

3

$$f(x) = \arcsin \frac{x}{\sqrt{2x^2+4x+4}}$$

1)  $D_f = ?$

$$\frac{x}{\sqrt{2x^2+4x+4}} \in [-1, 1]$$

$$-1 \leq \frac{x}{\sqrt{2x^2+4x+4}} \leq 1$$

$$-\sqrt{x^2+(x+2)^2} \leq x \leq \sqrt{x^2+(x+2)^2}$$

3a  $x > 0$ :  $x^2 \leq x^2 + (x+2)^2$   
 $0 \leq (x+2)^2$  ✓

3a  $x < 0$ :  $-\sqrt{x^2+(x+2)^2} \leq -(-x)$   
 $\sqrt{x^2+(x+2)^2} > -x$  ✓

$\Rightarrow D_f = \mathbb{R}$

4° асимптоты:

вертикальные: нет

гор:  $\lim_{x \rightarrow +\infty} f(x) = \arcsin \frac{1}{\sqrt{2}} = \frac{\pi}{4}$

$\lim_{x \rightarrow -\infty} f(x) = \arcsin \frac{-1}{\sqrt{2}} = -\frac{\pi}{4}$

косе: нет

2° Нули и знаки

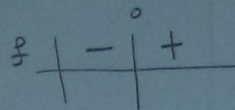
$\arcsin \frac{x}{\sqrt{2x^2+4x+4}} = 0$  3a  $x = 0$

$\arcsin: [-1, 1] \rightarrow [-\frac{\pi}{2}, \frac{\pi}{2}]$

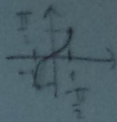
$\arcsin \frac{x}{\sqrt{2x^2+4x+4}} > 0$  3a  $\frac{x}{\sqrt{2x^2+4x+4}} \in (0, 1]$

3a  $x > 0$

$\arcsin \frac{x}{\sqrt{2x^2+4x+4}} < 0$  3a  $x < 0$



3° Ну/Ну/Ну



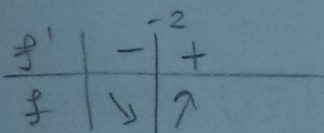
$f'(-1) = \frac{1}{1} = 1$

$f'(0) = \frac{1}{2}$

5° монотонность:

$$f'(x) = \frac{2x+4}{\sqrt{2x^2+4x+4} (2x^2+4x+4)} = \frac{x+2}{|x+2| (x^2+2x+2)}, x \neq -2$$

$\text{sgn } f'(x) = \text{sgn}(x+2)$



3a  $x = -2$  је локални мн  $f(-2) = \arcsin \frac{-2}{2} = \arcsin(-1) = -\frac{\pi}{2}$

$f'_+(-2) = \lim_{x \rightarrow -2^+} f'(x) = \frac{1}{2}$

$f'_-(-2) = \lim_{x \rightarrow -2^-} f'(x) = -\frac{1}{2}$

6°  $f''(x) = \begin{cases} \left(\frac{1}{x^2+2x+2}\right)', & x > -2 \\ \left(\frac{-1}{x^2+2x+2}\right)', & x < -2 \end{cases}$

$$f''(x) = \begin{cases} \frac{-2x-2}{(x^2+2x+2)^2}, & x > -2 \\ \frac{2x+2}{(x^2+2x+2)^2}, & x < -2 \end{cases} = -\text{sgn}(x+2) \frac{x+1}{(x^2+2x+2)^2}$$

$x+2$	-	+	+
$-(x+1)$	+	+	-
$f''$	-	+	-
$f$	∩	∪	∩

$f(-2) = -\frac{\pi}{2}$   
 $f(-1) = -\frac{\pi}{4}$

