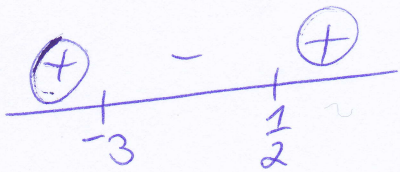


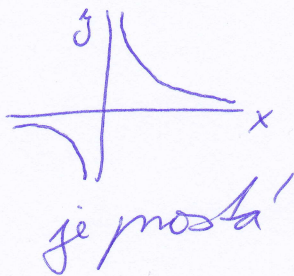
(A)

$$1) \frac{x-1}{x+3} \geq 0$$



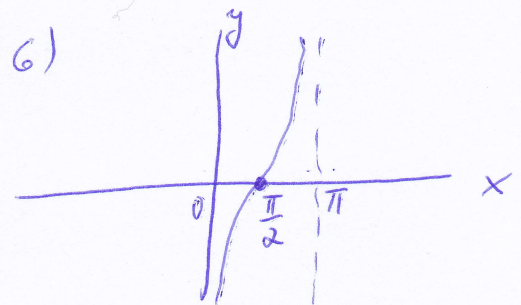
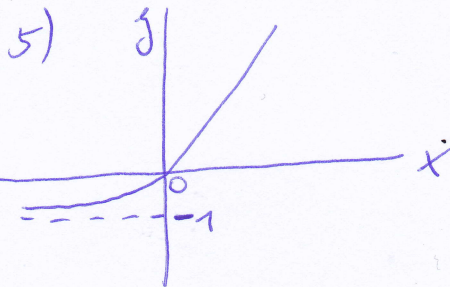
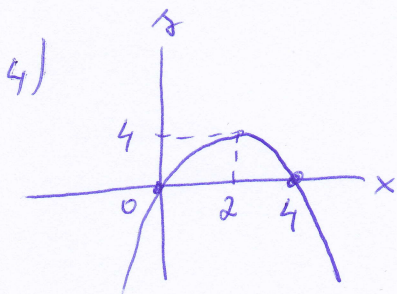
$$x \in (-\infty; -3) \cup \left[\frac{1}{2}; \infty\right)$$

$$2) y = \frac{1}{x}$$



$$3) \left(\frac{x \cdot x^{\frac{1}{2}}}{x^{\frac{2}{3}}} \right)^{\frac{1}{3}} = \left(\frac{x^{\frac{3}{2}}}{x^{\frac{2}{3}}} \right)^{\frac{1}{3}} = \left(x^{\frac{5}{6}} \right)^{\frac{1}{3}} = x^{\frac{5}{18}} = \sqrt[18]{x^5}$$

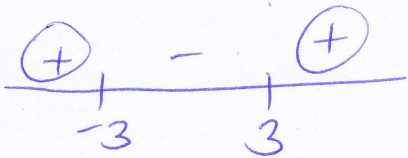
$$x > 0$$



$$7) \frac{1}{y+2} + \frac{(y-3)(y+2)}{(y+2)^2} = \frac{1+y-3}{y+2} = \frac{y-2}{y+2} \quad y \neq -2$$

