№ 11

$f(x_0+\delta x) - f(x_0) = f'(x_0)\,\delta x$

$f(x_0+\delta x) = f(x_0) + f'(x_0)\delta x$

$f(x) = \sqrt[3]{x}$ $\quad f'(x) = \frac{1}{3} x^{-\frac{2}{3}}$

$\sqrt[3]{64+1} \approx \frac{1}{3}\cdot\frac{1}{16}\cdot 1 + 4 = 4 + \frac{1}{48}$

№ 5

Четные $\quad f(x) = f(-x) \quad \left.\frac{df}{dx}\right|_{x} = -\left.\frac{df}{dx}\right|_{-x}$

нечетные $\quad f(x) = -f(-x) \quad \left.\frac{df}{dx}\right|_{x} = \left.\frac{df}{dx}\right|_{-x}$

№ 6.

$y = 2x - \cos\frac{x}{2}$ $\quad , y_0 = -1$

$\cos\frac{x}{2} = 2x - y$

$\frac{x}{2} = \arccos(2x-y)$

$x = 2\arccos(2x-y)$

$\frac{dy}{dx} = 2 + \frac{1}{2}\cdot\sin\frac{x}{2}$

$\frac{dx}{dy} = \frac{1}{2+\frac{1}{2}\sin\frac{x}{2}} = \left.\frac{1}{2}\right|_{x=0}$

$2x - \cos\frac{x}{2} - y = 0$

$\cos(0) = 1$

$2\,dx + \frac{1}{2}\sin\frac{x}{2}\,dx - dy = 0$

$-1 = 2x - \cos\frac{x}{2}$

№ 7. $\quad y'_x$ — ?

$$\begin{cases} x = t^2 + 6t + 5 \\ y = \frac{t^3 - 5y}{t} \end{cases}$$

$\frac{dx}{dt} = 2t + 6$

$\frac{dy}{dt} = 2t + \frac{5y}{t^2} = \frac{2t^3 + 5y}{t^2}$

$\frac{dy}{dx} = \frac{2t^3 + 5y}{2t^3 + 6t^2}$

$$\begin{cases} x = \cot 2t = \dfrac{1}{tg 2t} \\ y = \dfrac{2\cos 2t - 1}{2\cos t} \end{cases}$$

$$\frac{dx}{dt} = -1 \cdot \frac{1}{(tg 2t)^2} \cdot \frac{1}{(\cos 2t)^2} \cdot 2 = -2 \cdot \left(\frac{\cos 2t}{\sin 2t}\right)^2 \cdot \frac{1}{(\cos 2t)^2} = -2 \cdot \frac{1}{\sin 2t}$$

$$\frac{dy}{dt} = \frac{-2 \cdot 2 \cdot \sin 2t \cdot (2\cos t) - 2 \cdot (-\sin t) \cdot (2\cos 2t - 1)}{(2\cos t)^2}$$

$$\frac{-8 \sin 2t \cdot \cos t + 2 \sin t \left(\cos(2t) - 1\right)}{(2 \cos t)^2}$$

№ 10

a) $y = u^3 v$

$$\frac{\partial y}{\partial u} = 3v \cdot u^2$$

$$\frac{\partial y}{\partial v} = u^3$$

$$dy = 3vu^2 \cdot du + u^3 dv$$

c) $y = \dfrac{u^2}{v - u^3}$

$$\frac{\partial y}{\partial u} = \frac{2u(v-u^3) - u^2 \cdot (-3u^2)}{(v-u^3)^2} = \frac{2uv - 2u^4 + 3u^4}{(v-u^3)^2} = \frac{u^4 + 2vu}{(v-u^3)^2}$$

$$\frac{\partial y}{\partial v} = \frac{0 - u^2 \cdot v}{(v-u^3)^2} = -\frac{vu^2}{(v-u^3)^2}$$

$$dy = \frac{u^4 + 2vu}{(v-u^3)^2} du - \frac{vu^2}{(v-u^3)^2} dv$$