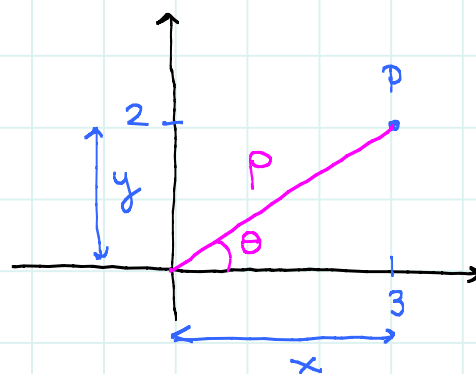


Coord. polari nel piano (x, y) coord. cartesiane ρ, θ coord. polari $\uparrow$
RHO $\uparrow$
THETA ρ = distanza del punto dall'origine θ = angolo tra semiasse positivo delle x e vettore OP che congiunge l'origine al punto, calcolato in verso antiorarioFormule di passaggio

(trigonometria triang. rettangoli)

Se conosco ρ e θ :

$$x = \rho \cos \theta$$

$$y = \rho \sin \theta$$

Se conosco x e y :

$$\rho = \sqrt{x^2 + y^2}$$

Per il calcolo di θ osservo che

$$x = \rho \cos \theta$$

$$y = \rho \sin \theta$$

 $\leadsto$

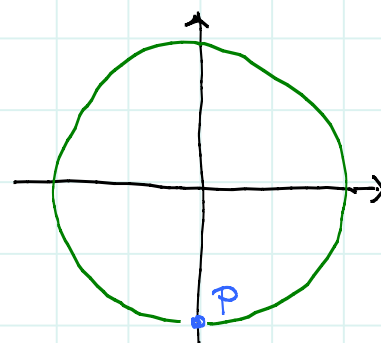
$$\frac{y}{x} = \frac{\sin \theta}{\cos \theta} = \tan \theta$$

Questa va bene se
 $x \neq 0$

Oss. Per forza $\rho \geq 0$ e vale $\rho = 0$ se e solo se il punto $(0, 0)$.
L'angolo θ è definito, come in trigonometria, a meno di multipli di 2π (0 360°)

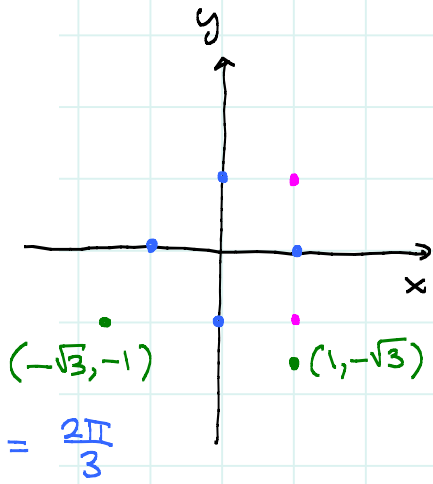
Il punto P ha $\theta = \frac{3\pi}{2}$, oppure $\theta = -\frac{\pi}{2}$, oppure

$$\theta = \frac{7\pi}{2}$$



x	y	ρ	θ
1	0	1	0
0	1	1	$\frac{\pi}{2}$
-1	0	1	π
0	-1	1	$-\frac{\pi}{2}$
1	1	$\sqrt{2}$	$\pi/4$
1	-1	$\sqrt{2}$	$-\pi/4$
-4	4	$4\sqrt{2}$	$3\pi/4$
1	$-\sqrt{3}$	2	$-\frac{\pi}{3}$
0	0	0	N.D.
$-\sqrt{3}$	-1	2	$7\pi/6$

x	y	ρ	θ
0	2	2	$\pi/2$
-3	0	3	π
-1	0	1	$5\pi = \pi$
0	0	0	π
0	0	0	$\pi/4$
$\sqrt{3}$	1	2	$\pi/6$
0	-6	6	$-\pi/2$
$-\frac{\sqrt{2}}{2}$	$-\frac{\sqrt{3}}{\sqrt{2}}$	$\sqrt{2}$	$-4\pi/3$
-5	5	$5\sqrt{2}$	$3\pi/4$
	-2		$7\pi/6$