$$8) x^2 - 9 > 0$$

$$(x-3)(x+3) > 0$$



$$Df = (-\infty; -3) \cup (3; \infty)$$

$$9) y = \frac{\pi}{6} - x$$

$$\cos y = \frac{\sqrt{3}}{3}$$

$$y = \frac{\pi}{3} + 2k\pi$$

$$\frac{\pi}{6} - x = \frac{\pi}{3} + 2k\pi$$

$$-x = \frac{\pi}{6} + 2k\pi$$

$$x = -\frac{\pi}{6} - 2k\pi$$

$$10) y = 4^x$$

$$y^2 - 6y + 8 = 0$$

$$(y-2)(y-4) = 0$$

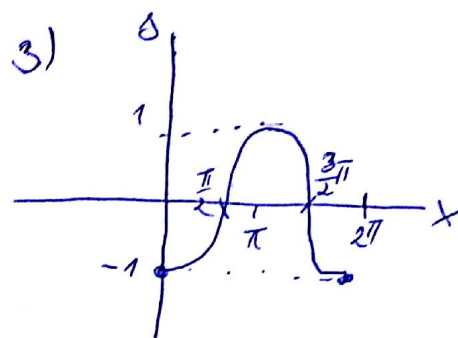
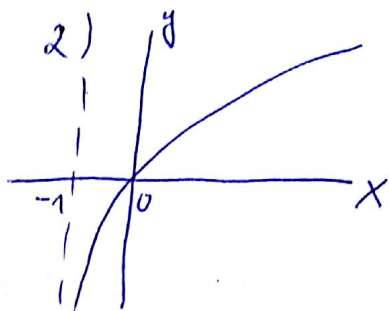
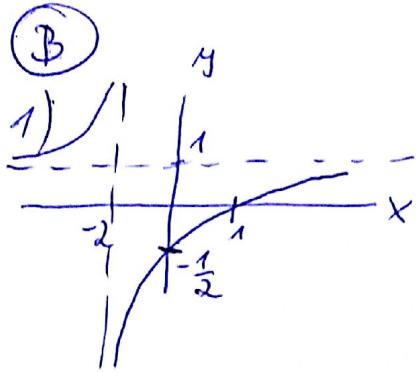
$$y_1 = 2 \quad y_2 = 4$$

$$2 = 4^x \quad 4 = 4^x$$

$$2 = 2^{2x} \quad 1 = x_2$$

$$1 = 2x$$

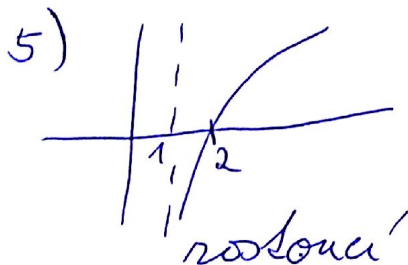
$$\frac{1}{2} = x_1$$



4) $x(x-5) \leq 0$

$$\begin{array}{c} + \quad \ominus \quad + \\ | \quad | \quad | \\ 0 \quad 5 \end{array}$$

$$x \in \{0, 1, 2, 3, 4, 5\}$$



6) $\frac{3a(a+1)-3a}{a+1} \cdot \frac{a^2-1}{a^2} = \frac{3a^2+3a-3a}{a+1} \cdot \frac{(a+1)(a-1)}{a^2} =$

$$= \frac{3(a-1)}{a+1} \quad a \neq -1 \quad a \neq 0$$

7) $(x^{-2} \cdot x^{\frac{3}{2}})^{\frac{1}{2}} : x^{\frac{1}{3}} = (x^{-\frac{1}{2}})^{\frac{1}{2}} : x^{\frac{1}{3}} = x^{-\frac{1}{4}} : x^{\frac{1}{3}} = x^{-\frac{7}{12}} = \frac{1}{\sqrt[12]{x^7}}$

8) $\frac{x+2}{1-x} \geq 0$

$$\begin{array}{c} - \quad \oplus \quad - \\ | \quad | \quad | \\ -2 \quad 1 \end{array}$$

$Df = (-2, 1)$

9) $y = 2x + \pi$

$\sin y = 1$

$y = \frac{\pi}{2} + 2k\pi$

$2x + \pi = \frac{\pi}{2} + 2k\pi$

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

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

10) $\log_2 x = y$

$y^2 + 2y - 3 = 0$

$(y+3)(y-1) = 0$

$y_1 = -3 \quad y_2 = 1$

$-3 = \log_2 x$

$2^{-3} = x$

$\frac{1}{8} = x_1$

$1 = \log_2 x$

$2^1 = x$

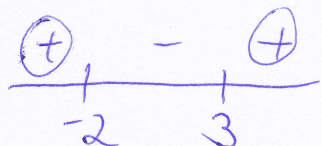
$x_2 = 2$

©

$$1) \quad x^2 - x > 6$$

$$x^2 - x - 6 > 0$$

$$(x-3)(x+2)$$



$$x \in (-\infty, -2) \cup (3, \infty)$$

$$2) \quad \frac{\frac{x+1}{1-x}}{\frac{x-1-x}{x-1}} = \frac{x+1}{1-x} \cdot \frac{x-1}{-1} =$$

$$= \frac{x+1}{1-x} \cdot \frac{-1(1-x)}{-1} = \underline{\underline{x+1}}$$

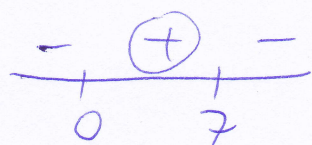
$$x \neq 1$$

$$3) \quad (x \cdot x^{\frac{1}{3}})^{\frac{1}{2}} \cdot (x \cdot x^{\frac{1}{2}})^{\frac{1}{3}} = (x^{\frac{4}{3}})^{\frac{1}{2}} \cdot (x^{\frac{3}{2}})^{\frac{1}{3}} = x^{\frac{2}{3}} \cdot x^{\frac{1}{2}} = x^{\frac{7}{6}} = \underline{\underline{\sqrt[6]{x^7}}}$$

