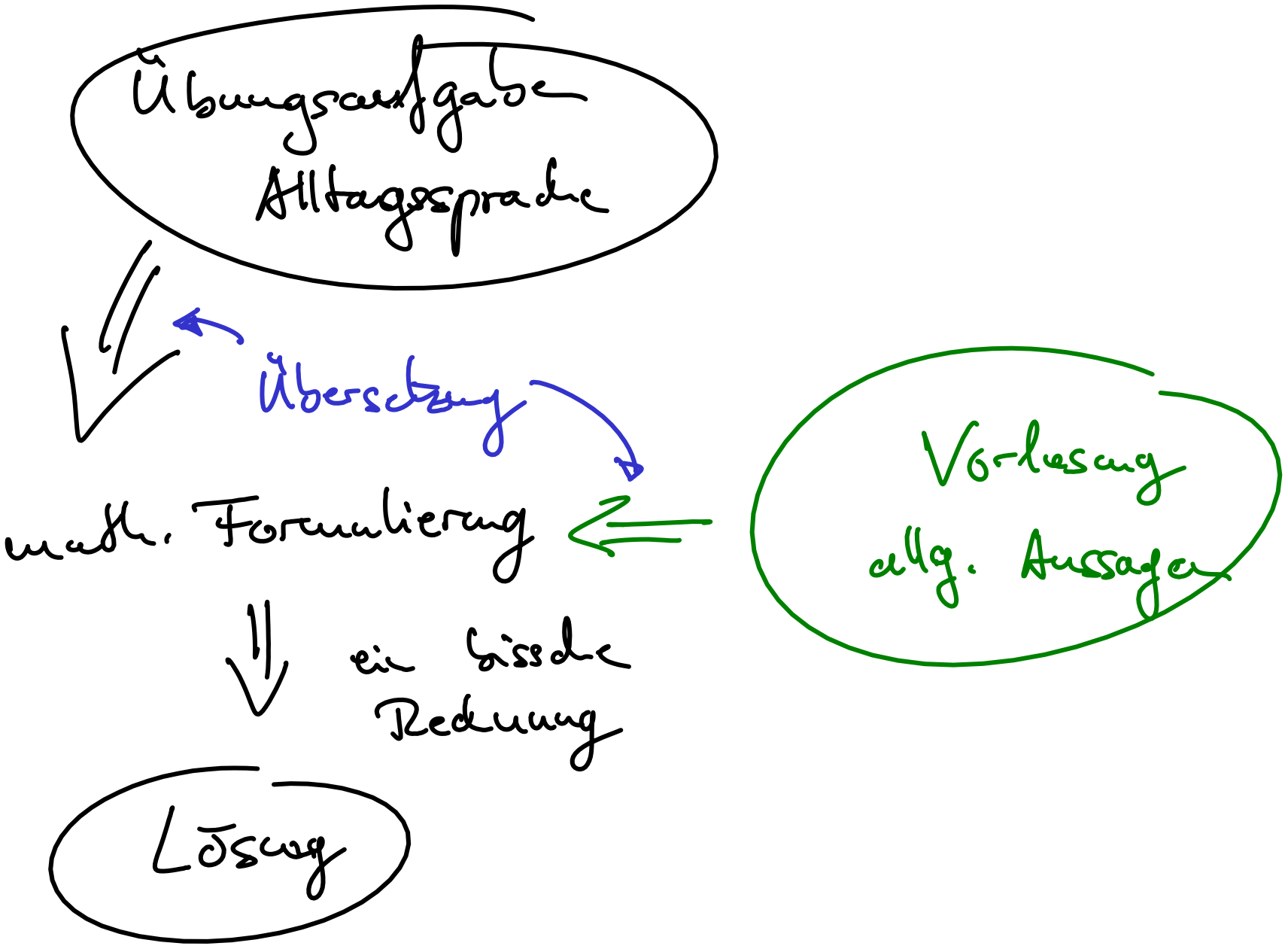
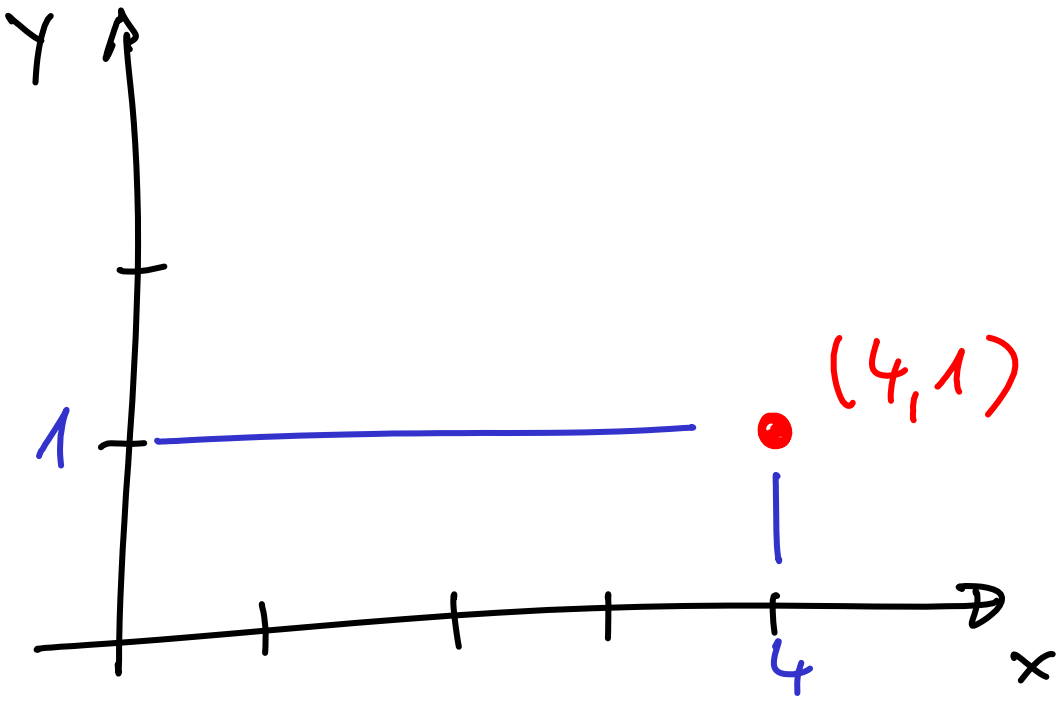
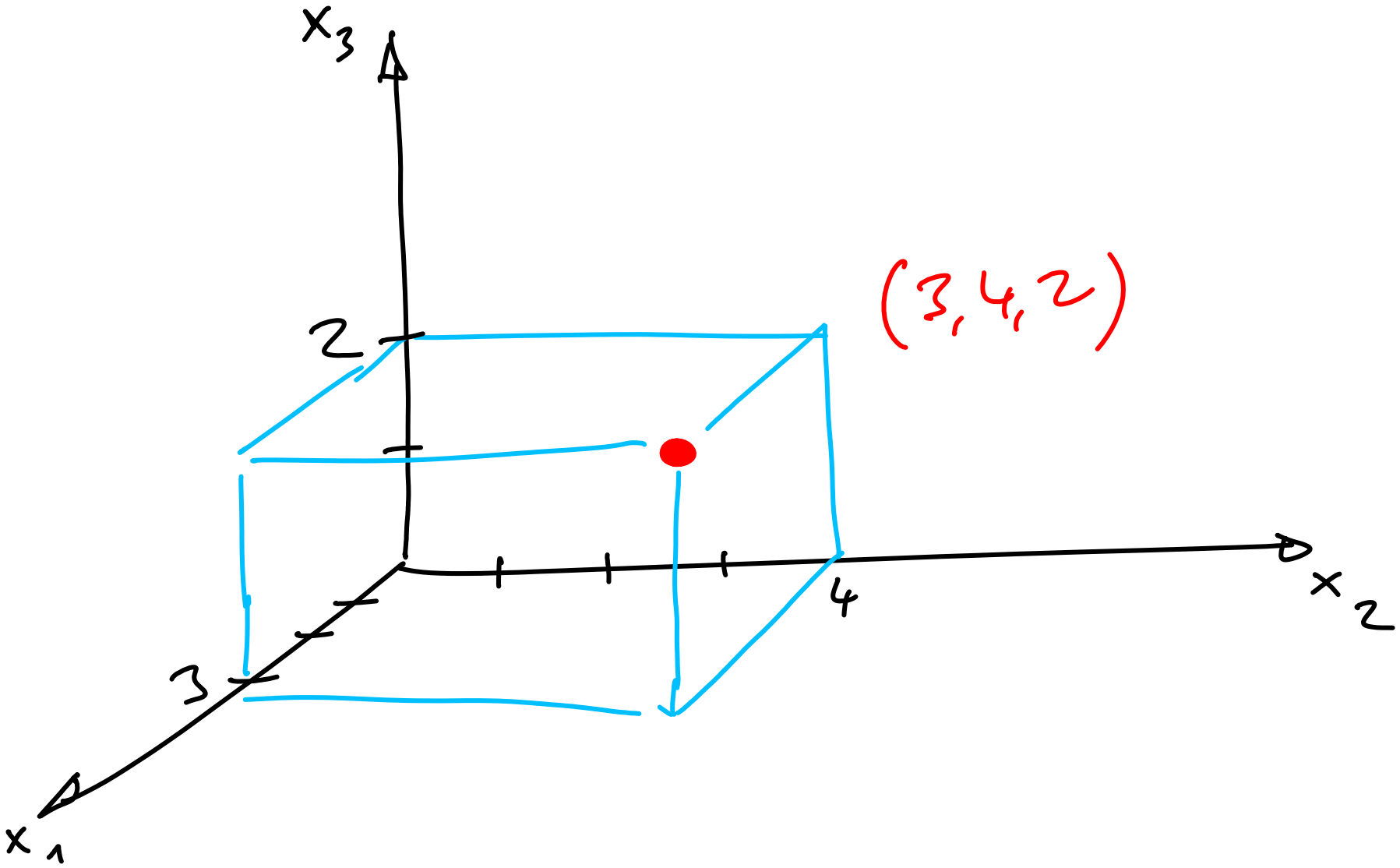
