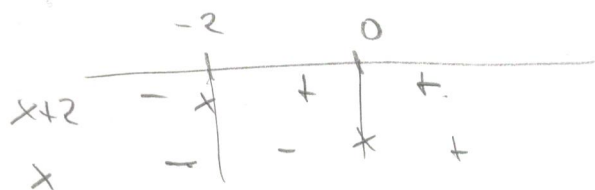


1. test 3A

(1) $|x+2| > |x| - x$



(a) $x \in (-\infty, -2)$

(b) $x \in (-2, 0)$

(c) $x \in (0, \infty)$

$-x-2 > -x-x$

$x > 2$

keine

$x+2 > -x-x$

$3x > -2$

$x > -\frac{2}{3}$

teufel $x \in (-\frac{2}{3}, 0)$

$x+2 > x-x$

$x > -2$

teufel $x \in (0, \infty)$

(d) Grenzfälle

$x = -2$

$0 > 2 - (-2)$

$0 > 4$ keine

$x = 0$

$2 > 0$ ✓

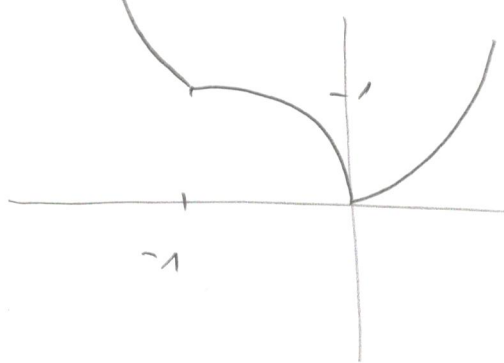
alles $x \in (-\frac{2}{3}, \infty)$

$$(2) |x^2+x| < a+x$$

$$|x^2+x| - x < a$$

$$x^2+x=0$$

$$x(x+1)=0$$



$$(a) x^2+x > 0$$

$$x \in (-\infty, -1) \cup (0, \infty)$$

$$x^2+x < a+x$$

$$x^2 < a$$

$$x_{1,2} = \pm\sqrt{a} \quad \forall a > 0$$

$$(b) x^2+x < 0$$

$$x \in (-1, 0)$$

$$-x^2-x < a+x$$

$$0 < x^2+2x+a$$

$$x_{1,2} = \frac{-2 \pm \sqrt{4-4a}}{2}$$

$$x_{1,2} = -1 \pm \sqrt{1-a} \quad \forall a < 1$$

$$(1) a < 0 \quad \emptyset$$

$$(2) a = 0 \quad \emptyset$$

$$(3) a \in (0, 1) \quad x \in (-1 + \sqrt{1-a}, 0] \cup (0, \sqrt{a}) \\ = (-1 + \sqrt{1-a}, \sqrt{a})$$

$$(4) a \in [1, \infty) \quad x \in (-\sqrt{a}, \sqrt{a})$$

$$(3) f(x,y,z) = \arctan(x+yz) + \frac{1}{1+(x+yz)^2}$$

$$\frac{\partial f}{\partial x} = \frac{1}{1+(x+yz)^2} + \frac{-1}{(1+(x+yz)^2)^2} \cdot 2(x+yz)$$

$$\frac{\partial f}{\partial y} = \frac{1}{1+(x+yz)^2} \cdot z + \frac{-1}{(1+(x+yz)^2)^2} \cdot 2(x+yz) \cdot z$$

$$\frac{\partial f}{\partial z} = \frac{1}{1+(x+yz)^2} \cdot y + \frac{-1}{(1+(x+yz)^2)^2} \cdot 2(x+yz) \cdot y$$