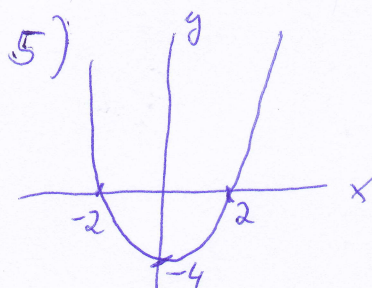
$$x > 0$$

$$4) \quad -x^2 + 7x > 0$$

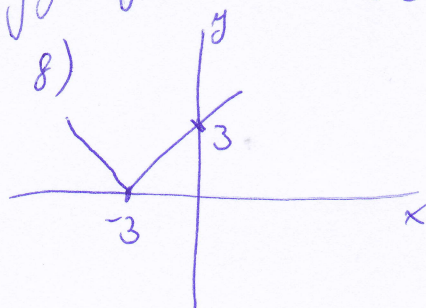
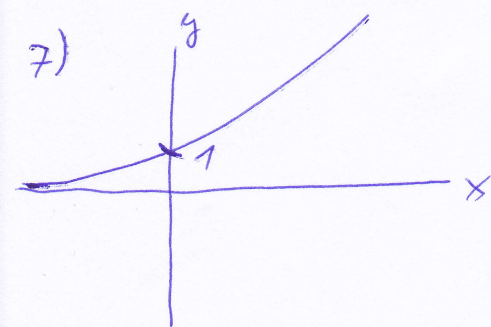
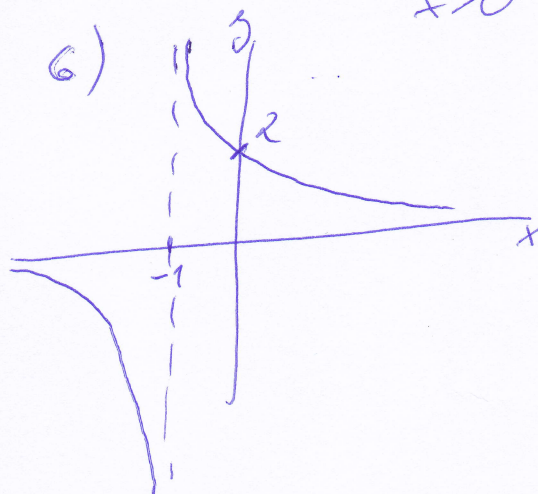
$$x(-x+7) > 0$$



$$Df = (0; 7)$$



$f(x) = f(-x)$
je sudá!
graf je symet. dle osy y



$$9) \quad \cos y = -\frac{1}{2} \quad 3x = y$$

$$y_1 = \frac{2}{3}\pi + 2k\pi$$

$$y_2 = \frac{4}{3}\pi + 2k\pi$$

$$3x_1 = \frac{2}{3}\pi + 2k\pi$$

$$3x_2 = \frac{4}{3}\pi + 2k\pi$$

$$\underline{\underline{x_1 = \frac{2}{9}\pi + \frac{2k\pi}{3}}}$$

$$\underline{\underline{x_2 = \frac{4}{9}\pi + \frac{2k\pi}{3}}}$$

$$10) \quad 3^x + 3^{x+1} = 108$$

$$3^x(1+3) = 108$$

$$3^x \cdot 4 = 108$$

$$3^x = 27$$

$$3^x = 3^3$$

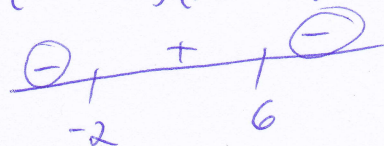
$$\underline{\underline{x = 3}}$$

①

$$1) -x^2 + 4x + 12 \leq 0$$

$$x^2 - 4x - 12 \geq 0$$

$$(x-6)(x+2) \geq 0$$



$$x \in (-\infty; -2] \cup [6; \infty)$$

$$3) \left(\frac{x^{\frac{1}{4}}}{x \cdot x^{\frac{1}{3}}} \right)^{\frac{1}{2}} =$$

