

# TEST A

① Graf funk.  $f(x) = \frac{1}{2} \tan\left(\frac{3\pi}{4} - \frac{x}{3}\right)$

**Ničle**:  $x = k\pi$

$$\frac{3\pi}{4} - \frac{1}{3}x = k\pi$$

$$\frac{1}{3}x = \frac{3\pi}{4} - k\pi \cdot 3$$

$$x = \frac{9\pi}{4} - 3k\pi$$

$$x = \frac{\pi(9 - 12k)}{4}; k \in \mathbb{Z}$$

| k  | x                  |
|----|--------------------|
| -2 | $\frac{33\pi}{4}$  |
| -1 | $\frac{21\pi}{4}$  |
| 0  | $\frac{9\pi}{4}$   |
| 1  | $-\frac{3\pi}{4}$  |
| 2  | $-\frac{15\pi}{4}$ |

**POL**:  $x = \frac{\pi}{2} + k\pi$

$$\frac{3\pi}{4} - \frac{1}{3}x = \frac{\pi}{2} + k\pi$$

$$-\frac{1}{3}x = -\frac{\pi}{4} + k\pi \quad | \cdot (-3)$$

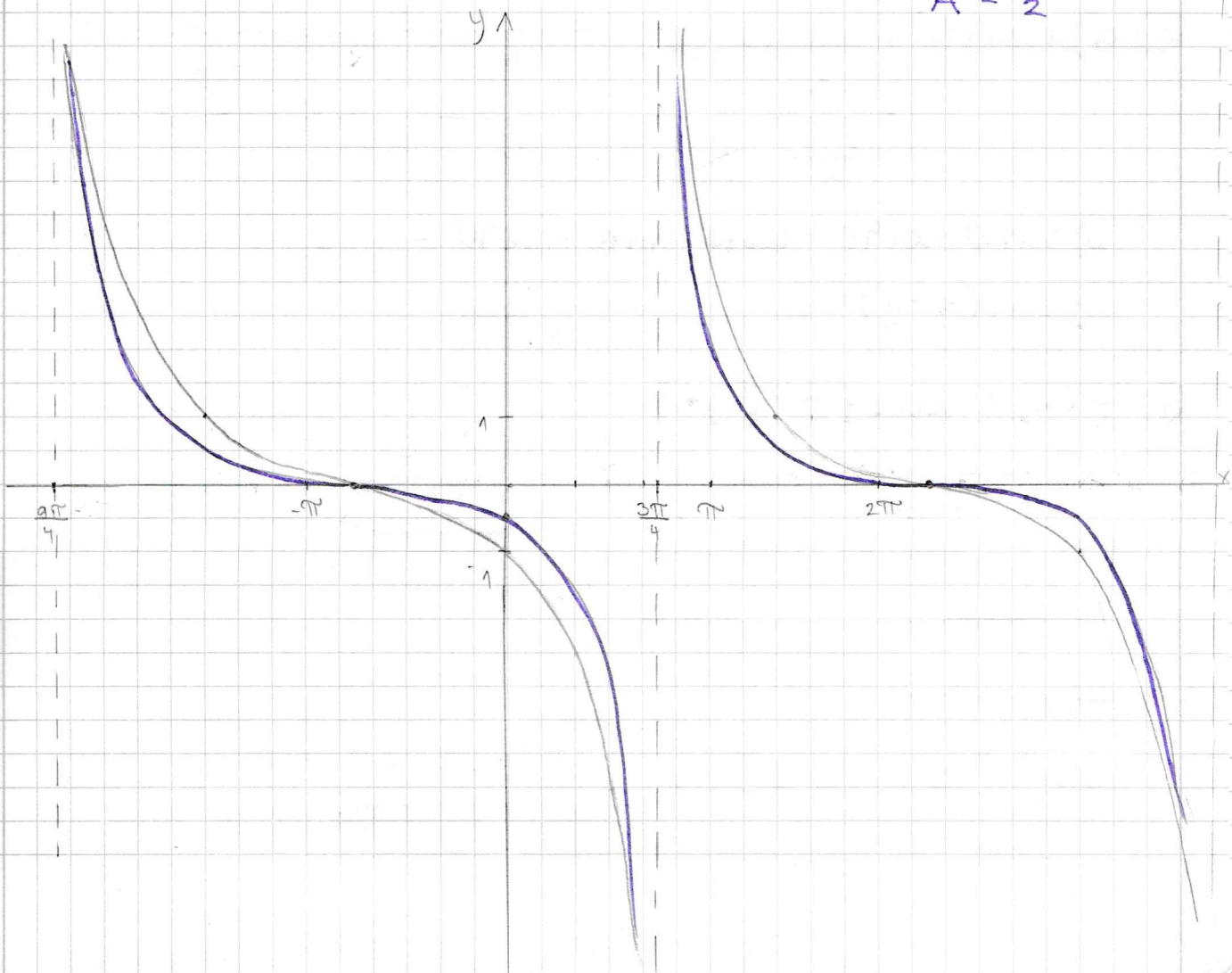
$$x = \frac{3\pi}{4} - 3k\pi$$

$$x = \frac{\pi(3 - 12k)}{4}; k \in \mathbb{Z}$$

| k  | x                  |
|----|--------------------|
| -2 | $\frac{27\pi}{4}$  |
| -1 | $\frac{15\pi}{4}$  |
| 0  | $\frac{3\pi}{4}$   |
| 1  | $-\frac{9\pi}{4}$  |
| 2  | $-\frac{21\pi}{4}$ |

**Zač. vr**:  $f(0) = \frac{1}{2} \tan \frac{3\pi}{4} = \frac{1}{2} \cdot (-1) = \underline{\underline{-\frac{1}{2}}}$  (že s premikom)

$$A = \frac{1}{2}$$



$$\textcircled{2} p_1: 3x - 2y - 4 = 0$$

$$p_2: mx + 5y + 6 = 0$$

$$\varphi = 45^\circ$$

$$p_1: 2y = 3x - 4 \quad | :2$$

$$y = \frac{3}{2}x - 2$$

$$k_1 = \frac{3}{2}$$

$$p_2: 5y = mx - 6 \quad | :5$$

$$y = -\frac{m}{5}x - \frac{6}{5}$$

$$k_2 = -\frac{m}{5}$$

$$\tan \varphi = \left| \frac{k_2 - k_1}{1 + k_1 \cdot k_2} \right| \quad \rightarrow \quad 1 = \left| \frac{-\frac{m}{5} - \frac{3}{2}}{1 + \frac{3}{2} \cdot \left(-\frac{m}{5}\right)} \right|$$