$$(-4, 4) \rightsquigarrow \rho = \sqrt{16+16} = \sqrt{32} = 4\sqrt{2}$$

$$(-1, 1) \rightsquigarrow \rho = \sqrt{2}$$

$$(-4, 4) = 4(-1, 1)$$

$$(1, -\sqrt{3}) \rightsquigarrow \rho = 2$$

$$\frac{y}{x} = -\sqrt{3} = \tan \theta$$

$$(-\sqrt{3}, -1) \rightsquigarrow \rho = 2$$

$$\frac{y}{x} = \frac{1}{\sqrt{3}} = \tan \theta$$

$$\rho = 2 \quad \theta = \frac{\pi}{6} = 30^\circ$$

$$x = \rho \cos \theta = 2 \cdot \frac{\sqrt{3}}{2} = \sqrt{3}$$

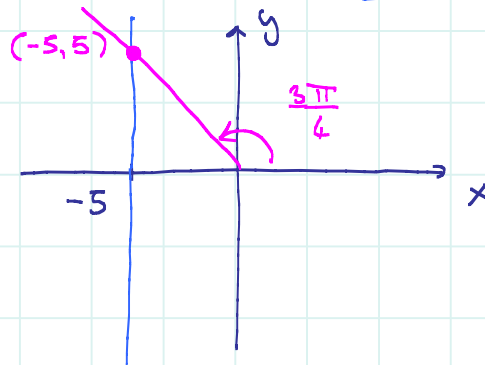
$$y = \rho \sin \theta = 2 \cdot \frac{1}{2} = 1$$

$$\rho = \sqrt{2} \quad \theta = \frac{2\pi}{3} = 120^\circ$$

$$x = \rho \cos \theta = \sqrt{2} \cdot \left(-\frac{1}{2}\right) = -\frac{\sqrt{2}}{2}$$

$$y = \rho \sin \theta = \sqrt{2} \cdot \frac{\sqrt{3}}{2} = \frac{\sqrt{3}}{\sqrt{2}}$$

$$x = -5 \quad \theta = \frac{3\pi}{4}$$



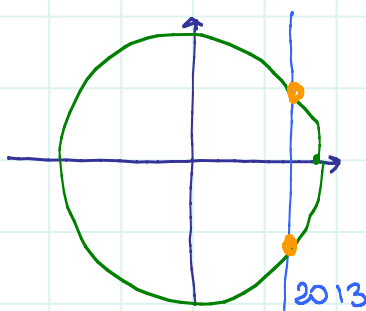
Relazioni	Soluzioni
$x = 2013, \rho = 2014$	2
$x = 2013, \rho = 2013$	1
$x = 2013, \rho = 2012$	0
$y = -2013, \rho = 2014$	2
$y = -2013, \rho = 2013$	1
$x = 2013y, \rho = 2$	2
$x + y = -3, \rho = 3$	
$x + y = -3, \rho = 4$	
$x - y = 3, \rho = 4$	

Relazioni	Soluzioni
$x + y = -3, \rho = 5$	
$x = 2013, \theta = \pi/4$	1
$x = 2013, \tan \theta = -1$	1
$x = -2013, \tan \theta = -1$	1
$x = 2013, \theta = 1$	1
$x = 2013, \theta = 2$	0
$x + y = 2013, \theta = 2\pi/3$	
$y = x^2, \rho = 7$	2
$y = x^2 - 7, \theta = 3$	