$$= \left(\frac{x^{\frac{1}{4}}}{x^{\frac{4}{3}}} \right)^{\frac{1}{2}} = \left(x^{-\frac{13}{12}} \right)^{\frac{1}{2}} = x^{-\frac{13}{24}} = \frac{1}{\sqrt[24]{x^{13}}}$$

$$x > 0$$

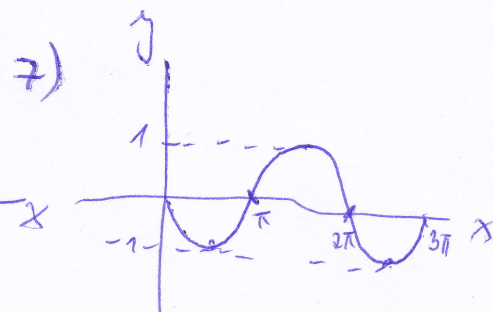
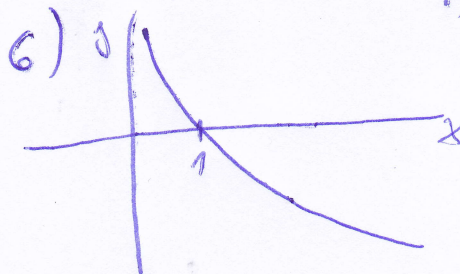
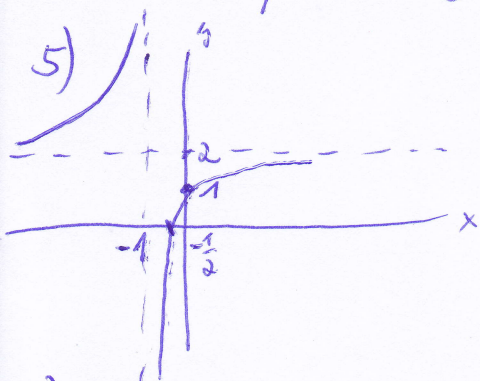
$$2) \frac{2x}{(x-3)(x+3)} - \frac{x}{x+3} + \frac{x-7}{x-3}$$

$$= \frac{2x - x(x-3) + (x-7)(x+3)}{(x-3)(x+3)} =$$

$$= \frac{2x - x^2 + 3x + x^2 - 4x - 21}{(x-3)(x+3)} =$$

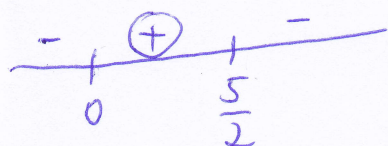
$$= \frac{x-21}{x^2-9} \quad x \neq \pm 3$$

