}{1+1} = \frac{\pi}{4} - \frac{1}{2}$$

$$y = \left(\frac{\pi}{4} - \frac{1}{2}\right)(x-1) + \frac{\pi}{4} = \left(\frac{\pi}{4} - \frac{1}{2}\right)x + \frac{1}{2}$$

e) $f(x) = \sin 2x - \cos 3x$ $\qquad x_0 = 0$



$$f'(x) = 2\cos 2x + 3\sin 3x$$

$$f'(0) = 2$$

$$y = 2x - 1$$