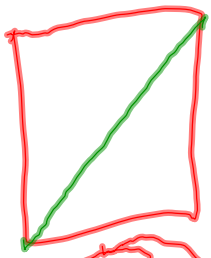
$\mathbb{N}$: 0, 1, 2, 3, 4, ...

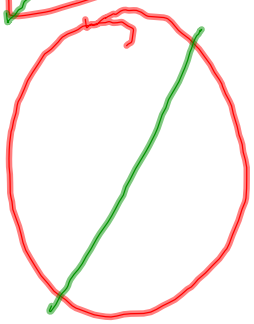
$\mathbb{Z}$: -3, -2, -1, 0, 1, ...

$\mathbb{Q}$: $3/2$, $-4/17$, ...

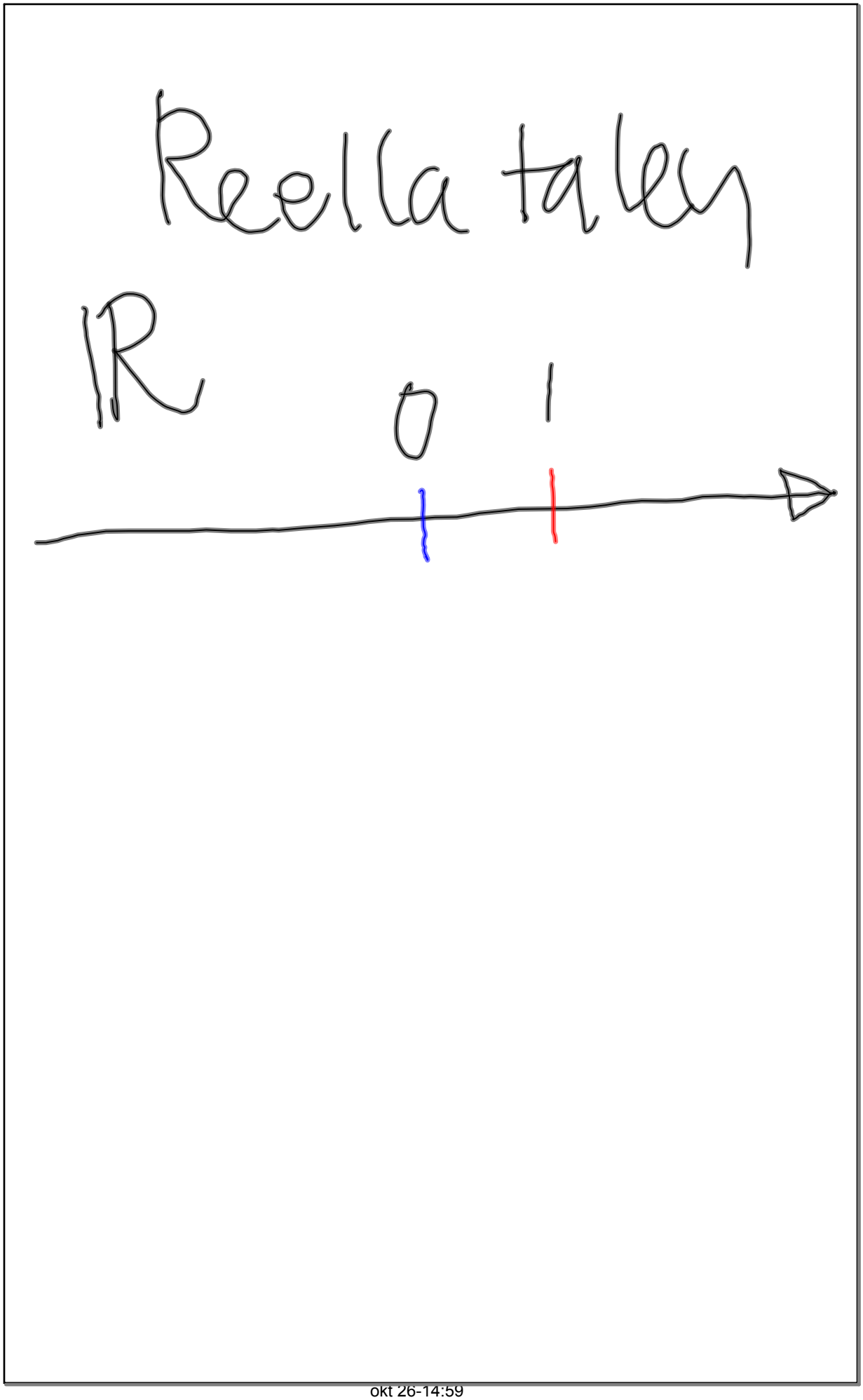
$\mathbb{R}$ $\sqrt{2}$



π



okt 26-14:58



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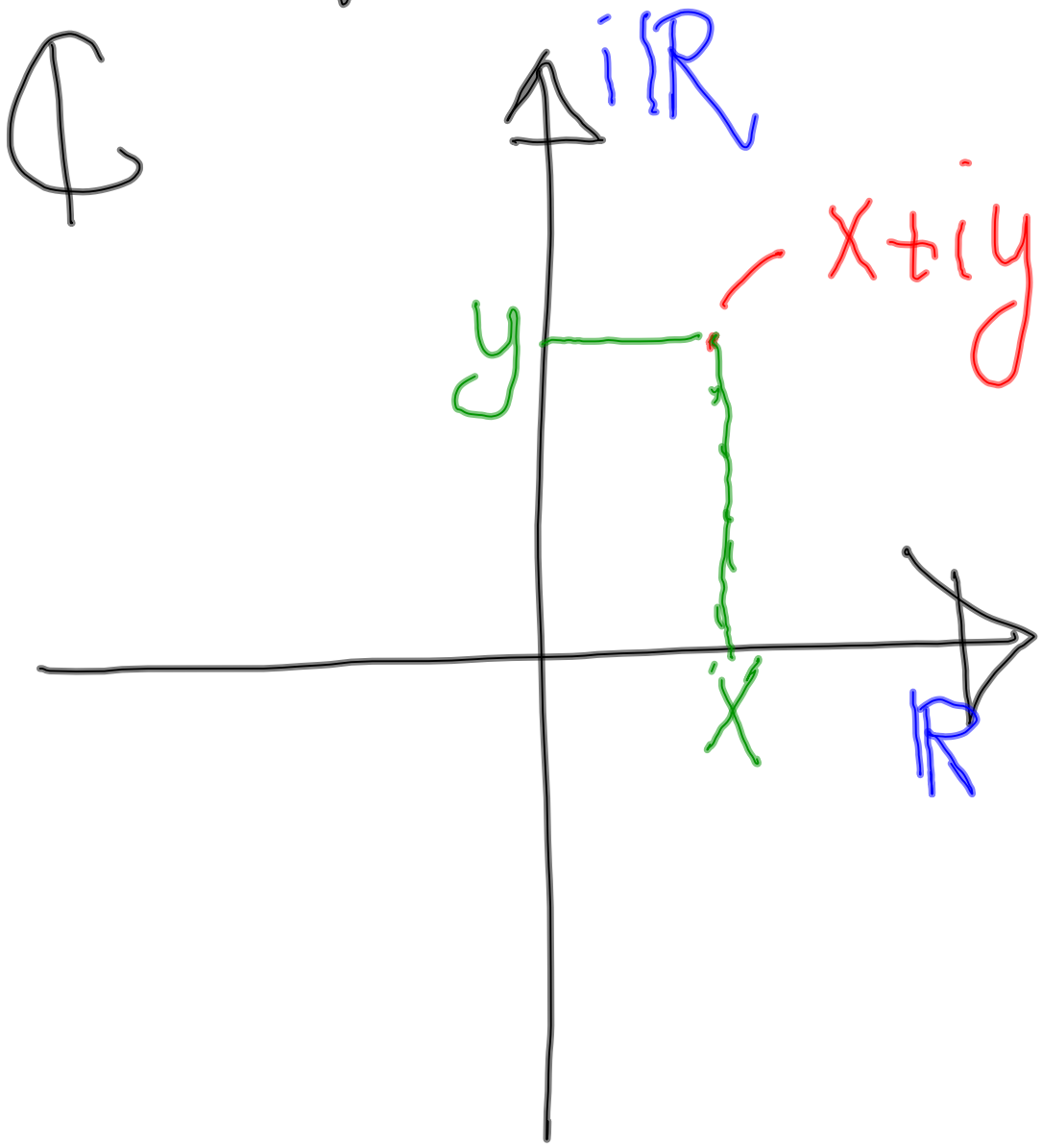
Komplexa talen