4) nemí, protože je periodická



$$8) 5x - 2x^2 \geq 0$$

$$x(5-2x) \geq 0$$



$$Df = \left(0; \frac{5}{2} \right]$$

$$9) y = x + \pi$$

$$\omega y = \frac{\sqrt{3}}{2}$$

$$y_1 = \frac{\pi}{6} + 2k\pi$$

$$y_2 = \frac{5\pi}{6} + 2k\pi$$

$$x_1 + \pi = \frac{\pi}{6} + 2k\pi$$

$$x_1 = -\frac{5\pi}{6} + 2k\pi$$

$$x_2 + \pi = \frac{11\pi}{6} + 2k\pi$$

$$x_2 = \frac{5\pi}{6} + 2k\pi$$

$$10) \log_6(x+1) + \log_6 x = 1$$

$$\log_6(x+1) \cdot x = 1$$

$$x^2 + x = 6$$

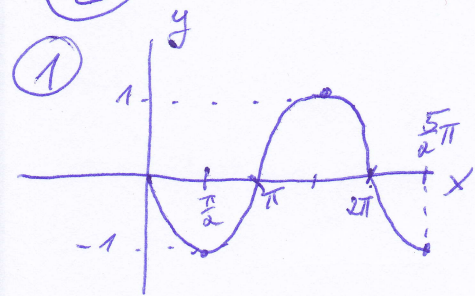
$$x^2 + x - 6 = 0$$

$$(x+3)(x-2) = 0$$

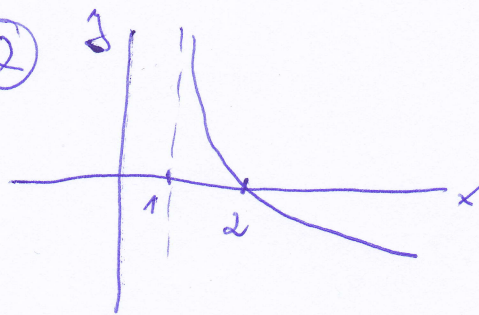
$$x_1 = -3 \quad x_2 = 2$$

$$x > 0$$

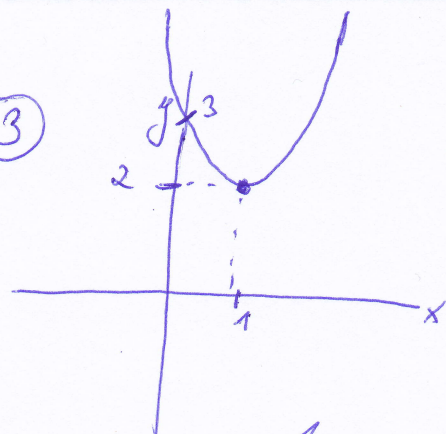
① E



②



③

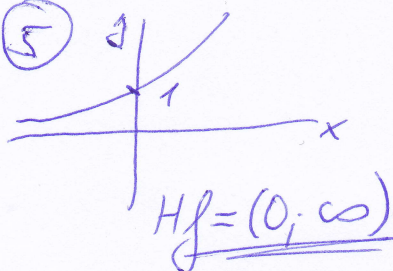


④ $\frac{3x-5}{x+1} \leq 0$



$x \in \{0; 1\}$

⑤



⑦

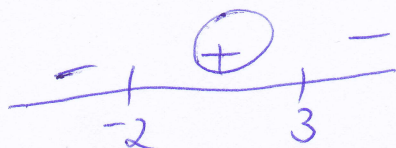
$$\frac{x^{\frac{1}{3}}}{x} \cdot \frac{x^2}{x^{\frac{1}{4}}} = \frac{x^{\frac{1}{3}} \cdot x}{x^{\frac{1}{4}}} = \frac{x^{\frac{4}{3}}}{x^{\frac{1}{4}}} = x^{\frac{13}{12}} = \sqrt[12]{x^{13}}$$

$x > 0$

⑥ $\frac{x+1-2}{x+1} \cdot \frac{1-x-2}{1-x} = \frac{x-1}{x+1} \cdot \frac{-x-1}{1-x} = \frac{-(-x+1)}{x+1} \cdot \frac{(-1)(x+1)}{1-x} = \frac{1}{1-x}$

$x \neq -1 \quad x \neq 1$

⑧ $-x^2 + x + 6 > 0$
 $x^2 - x - 6 < 0$
 $(x-3)(x+2) < 0$



$Df = (-2; 3)$

⑨

$\text{Arg } y = 1 \quad y = 4x - \frac{\pi}{2}$

$y = \frac{\pi}{4} + k\pi$

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

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

$x = \frac{3}{16}\pi + \frac{k\pi}{4}$

⑩ $\log_4(5x-4) = 2$

$5x-4 = 4^2$

$5x-4 = 16$

$5x = 20$

$x = 4$

(F)

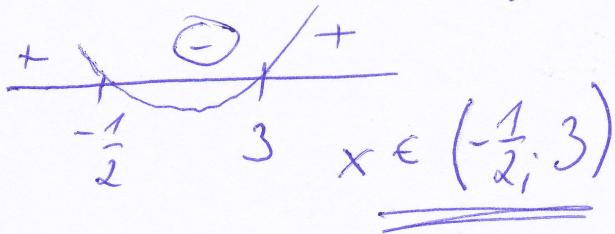
$$1) \frac{1-(1-a)}{1-a} : \frac{2a^2-a(1-a)}{1-a} = \frac{1-1+a}{1-a} \cdot \frac{1-a}{2a^2-a+a^2} =$$

$$= \frac{a}{3a^2-a} = \frac{a}{a(3a-1)} = \frac{1}{3a-1} \quad \begin{matrix} a \neq 1 \\ a \neq 0 \\ a \neq \frac{1}{3} \end{matrix}$$

$$2) 2x^2 - 5x - 3 < 0$$

$$D = 25 - 4 \cdot 2 \cdot (-3) = 25 + 24 = 49$$

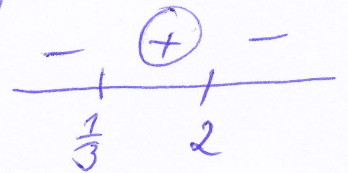
$$x_{1,2} = \frac{5 \pm 7}{4} = \begin{matrix} 3 \\ -\frac{1}{2} \end{matrix}$$