$$\tan 45^\circ = 1$$

$$1 = \left| \frac{-2m - 15}{10 - 3m} \right|$$

$$\frac{-2m - 15}{10 - 3m} = 1$$

$$-2m - 15 = 10 - 3m$$

$$\boxed{m = 25}$$

$$\frac{-2m - 15}{-10 + 3m} = 1$$

$$-2m - 15 = -10 + 3m$$

$$5m = -5$$

$$\boxed{m = -1}$$

$$\textcircled{3} \text{ a) } \tan 75^\circ = \tan(30^\circ + 45^\circ) = \frac{\tan 30^\circ + \tan 45^\circ}{1 - \tan 30^\circ \cdot \tan 45^\circ} = \frac{\frac{\sqrt{3}}{3} + 1}{1 - \frac{\sqrt{3}}{3}} = \frac{\frac{\sqrt{3} + 3}{3}}{\frac{3 - \sqrt{3}}{3}} = \frac{(\sqrt{3} + 3)(3 + \sqrt{3})}{(3 - \sqrt{3})(3 + \sqrt{3})} = \frac{3\sqrt{3} + 3 + 9 + 3\sqrt{3}}{9 - 3} = \frac{12 + 6\sqrt{3}}{6} = \underline{2 + \sqrt{3}}$$

$$\text{b) } \sin 10^\circ \cdot \cos 40^\circ + \cos 10^\circ \cdot \sin 40^\circ - \cos 40^\circ = \sin(10^\circ + 40^\circ) - \sin 50^\circ = \underline{0}$$

$$\text{c) } \sin(x - y) = \sin x \cdot \cos y - \sin y \cdot \cos x$$

$$\textcircled{4} f(x) = -2 \cos\left(\frac{x}{2} - \frac{\pi}{3}\right) + \frac{3}{2}$$

$$y = A \cos(\omega(x - p)) + q$$

$$f(x) = -2 \cos \frac{1}{2} \left(x - \frac{2\pi}{3}\right) + \frac{3}{2}$$

$$\omega = \frac{1}{2}$$

$$\text{perioda} : \frac{2\pi}{\omega} = \frac{2\pi}{\frac{1}{2}} = \frac{1}{\frac{1}{2}} = \underline{4\pi}$$

$$\mathbb{D}f = \mathbb{R}$$

$$\mathbb{Z}f = \left[-2 + \frac{3}{2}, 2 + \frac{3}{2}\right] \rightarrow \underline{\underline{\mathbb{Z}f = \left[-\frac{1}{2}, \frac{7}{2}\right]}}$$