(20.04.20)

№7.1.65

$x^3+y^3=\sin(x-2y)$ $\quad y'-?$

$y=y(x)$; $y'=y'_x$

$(y^2)'=2y\cdot y'$

$(x^3+y^3)'_x=(\sin(x-2y))'_x$

$(x^3)'_x+(y^3)'_x=\cos(x-2y)(x-2y)'_x$

$3x^2+3y^2y'=\cos(x-2y)(1-2y')$

$3y^2y'+2y'\cos(x-2y)=\cos(x-2y)-3x^2$

$y'(3y^2+2\cos(x-2y))=\cos(x-2y)-3x^2$

$$y'=\frac{\cos(x-2y)-3x^2}{3y^2+2\cos(x-2y)}$$

№7.1.72

$x=2\cos t$ $\quad y=3\sin t$ $\quad y'(x)-?$

$$y'(x)=\frac{y'(t)}{x'(t)}=\frac{(3\sin t)'_t}{(2\cos t)'_t}=\frac{3\cos t}{-2\sin t}=-\frac{3}{2}\,\mathrm{ctg}\,t$$

№7.1.83

1) $f(x)=\sin 3x$ $\quad f'''(x)-?$

$f'(x)=\cos(3x)\cdot(3x)'=3\cos(3x)$

$f''(x)=(3\cos(3x))'=-3\sin(3x)\cdot(3x)'=-9\sin(3x).$

$f'''(x)=(-9\sin(3x))'=-9\cos(3x)\cdot(3x)'=-27\cos(3x)$

2) $x=t^2$ $\quad y=t^3$ $\quad y''_{xx}-?$

$$y''_{xx} = \frac{x'_t \cdot y''_{tt} - y'_t \cdot x''_{tt}}{(x'_t)^3} = \frac{(t^2)' \cdot ((t^3)')' - (t^3)' \cdot ((t^2)')'}{((t^2)')^3} =$$

$$= \frac{2t \cdot 6t - 3t^2 \cdot 2}{(2t)^3} = \frac{12t^2 - 6t^2}{8t^3} = \frac{6t^2}{8t^3} = \frac{3t^2}{4t^3} = \frac{3}{4t}$$