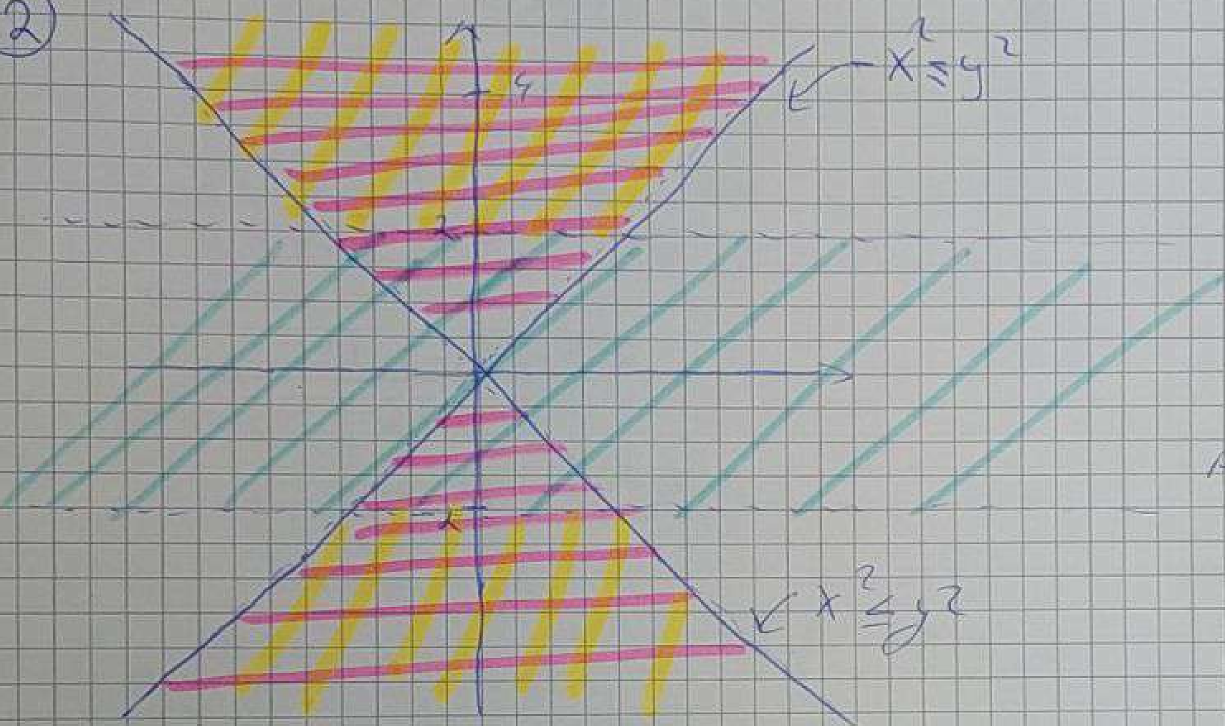
Кр 4 вариант

(1) $A = \{1, 2, 3, 4, 5\}$

$A \cup x = \{1, 2, 3, 4, 5, 6, 7\}$, $A \cap x \{1, 2\}$

$\Rightarrow x = \{1, 2, 6, 7\}$

(2)



Ответ: $\{(x,y) \mid x^2 \leq y^2\} \setminus \{(x,y) \mid |y| \leq 2\} =$ 

(5) $\left| \frac{2-2n}{3+4n} + \frac{1}{2} \right| < \varepsilon$

$$\left| \frac{2(2-2n)+3+4n}{2(3+4n)} \right| < \varepsilon$$

$$\left| \frac{4-4n+3+4n}{6+8n} \right| < \varepsilon$$

$$\left| \frac{7}{6+8n} \right| < \varepsilon$$

$$\frac{7}{6+8n} < \varepsilon \Rightarrow \frac{7}{6+8n} < \frac{7}{8n} \Rightarrow \frac{7}{8n} < \varepsilon \Rightarrow n > \frac{7}{8\varepsilon}$$

Ответ: $n = \left[\frac{7}{8\varepsilon} \right]$

④ $X_n = n^2(1+(-1)^n)$

$X_n = \{0, 4, 0, 32, 0, 72, 0 \ldots\}$

$\sup = +\infty$ max - keorh

$\min = \inf = 0$

⑥ $\lim\limits_{n\to\infty} \frac{2(n+1)^3-(n-2)^3}{n^2+2n-3} = \lim\limits_{n\to\infty} \frac{2(n^3+3n^2+3n+1)-(n^3-3n^2 2+3n 4-8)}{n^2+2n-3} =$

$= \lim\limits_{n\to\infty} \frac{2n^3+6n^2+6n+2-n^3+6n^2-12n+8}{n^2+2n-3} = \lim\limits_{n\to\infty} \frac{n^3+12n^2-6n+10}{n^2+2n-3} =$

$= \lim\limits_{n\to\infty} \frac{n^2(n+12-\frac{16}{n^2}+\frac{10}{n^3})}{n^2(1+\frac{2}{n}-\frac{3}{n^2})} = \frac{+\infty}{1} = +\infty$