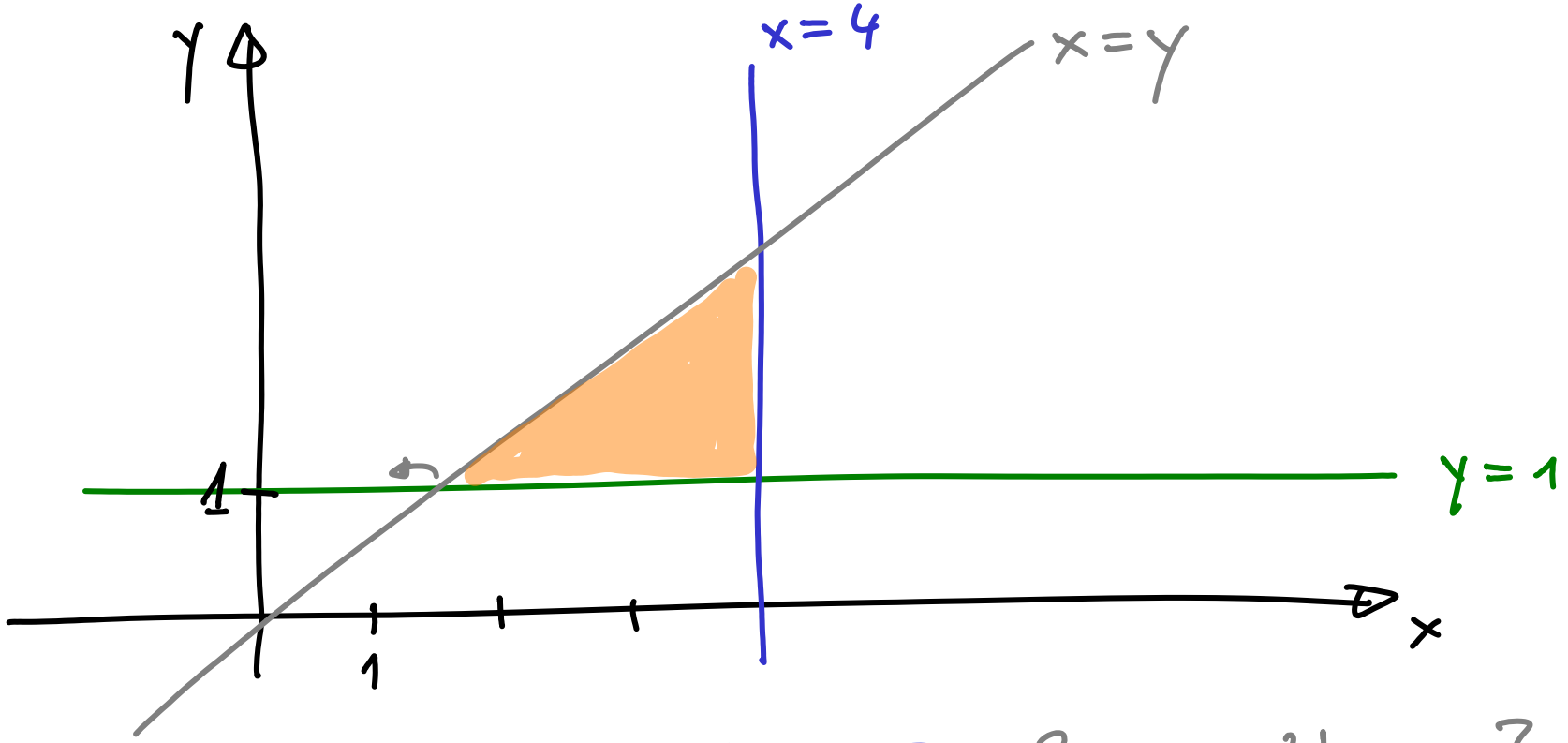
Gruppeneinteilung folgt im Laufe der Woche