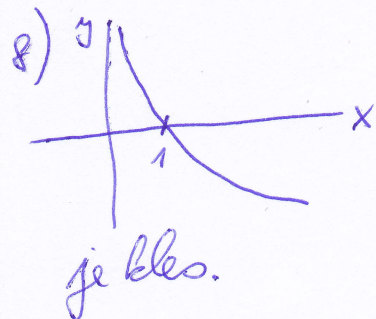
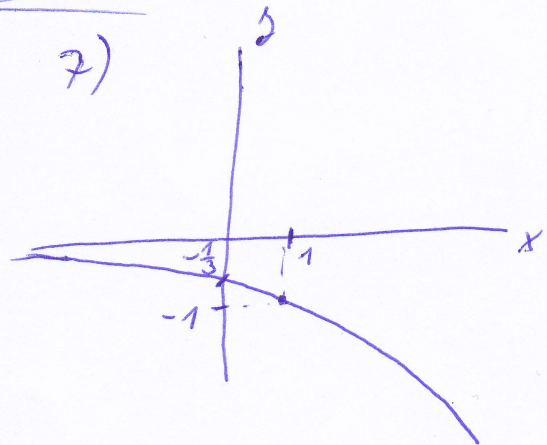
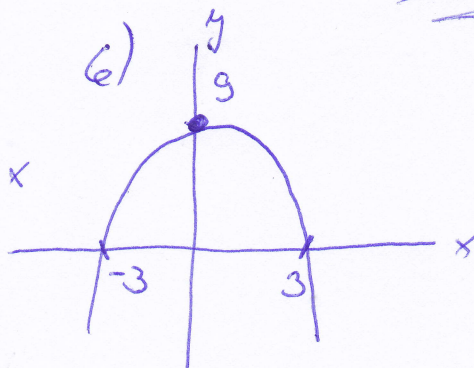
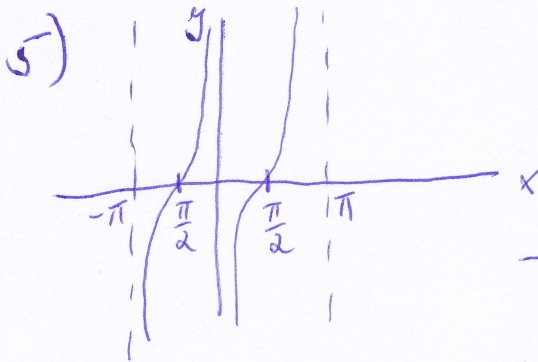
$$3) (x^2 \cdot x^{\frac{2}{3}})^{\frac{1}{3}} =$$

$$(x^{\frac{8}{3}})^{\frac{1}{3}} = x^{\frac{8}{9}} = \sqrt[9]{x^8}$$

$$4) \frac{3x-1}{2-x} \geq 0$$



$$Df = [\frac{1}{3}, 2)$$



$$9) 5^x \cdot 2^x = 100^{x-1}$$

$$10^x = 10^{2x-2}$$

$$x = 2x - 2$$

$$\underline{\underline{2 = x}}$$

$$10) \sin y = \frac{\sqrt{2}}{2}$$

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

$$2x_1 - \frac{\pi}{4} = \frac{\pi}{4} + 2k\pi$$

$$2x_1 = \frac{\pi}{2} + 2k\pi$$

$$\underline{\underline{x_1 = \frac{\pi}{4} + k\pi}}$$

$$2x_2 - \frac{\pi}{4} = \frac{3\pi}{4} + 2k\pi$$

$$2x_2 = \pi + 2k\pi$$

$$\underline{\underline{x_2 = \frac{\pi}{2} + k\pi}}$$

$$y_1 = \frac{\pi}{4} + 2k\pi$$

$$y_2 = \frac{3\pi}{4} + 2k\pi$$