$\mathbb{C}$



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Addition:

$$(2+i)+(2+3i) =$$

$$= 2+i+2+3i =$$

$$= 4+4i$$

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Multiplikation

$$(2+i)\cdot(2+3i) =$$

$$= 2\cdot(2+3i) +$$

$$i(2+3i) =$$

$$= 2\cdot 2 + 2\cdot 3i + i\cdot 2$$

$$+ i\cdot 3i = 4 + 6i.$$

$$+2i + 3i^2 = 4 + 6i$$

$$+2i + 3(-1) =$$

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$$4 - 3 + (6 + 2)i$$

$$= 1 + 8i$$

okt 26-14:59

Andragradsekv.

$$x^2 + 4x + 1 = 0$$

$$\Longleftrightarrow (x+2)^2 - 4 = -1$$

$$\Longleftrightarrow (x+2)^2 = 3$$

$$\Longleftrightarrow x = -2 \pm \sqrt{3}$$

okt 26-14:59

$$x^2 + 2x + 3 = 0$$

$$\Leftrightarrow (x+1)^2 - 1 = -3$$

$$\Leftrightarrow (x+1)^2 = -2$$

$$\Leftrightarrow x + 1 = \pm i\sqrt{2}$$

$$\Leftrightarrow x = -1 \pm i\sqrt{2}$$

okt 26-14:59

Konjugerade

$x_1 = -1 + i\sqrt{2}$

och

$x_2 = -1 - i\sqrt{2}$

är varandras

konjugat

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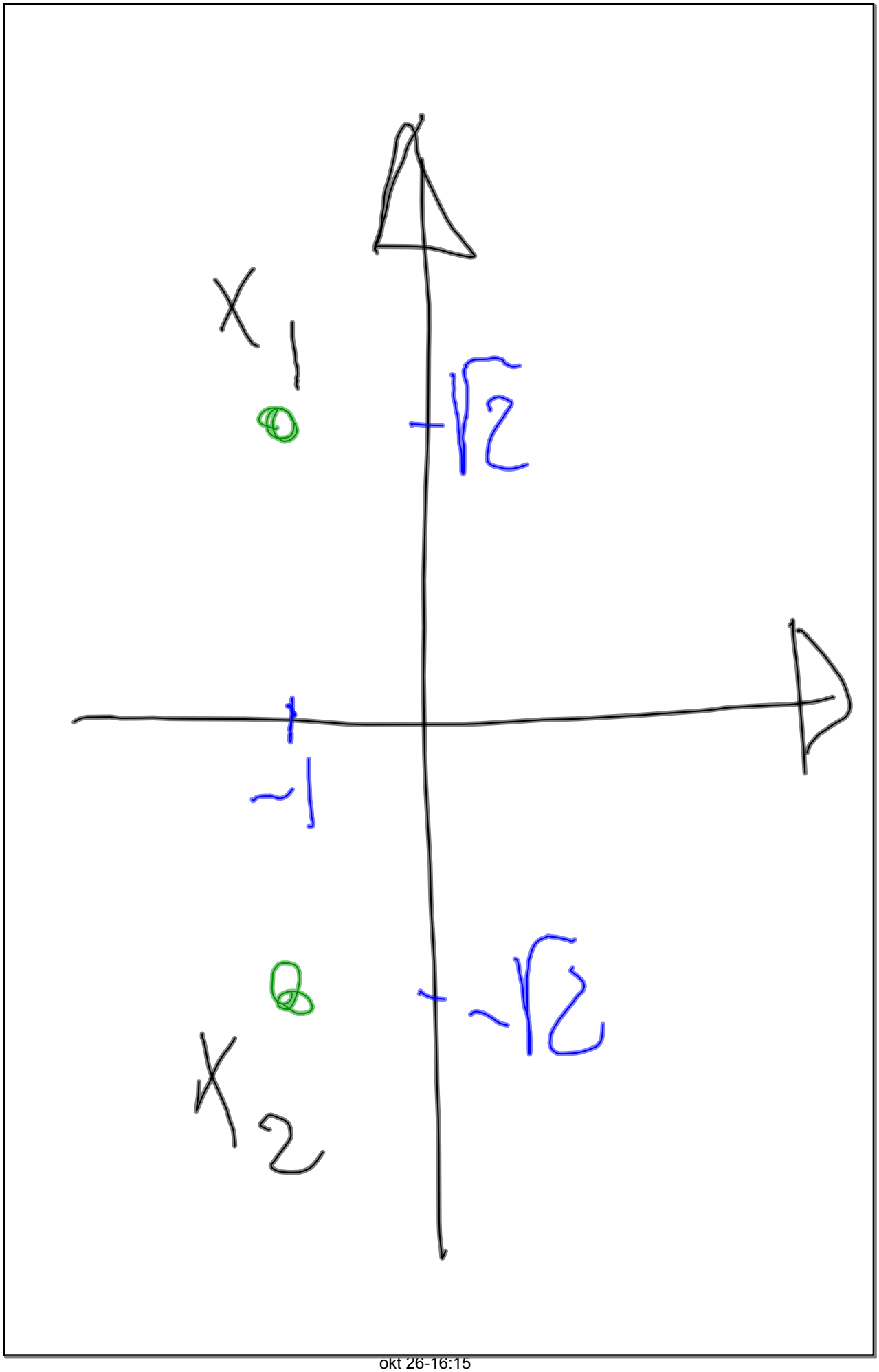
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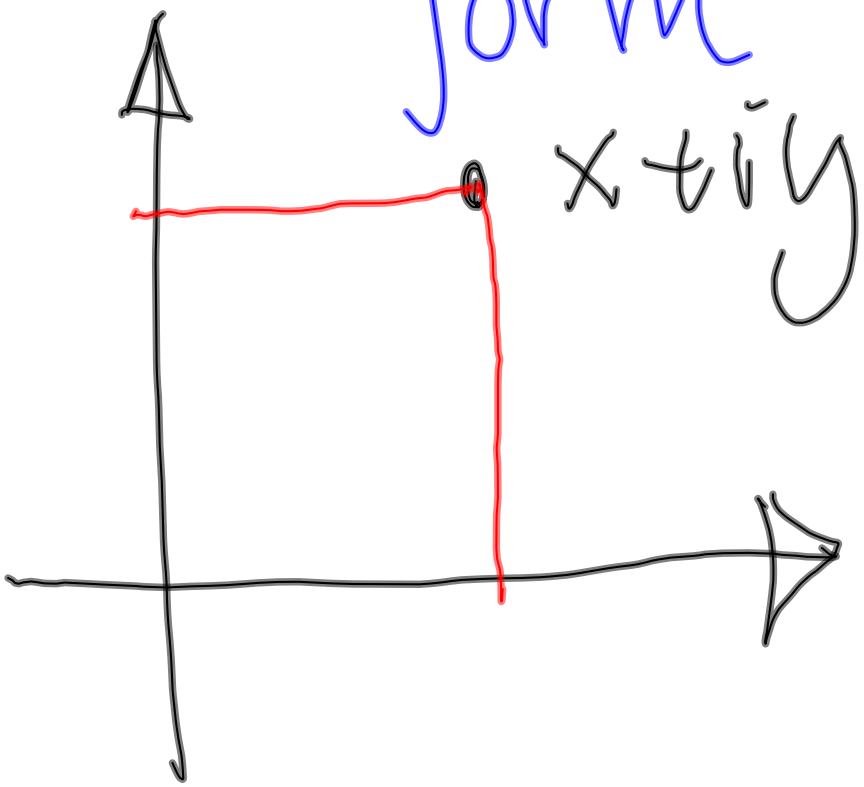
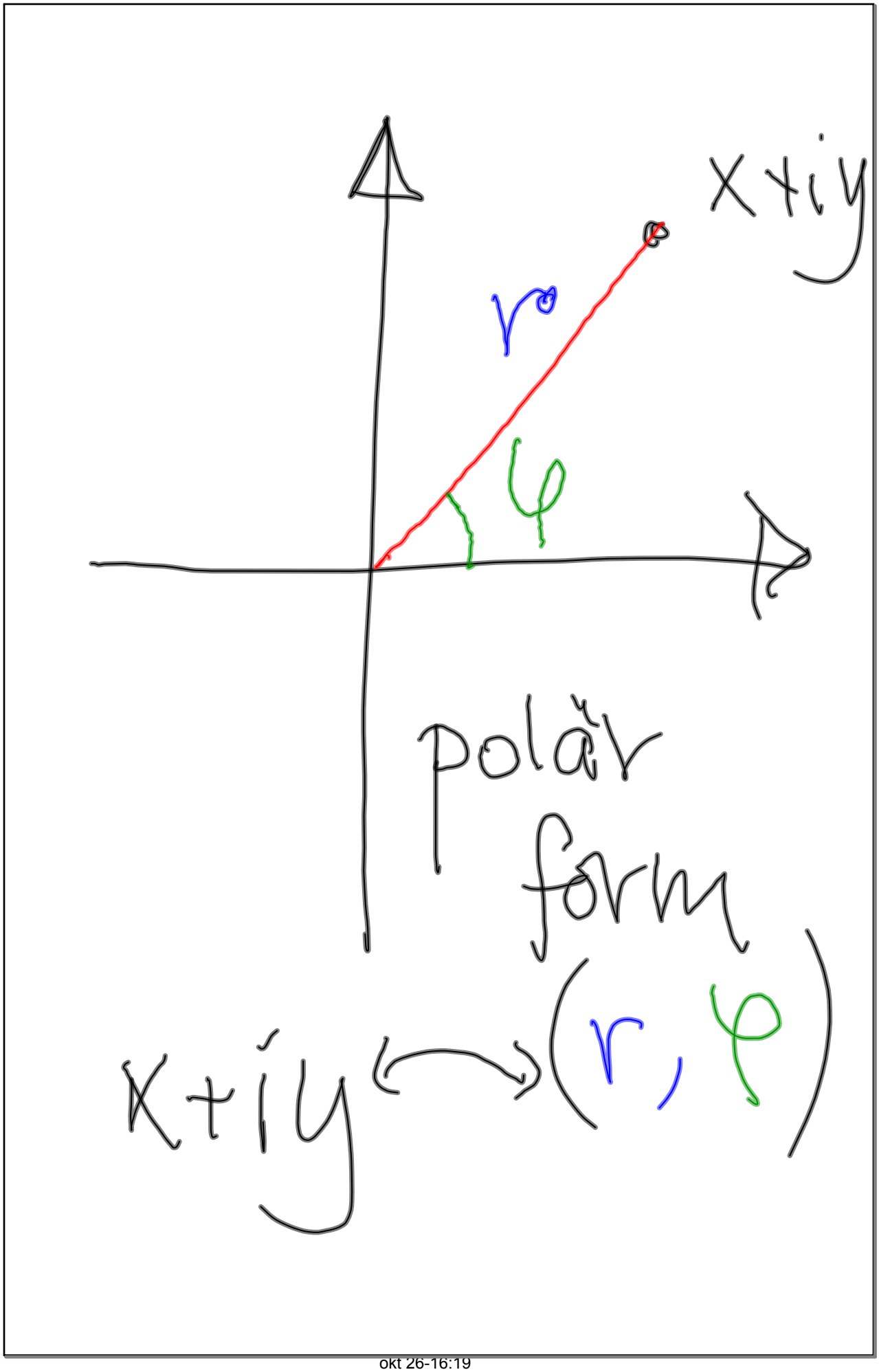
Sätt att skriva:

$x+iy$

rektangulär form



okt 26-16:17



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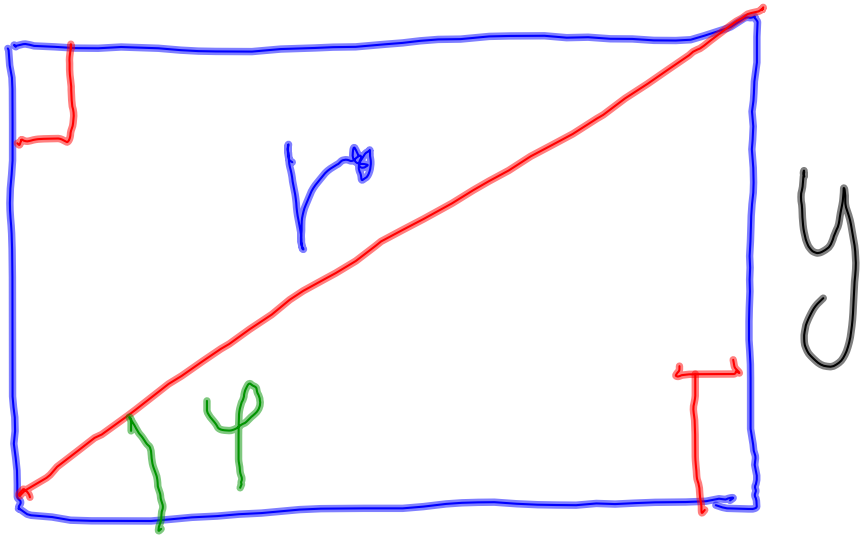
Trigonometri:



$$\begin{cases} x = r\cos\varphi \\ y = r\sin\varphi \end{cases}$$

okt 26-16:21

Konjugat

$$z = x + iy$$

$$\bar{z} = x - iy$$

$$z = (r, \varphi)$$

$$\bar{z} = (r, -\varphi)$$

okt 26-16:23

Andragradsekv.

$$z^2 - (4+4i)z + 1 + 8i = 0$$

$$\Leftrightarrow \left(z - (2+2i)\right)^2 - (2+2i)^2 + 1 + 8i = 0 \Leftrightarrow$$

$$\left(z - (2+2i)\right)^2 - 4 - 8i + 4 + 1 + 8i = 0$$

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$$\Leftrightarrow \left(z-(2+2i)\right)^2 = -1$$

$$\Leftrightarrow z-(2+2i) = \pm i$$

$$\Leftrightarrow z = 2+2i \pm i$$

$$z_1 = 2+3i$$

$$z_2 = 2+i$$

okt 26-16:31

Kvadratrot ur komplext tal

$$z^2 = 3 + 4i$$

Ansätt $z = x + iy$

Då är

$$z^2 = (x+iy)^2 =$$

okt 26-16:35

$$= x^2 + 2x \cdot iy + (iy)^2$$

$$= x^2 - y^2 + 2xyi$$

vi måste ha

$$\begin{cases} x^2 - y^2 = 3 \\ 2xy = 4 \end{cases}$$

okt 26-16:37

$$\Leftrightarrow \begin{cases} x^2 - y^2 = 3 \\ y = 2/x \end{cases}$$

$$\Leftrightarrow \begin{cases} x^2 - \left(\frac{2}{x}\right)^2 = 3 \\ y = \frac{2}{x} \end{cases}$$

okt 26-16:39

$$\Leftrightarrow \begin{cases} x^4 - 4 = 3x^2 \\ y = \frac{2}{x} \end{cases}$$

$$\Leftrightarrow \begin{cases} (x^2)^2 - 3x^2 - 4 = 0 \\ y = \frac{2}{x} \end{cases}$$

$$\Leftrightarrow \begin{cases} x^2 = 4, \ x^2 = -1 \\ y = \frac{2}{x} \end{cases}$$

okt 26-16:40

$$\begin{cases} x = \pm 2 \\ y = \frac{2}{x} \end{cases}$$

Lösningarna är

$z_1 = 2 + i$

$z_2 = -2 - i$

okt 26-16:44