Gruppenansagen (im Forum)


Übungsaufgabe
Alltagssprache
Übersetzung
Vorlesung
allg. Aussagen
math. Formulierung
ein bisschen
Rechnung
Lösung


Y
1
(4,1)
4
x


x_3
2
(3, 4, 2)
4
x_2
3
x_1

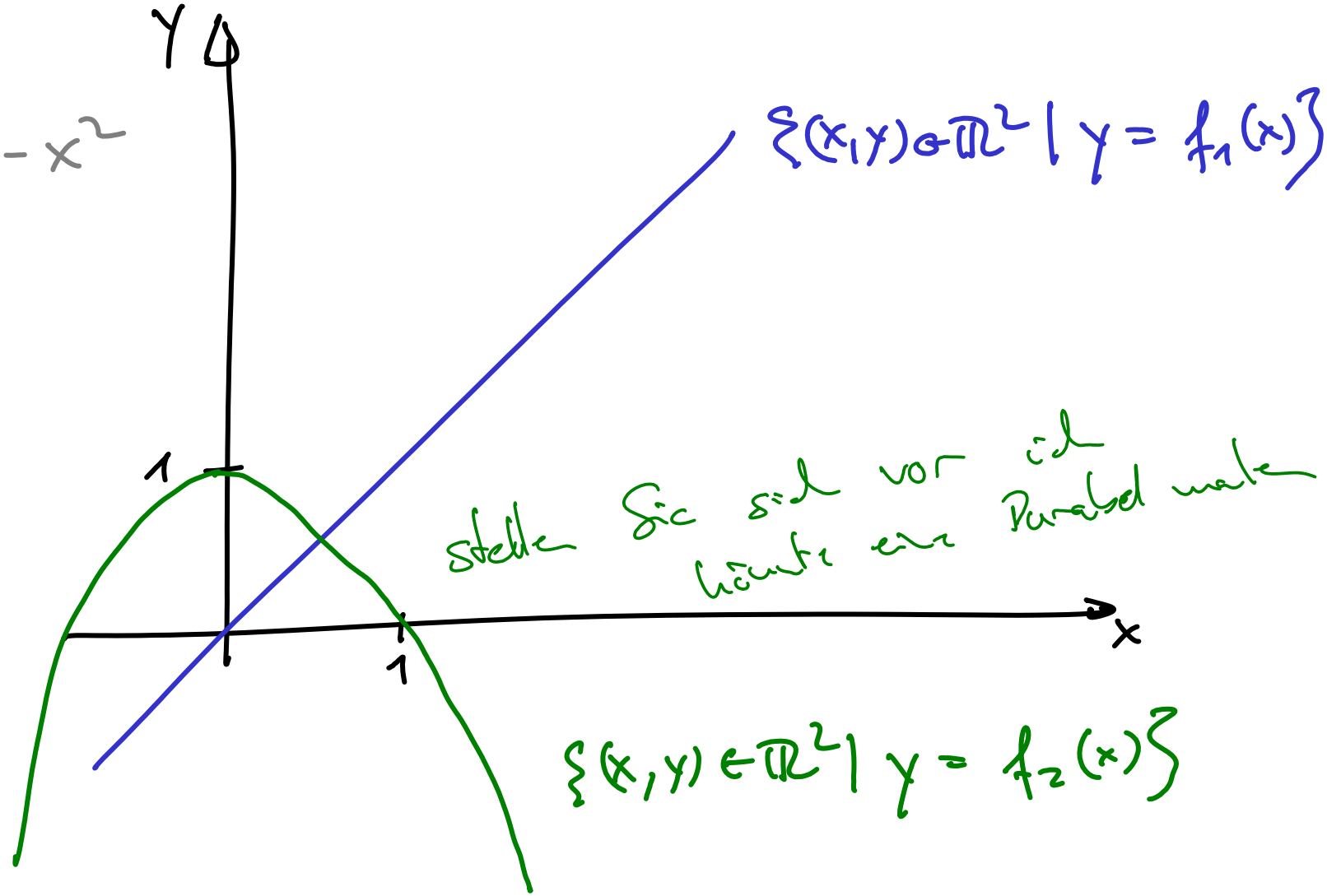


$\{(x,y) \in \mathbb{R}^2 \mid y = 1\}$, $\{(x,y) \in \mathbb{R}^2 \mid x = 4\}$, $\{(x,y) \in \mathbb{R}^2 \mid y = x\}$

$\{(x,y) \in \mathbb{R}^2 \mid y > 1\} \cap \{(x,y) \in \mathbb{R}^2 \mid x < 4\} \cap \{(x,y) \in \mathbb{R}^2 \mid x > y\}$

$f_1(x) = x$

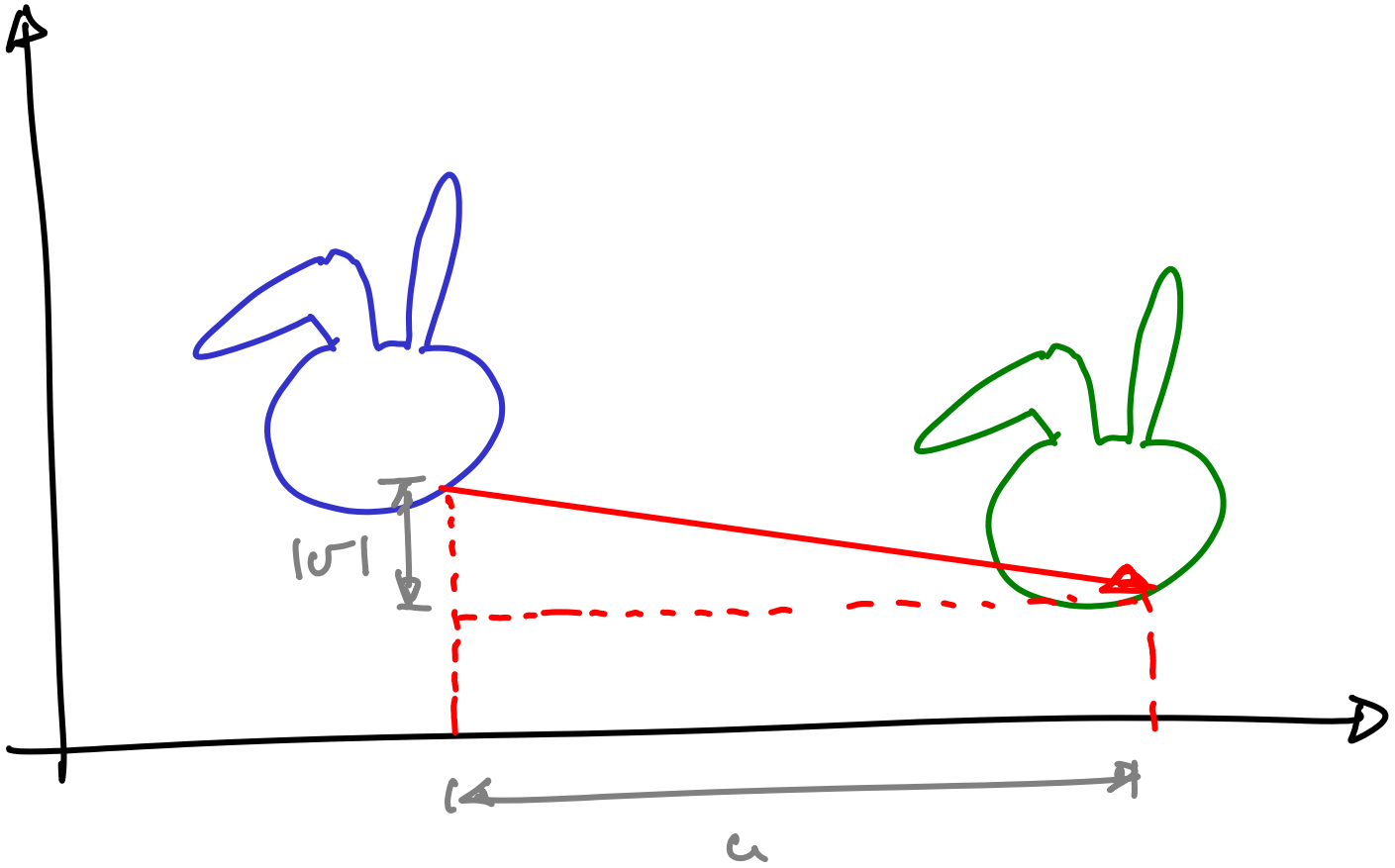
$f_2(x) = 1 - x^2$



$\{(x,y) \in \mathbb{R}^2 \mid y = f_1(x)\}$

stellen Sie sich vor, ich könnte eine Parabel malen

$\{(x,y) \in \mathbb{R}^2 \mid y = f_2(x)\}$



Translation : $(x, y) \longmapsto (x+u, y+v)$

$v < 0$ (hier)