⑦ $\lim\limits_{n\to\infty} \frac{\sqrt{n+3}-\sqrt{n^2-3}}{\sqrt[3]{n^5-4}-\sqrt[4]{n^4+1}} = \lim\limits_{n\to+\infty} \frac{n\sqrt{\frac{1}{n}+\frac{3}{n^2}}-n\sqrt{1-\frac{3}{n^2}}}{n\sqrt[3]{n^2-\frac{4}{n^3}}-n\sqrt{1+\frac{1}{n^4}}} =$

$= \lim\limits_{n\to\infty} \frac{-1}{\sqrt[3]{n^2}-1} = 0$

⑧ $\lim\limits_{n\to\infty} n^2(\sqrt[3]{5+n^3}-\sqrt{n^3+3}) =$

$= \lim\limits_{n\to\infty} \frac{2n^2}{\sqrt[3]{(n^3+5)^2}+\sqrt[3]{n^3+5}\sqrt[3]{n^3+3}+\sqrt[3]{(n^3+3)^2}} =$

$= \lim\limits_{n\to\infty} \frac{2}{\sqrt[3]{(\frac{5}{n^3}+1)^2}+\sqrt[3]{\frac{3}{n^3}+1}\sqrt[3]{\frac{5}{n^3}+1}+\sqrt[3]{(\frac{5}{n^3}+1)^2}} = \lim\limits_{n\to\infty} \frac{2}{1+1+1} = \frac{2}{3}$

(9) $$\lim_{n\to\infty}\left(\frac{n+2}{1+2+3+\ldots+n}-\frac{2}{3}\right)=\lim_{n\to\infty}\left(\frac{n+2}{\frac{1+n}{2}\cdot n}-\frac{2}{3}\right)=$$

$$=\lim_{n\to\infty}\left(\frac{n+2}{\frac{n+n^2}{2}}-\frac{2}{3}\right)=\lim_{n\to\infty}\left(\frac{2n+4}{n+n^2}\right)-\lim_{n\to\infty}\left(\frac{2}{3}\right)=$$

$$=0-\frac{2}{3}=-\frac{2}{3}$$

(10) $$\lim_{n\to\infty}\left(\frac{7n^2+18n-15}{7n^2+11n+15}\right)^{n+2}=\lim_{n\to\infty}\left(1+\frac{7n-30}{7n^2+11n+15}\right)^{n+2}=$$

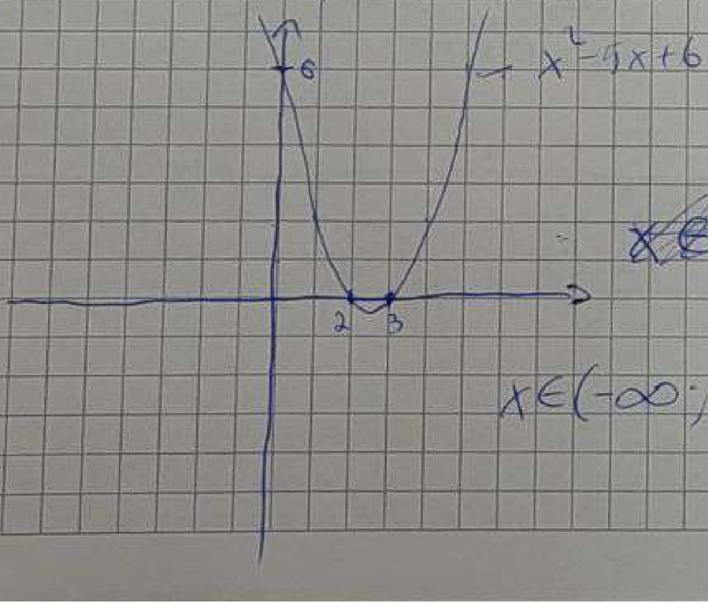
$$=\lim_{n\to\infty}\left(1+\underbrace{\frac{7n-30}{7n^2+11n+15}}_{\to 0}\right)^{\frac{(n+2)(7n-30)(7n^2+11n+15)}{(7n-30)(7n^2+11n+15)}}=$$

$$=\left[\begin{matrix}\text{2 замеч}\\ \text{предел}\end{matrix}\right]=\lim_{n\to\infty} e^{\frac{(n+2)\overset{(7n-30)}{\cancel{(7n^2+11n+15)}}}{(7n^2+11n+15)}}=$$

$$=\lim_{n\to\infty} e^{\frac{7n^2-16n-60}{7n^2+11n+15}}=\lim_{n\to\infty} e^{\frac{n^2\left(7-\frac{16}{n}-\frac{60}{n^2}\right)}{n^2\left(7+\frac{11}{n}+\frac{15}{n^2}\right)}}=$$

$$=\lim_{n\to\infty} e^{\frac{7}{7}}=e$$

(3) $f: R\to R \quad f(x)=x^2-5x+6$



~~$x\in(2;\infty)$~~

$x\in(-\infty;2)\cup(3;+\infty)$