(1.) 1) $\lim\limits_{x\to 0_+}\left(\log\frac{1}{x}+\frac{1}{\sin x}\right)=\infty+\infty=+\infty$

2) $\lim\limits_{x\to -1}\frac{1+x}{1-x^2}=\lim\limits_{x\to -1}\frac{1+x}{(1-x)(1+x)}=\lim\limits_{x\to -1}\frac{1}{1-x}=\frac{1}{2}$

3) $\lim\limits_{x\to 2}\frac{2-x}{3x^3-12x}=\lim\limits_{x\to 2}\frac{2-x}{3x(x^2-4)}=\lim\limits_{x\to 2}\frac{(-1)(x-2)}{3x(x-2)(x+2)}$

$=\lim\limits_{x\to 2}\frac{(-1)}{3x(x+2)}=-\frac{1}{3\cdot 2\,(2+2)}=-\frac{1}{24}$

4) $\lim\limits_{x\to 2}\frac{8-x^3}{x^2+x-6}=\lim\limits_{x\to 2}\frac{(2-x)(4+2x+x^2)}{(x-2)(x+3)}=$

$=\lim\limits_{x\to 2}\frac{(-1)(x-2)(4+2x+x^2)}{(x-2)(x+3)}=-\frac{4+4+4}{5}=-\frac{12}{5}$

5) $\lim\limits_{x\to \frac{\pi}{2}}\log(\cos x)=\log 0_+=-\infty$

6) $\lim\limits_{x\to 3\pi_-}\arctan\left(\frac{1}{\sin x}\right)=\arctan\frac{1}{0_+}=\frac{\pi}{2}$
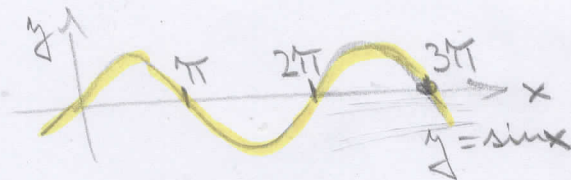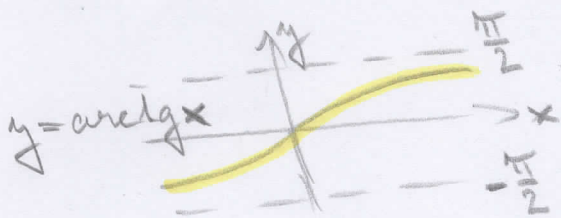
7) $\lim\limits_{x\to 0_+}\arctan\left(\cos\left(e^{-\frac{1}{x}}\right)\right)=\arctan(\cos 0)$

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

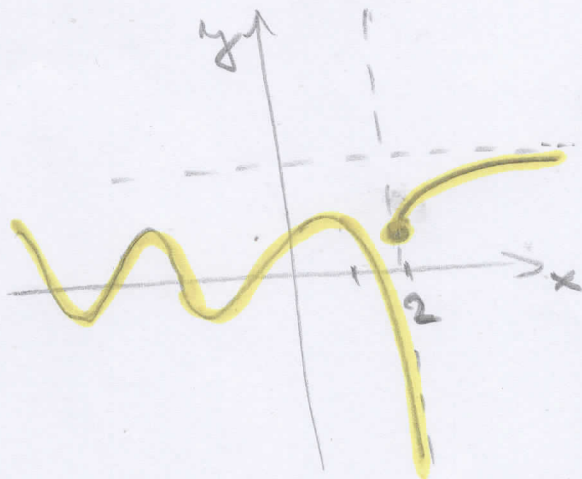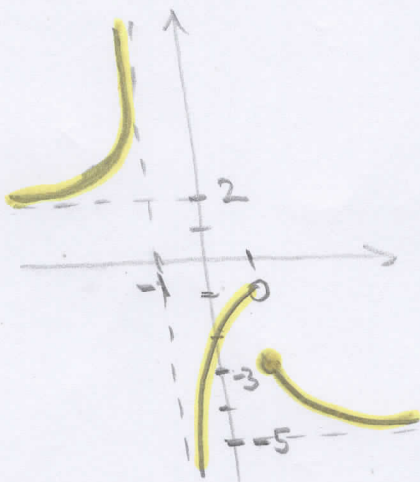$\lim\limits_{y\to -\infty}e^y=0$

2.
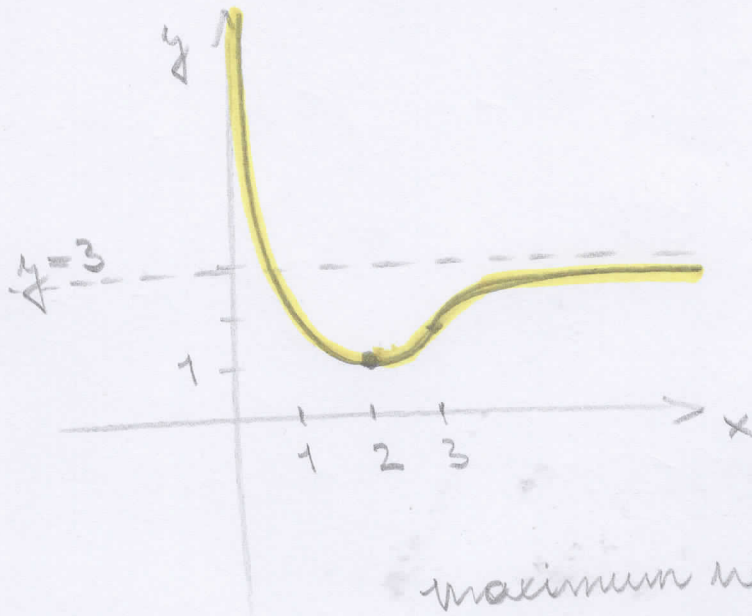
maximum nemá

minimum má v bodě $[2;1]$

není prostá

3.

4.

$$\lim_{x \to -\infty} g(x) = 2$$

$$\lim_{x \to +\infty} g(x) = -5$$

$$\lim_{x \to 1_+} g(x) = -3$$

$$\lim_{x \to 1_-} g(x) = -1$$

$$\lim_{x \to -1_+} g(x) = -\infty$$

$$\lim_{x \to -1_-} g(x) = +\infty$$