$$G_f := \{(x,y) \in \mathbb{R}^2 \mid y = f(x)\}$$

Translation: $(x,y) \longmapsto (x+u, y+v) = (\tilde{x}, \tilde{y})$

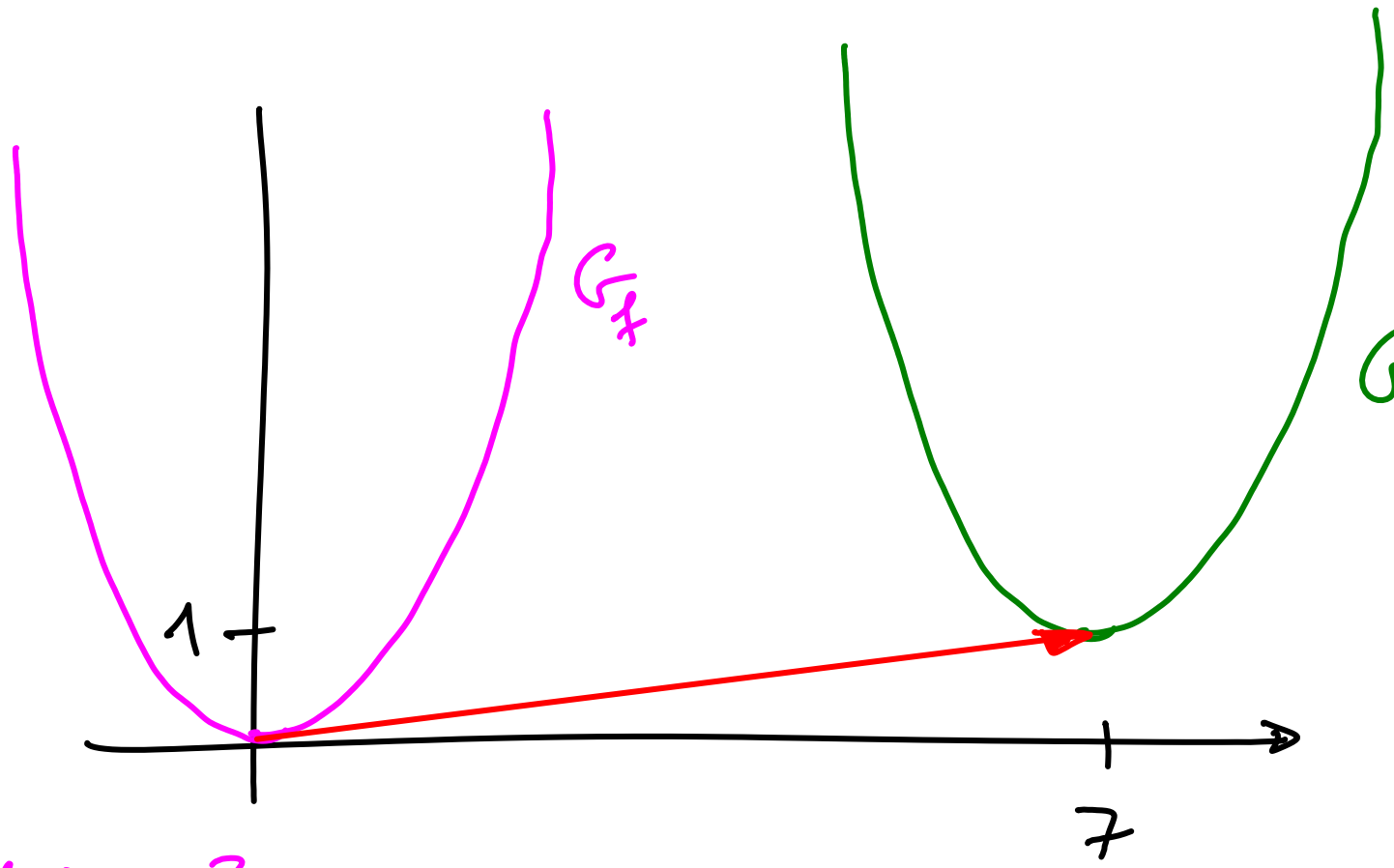
$$G_f \longmapsto \{(\tilde{x},\tilde{y}) \in \mathbb{R}^2 \mid y = f(x)\}$$

$$= \{(\tilde{x},\tilde{y}) \in \mathbb{R}^2 \mid \tilde{y} - v = f(\tilde{x} - u)\}$$

$$= \{(\tilde{x},\tilde{y}) \in \mathbb{R}^2 \mid \tilde{y} = f(\tilde{x} - u) + v\}$$

