5.73.

$X = \{1, \frac{1}{2}, \frac{1}{3}, .., \frac{1}{n}, ..\}$

max $X = 1$

sup $X = 1$

inf $X = 0$

5.74.

$X = \{x \in \mathbb{R} \mid x = \frac{1}{2^n}, n \in \mathbb{N}\}$

max $X = \frac{1}{2}$

sup $X = \frac{1}{2}$

inf $X = 0$

5.75.

$X = [-1, 1]$

max $X = 1$

min $X = -1$

sup $X = 1$

inf $X = -1$

5.76

$X = \{x \in \mathbb{Z} \mid -5 \leq x < 0\}$

max $= 0$

min $X = -5$

sup $X = 0$

inf $X = -5$

5.77

$\{X \in \mathbb{R} \mid x < 0\}$

max $X = -1$

sup $X = 0$

$$5.102$$

$$f(x) = \lg x^2$$

$$f(-1) = \lg 1 = 0$$

$$f(-0,001) = \lg 0,000001 = -6$$

$$f(100) = \lg 100 = 2$$

$$5.103$$

$$f(x) = \begin{cases} 1+x, & -\infty < x \le 0 \\ 2^x, & 0 < x < +\infty \end{cases}$$

$$f(-2) = \begin{cases} 1-2 \\ 2^{-2} \end{cases} = \begin{cases} -1 \\ \frac{1}{4} \end{cases}$$

$$f(-1) = \begin{cases} 1-1 \\ 2^{-1} \end{cases} = \begin{cases} 0 \\ \frac{1}{2} \end{cases}$$

$$f(0) = \begin{cases} 1+0 \\ 2^0 \end{cases} = \begin{cases} 1 - \text{не подх.} \\ 1 \end{cases}$$

$$f(1) = \begin{cases} 1+1 \\ 2^1 \end{cases} = \begin{cases} 2 - \text{не подх.} \\ 2 \end{cases}$$

$$f(2) = \begin{cases} 1+2 \\ 2^2 \end{cases} = \begin{cases} 3 - \text{не подх.} \\ 4 \end{cases}$$
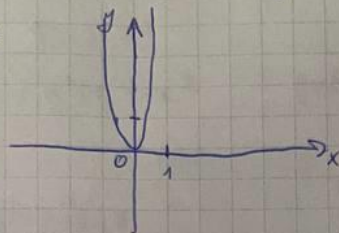
$$5.106$$

$$y = \ln(x+3)$$

$$D(f): \quad x+3 > 0 \qquad x > -3 \qquad (-3; +\infty)$$

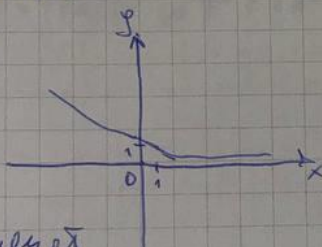$$E(f): \quad (-\infty; +\infty)$$
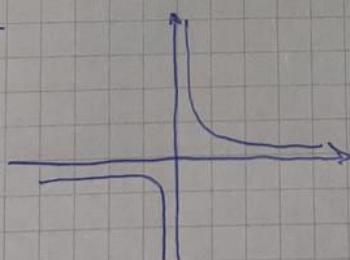
$f(x) = x^4 + 5x^2$

Четная

$f(x) = x^2 + x$
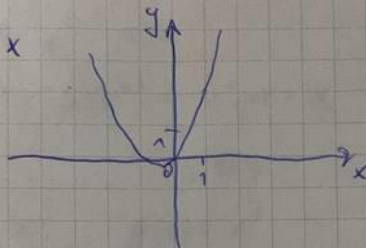
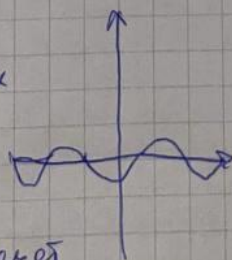**Ни чет ни нечет**

$f(x) = \dfrac{x}{2x-1}$

ни чет ни нечет

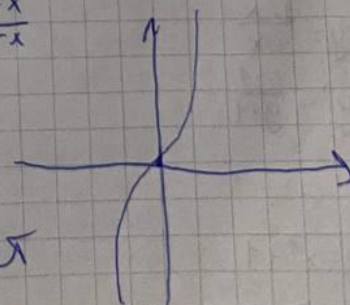$f(x) = \dfrac{e^x + 1}{e^x - 1}$

Нечет

$f(x) = \sin x - \cos x$

ни чет ни нечет

$f(x) = \lg \dfrac{1+x}{1-x}$

нечет

$$5.141$$

$$f(x) = 5\cos 7x$$
$$T = \frac{2\pi}{7}$$

$$5.142.$$

$$f(x) = \cos^2 2x - \text{не явл. период.}$$

$$5.147$$

$$y = ax + b$$
$$y^{-1} = \frac{y-b}{a}$$

$$5.148$$

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

$$5.149$$

$$y = \cos 2x$$
$$y' = \frac{\arccos y}{2}$$

$$5.150$$

$$y = \ln 2x$$
$$y' = \frac{e^y}{2}$$

$$5.151$$

$$y = 2^{x/2}$$
$$y' =$$

$$5.152$$

$$y = \frac{1-x}{1+x}$$
$$y' = \frac{y-1}{y+1}$$

$$5.153.$$

$$y = x^2 + 1$$
$$y' = \sqrt{y-1}$$

$$5.159$$

$f(x) = 1-x \qquad g(x) = x^2$

$f \circ g = f(g(x)) = f(x^2) = 1-x^2 \qquad\qquad g \circ f = f(1-x) = (1-x)^2$

$$5.160$$

$f(x) = e^x \qquad g(x) = \ln x$

$f \circ g = f(\ln x) = e^{\ln x} = x$

$g \circ f = f(e^x) = \ln(e^x) = x \ln e = x$

$$5.164$$

$\exists \ f(x) = x^{\frac{1}{2}} \qquad g(x) = x^2$

$f \circ g = f(g(x)) = f(x^2) = (x^2)^{\frac{1}{2}} = \sqrt{x^2} = |x|$