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Контролна 2

① $\sqrt{4x^2+x+5}$

$f(x) = x^2+8x+9$ → допирателните чрез z_1 и z_2

Асимптоти $\sqrt{4x^2+x+5} = h(x)$

$+\infty$

$$\lim_{x\to+\infty}\frac{h(x)}{x} = \lim_{x\to+\infty}\frac{x\sqrt{4+\frac{1}{x}+\frac{5}{x^2}}}{x} = 2 = a$$

$$\lim_{x\to+\infty} h(x)-ax = \lim_{x\to+\infty}\sqrt{4x^2+x+5}-2x =$$

$$= \lim_{x\to+\infty}\frac{4x^2+x+5-4x^2}{x\sqrt{4+\frac{1}{x}+\frac{5}{x^2}}+2} =$$

$$= \frac{x\left(1+\frac{5}{x}\right)}{x\sqrt{4+\frac{1}{x}+\frac{5}{x^2}}+2} = \frac{1}{4}$$

$$y = 2x+\frac{1}{4}$$

$z_1 \parallel y$:

$z_1 = 2x+c = x^2+8x+9 =$

$= x^2+6x+9-c=0$

$c<0 \Rightarrow D<0$ н.р.к

Ее $\Rightarrow \boxed{z_1 = 2x}$

1 решение когато $D=0$

$-\infty$

$$\lim_{x\to-\infty}\frac{h(x)}{x} = -\frac{x}{x}\sqrt{4+\frac{1}{x}+\frac{5}{x^2}} = -2$$

$$\lim_{x\to-\infty} h(x)-ax = \lim_{x\to-\infty}\sqrt{4x^2+x+5}+2x =$$

$$= \frac{x+5}{-x\sqrt{4\ldots}+2} = -\frac{1}{4}$$

$$y = -2x-\frac{1}{4}$$

$z_2 \parallel y \Rightarrow z_2 = y = -2x+c$

$-2x+c = x^2+8x+9$

$\Rightarrow x^2+10x+9-c=0$

1 точка $D=0$, когато $c=-16$

$z_2 = -2x-16$

$z_1 = z_2$; $2x = -2x-16 \Rightarrow x=-4$

$y = 2x = -8$ $\underline{(-4;8)}$