$$= \{(x,y) \in \mathbb{R}^2 \mid y = f(x-u) + v\}$$

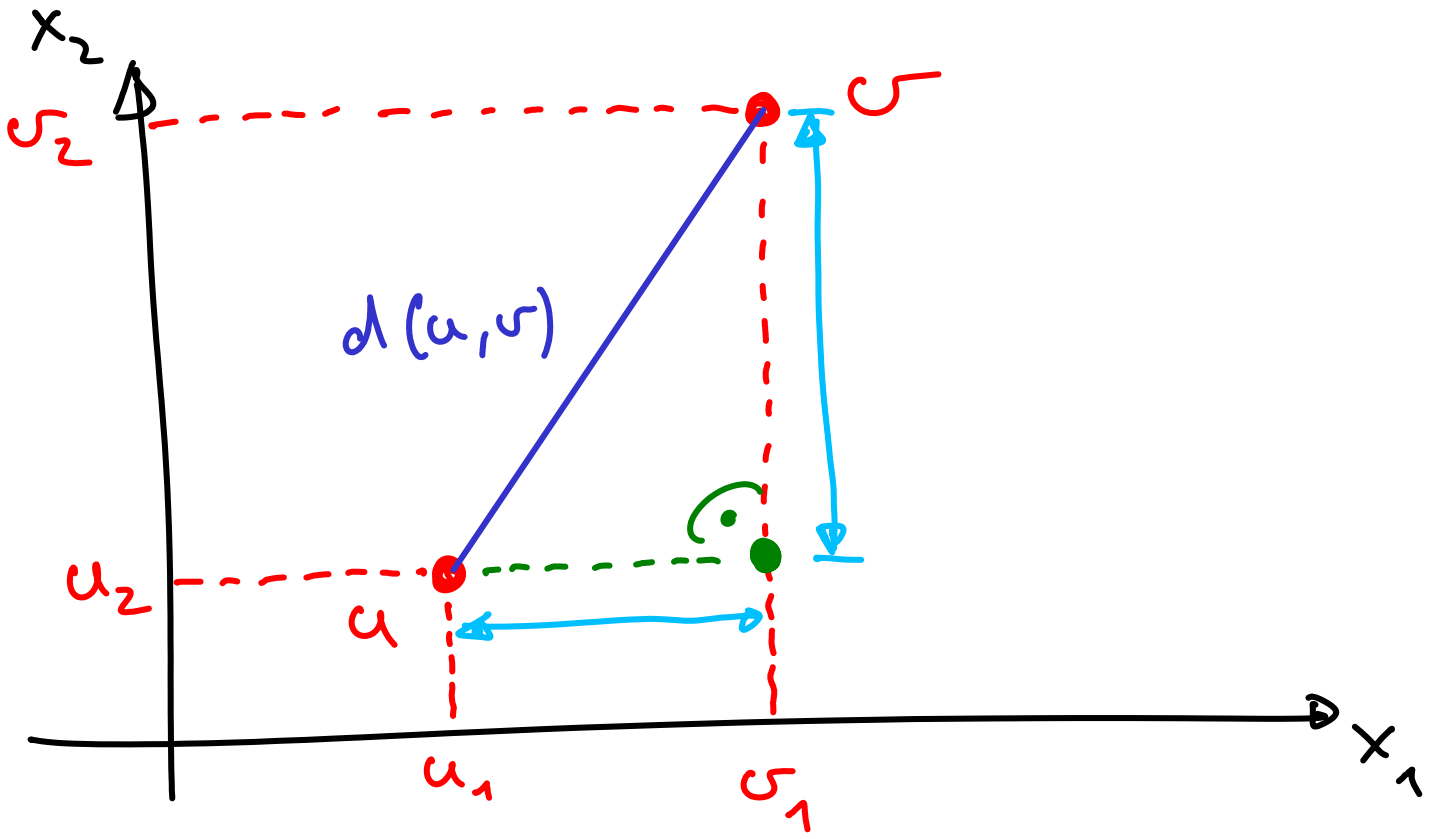
$$= G_g \quad \text{mit} \quad g(x) = f(x-u) + v$$