$(2013, 2013)$
 $(2013, -2013)$
 $(-2013, 2013)$
 $(2013, 2013 \tan 1)$

$$x = 2013$$

$$\rho = 2014$$



Come posso trovarle? $\sqrt{x^2 + y^2} = 2014 \leadsto x^2 + y^2 = 2014^2$

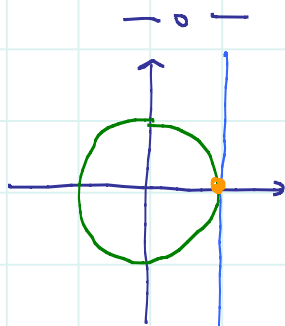
$$\leadsto y^2 = 2014^2 - x^2 = 2014^2 - 2013^2 = (2014 + 2013)(2014 - 2013) = 4027$$

$$a^2 - b^2 \quad (a+b) \quad (a-b)$$

I due punti sono $(2013, \pm \sqrt{4027})$

$$x = 2013$$

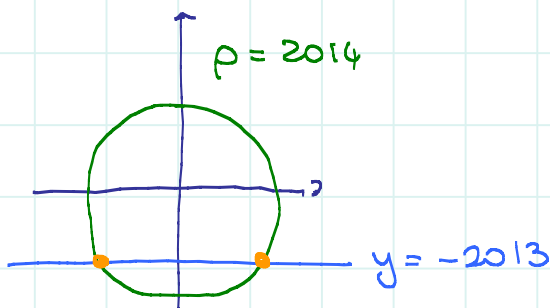
$$\rho = 2013$$



$\leadsto$ 1 sola soluzione
 $\leadsto (2013, 0)$

$$y = -2013$$

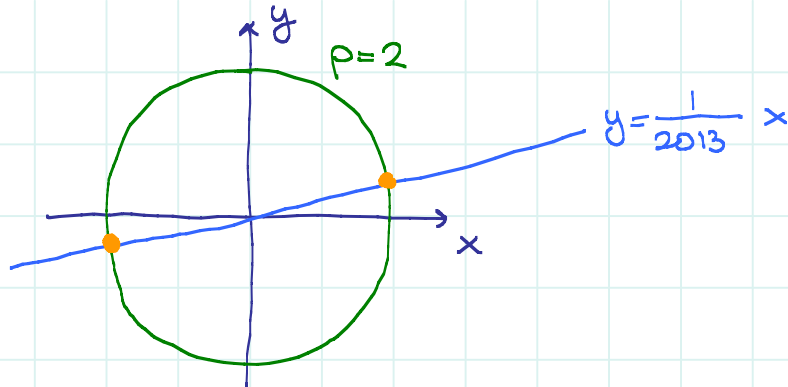
$$\rho = 2014$$



$\leadsto (\pm \sqrt{4027}, -2013)$

$$x = 2013 y$$

$$\rho = 2$$



Per trovarle, risolvo

$$x^2 + y^2 = 4$$

$$y = \frac{1}{2013} x$$

risolvo

$$\tan \theta = -1$$

$$\frac{\sin \theta}{\cos \theta} = -1$$

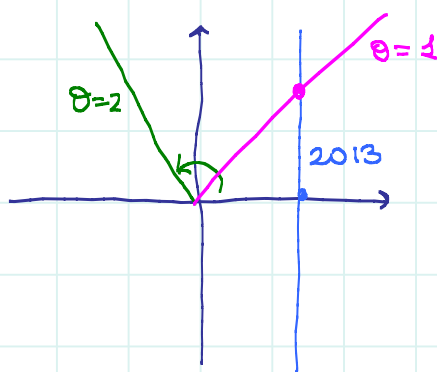
$$\frac{y}{x} = -1$$

$$y = -x$$

$$x = 2013$$

$$\theta = 2$$

↑
radianti
è compreso tra
 90° e 180°



$x = 2013$ $\theta = 1$ $\leadsto$ una intersezione, ma chi è?

$$x = \rho \cos \theta \quad y = \rho \sin \theta$$

$$2013 = \rho \cos 1 \quad \leadsto \quad \rho = \frac{2013}{\cos 1} \quad \leadsto \quad y = \rho \sin \theta = \frac{2013}{\cos 1} \cdot \sin 1$$

$$= 2013 \tan 1$$