$f(x) = x^2$

$g(x) = f(x-7) + 1$

$= (x-7)^2 + 1$

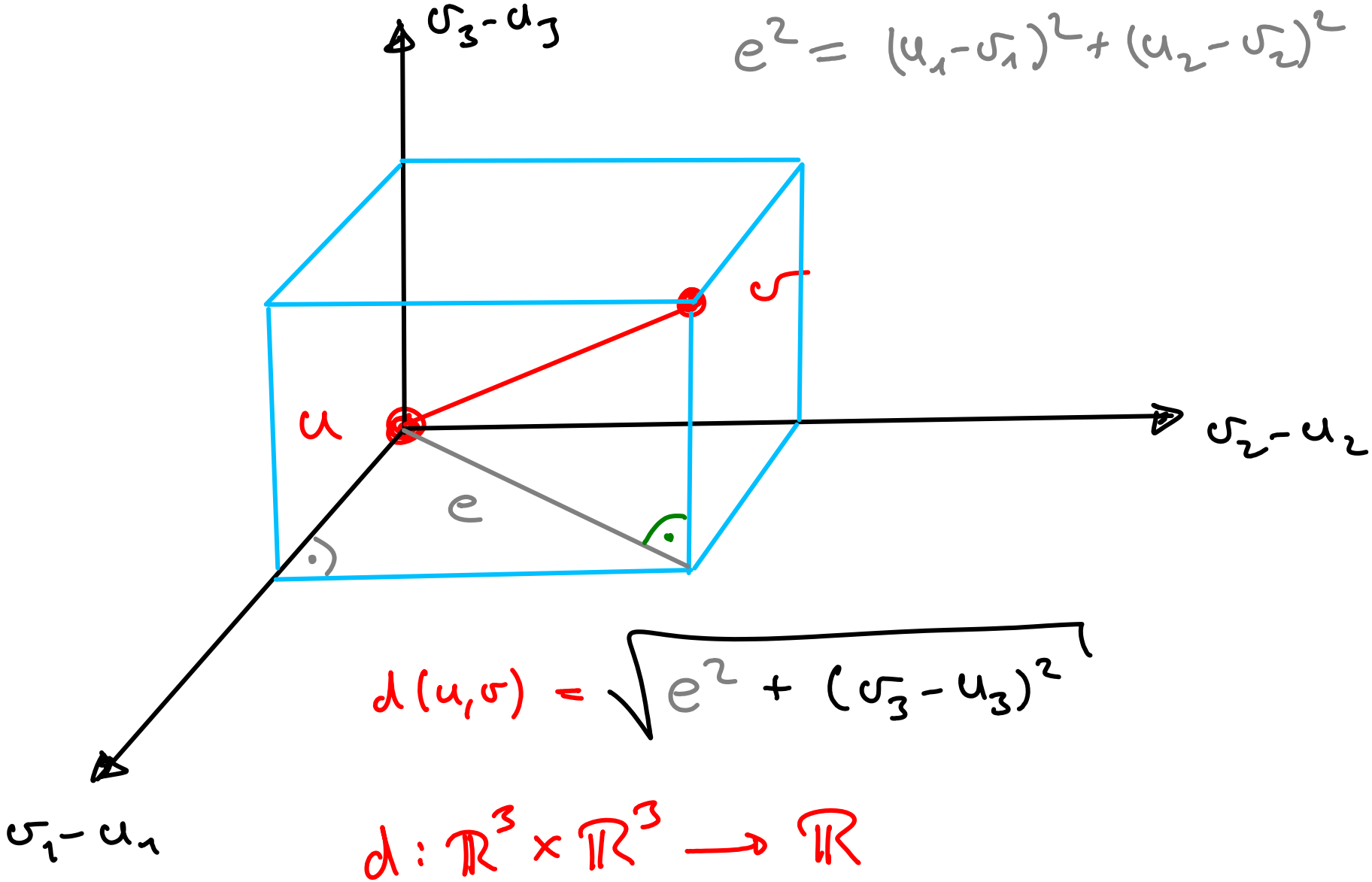


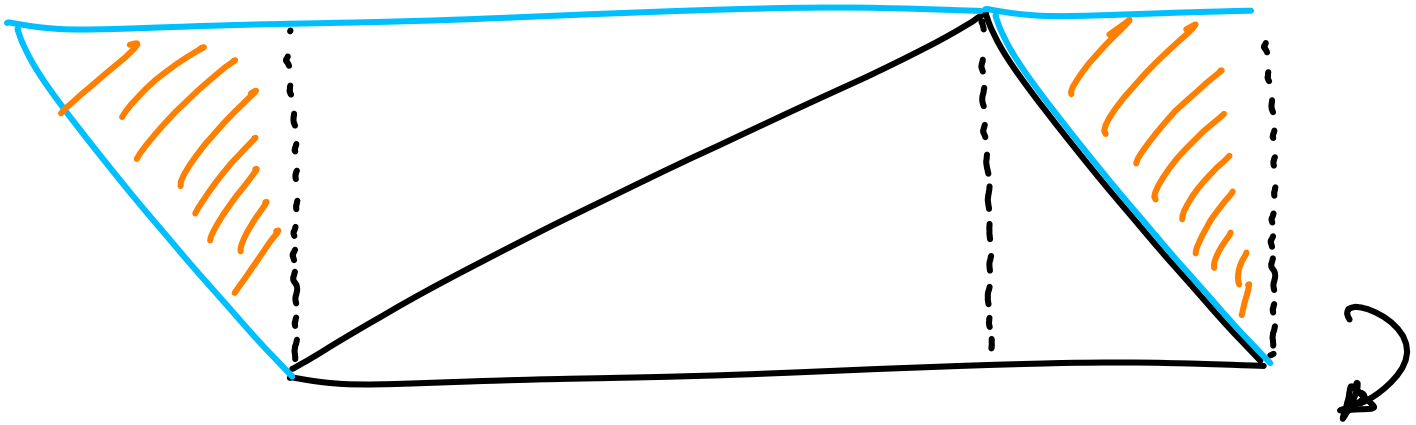
$$[d(u,v)]^2 = (v_1-u_1)^2 + (v_2-u_2)^2 = (u_1-v_1)^2 + (u_2-v_2)^2$$

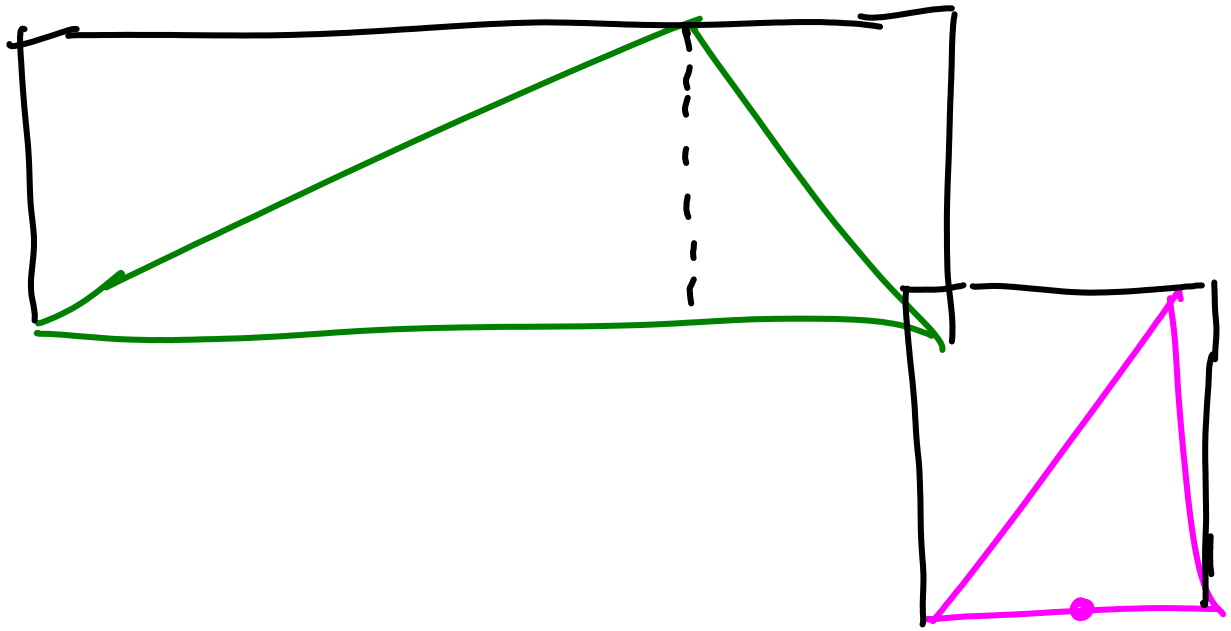
$$\Rightarrow \quad d(u,v) = \sqrt{(v_1-u_1)^2 + (v_2-u_2)^2}$$

$$d : \mathbb{R}^4 \longrightarrow \mathbb{R}$$

$$(u_1,u_2,v_1,v_2) \longmapsto d(u,v)$$


$v_3 - u_3$
$e^2 = (u_1 - v_1)^2 + (u_2 - v_2)^2$
v
u
$v_2 - u_2$
e
$v_1 - u_1$
$d(u,v) = \sqrt{e^2 + (v_3 - u_3)^2}$
$d : \mathbb{R}^3 \times \mathbb{R}^3 \longrightarrow \mathbb{R}$





zur Bergmannschen Regel

Wärmeverlust proportional zur Oberfläche O
(im Wesentlichen)

Wärmeproduktion proportional zum Volumen V
(im Wesentlichen)

Quotient $\frac{O}{V}$ $\xrightarrow{\text{zentr. Streckung}}$ $(x,y,z) \longmapsto (\alpha x, \alpha y, \alpha z)$

$$\frac{\alpha^2 O}{\alpha^3 V} = \frac{1}{\alpha} \frac{O}{V}$$

$\frac{1}{\alpha} < 1$

Kugelbär $\longmapsto$ Eisbär

$\alpha > 1$

Kreislinie als Fkt. u_1, u_2, r gegeben

gesucht v_2 als Fkt. von v_1

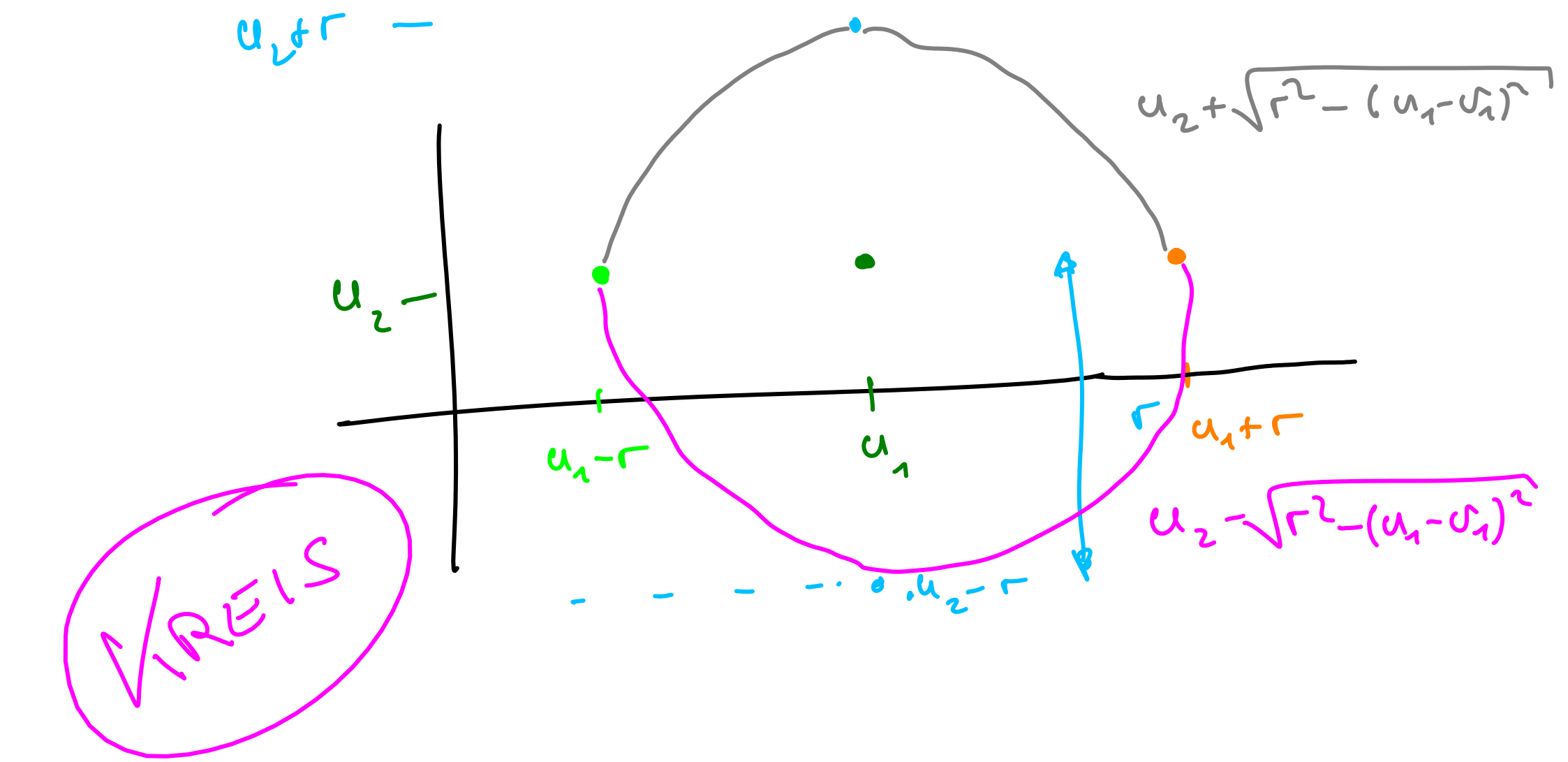
$$(u_1 - v_1)^2 + (u_2 - v_2)^2 = r^2$$

$$\Leftrightarrow \quad (v_2 - u_2)^2 = r^2 - (v_1 - u_1)^2$$

$$\Leftrightarrow \quad v_2 - u_2 = \pm \sqrt{r^2 - (v_1 - u_1)^2}$$

$$\Leftrightarrow \quad v_2 = u_2 \pm \sqrt{r^2 - (v_1 - u_1)^2}$$

$$u_1 - r \leq v_1 \leq u_1 + r$$


u_2+r
$u_2+\sqrt{r^2-(u_1-v_1)^2}$
u_2
u_1-r
u_1
r
u_1+r
$u_2-\sqrt{r^2-(u_1-v_1)^2}$
u_2-r
VRAIS