

Simmetria di oggetto(punto)
assiale secondo asse Y, asse X
centrale secondo centro assi O

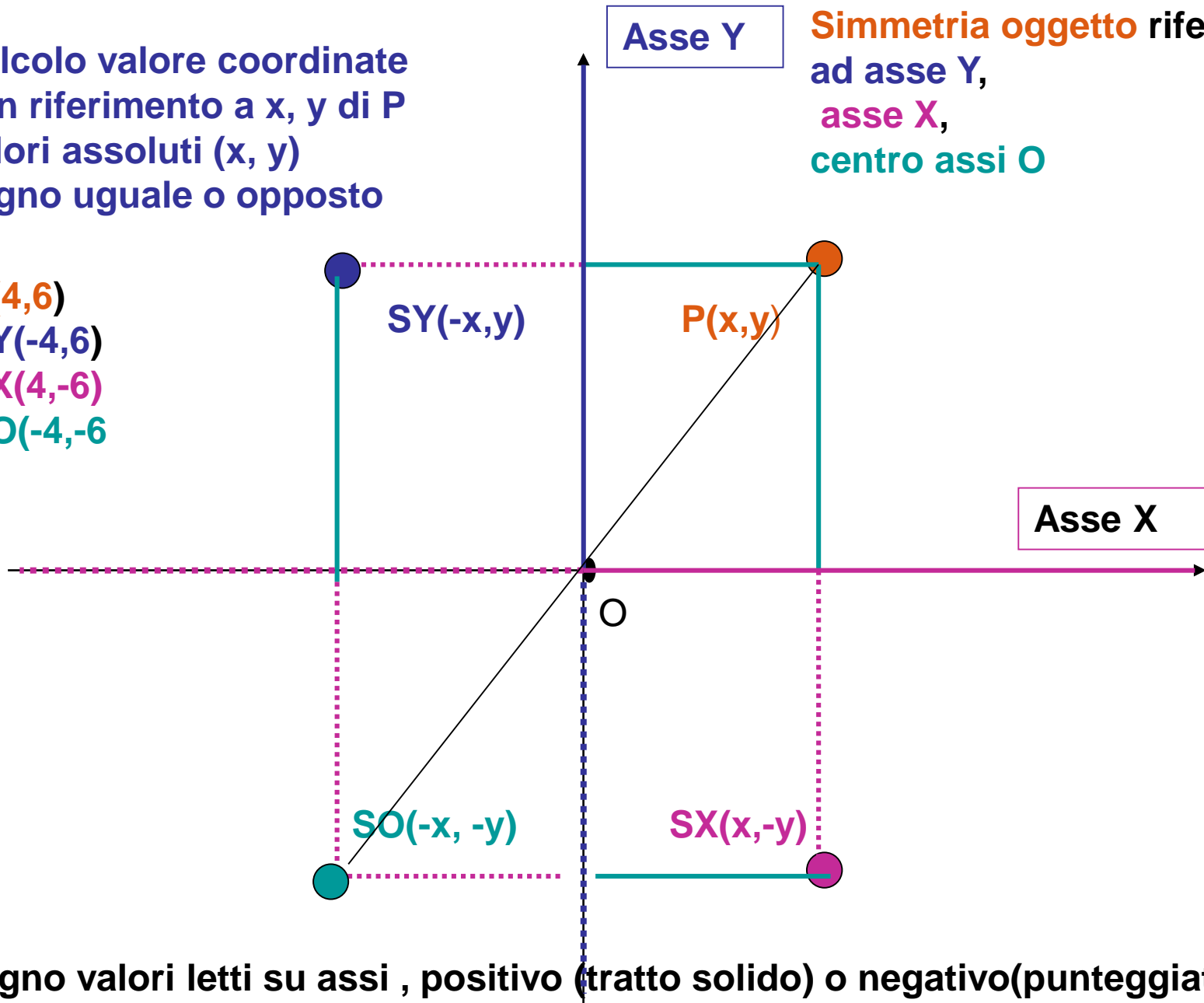
**Secondo retta parallela
ad asse Y, asse X,
centro Q (diverso da O)**

Simmetria di oggetto(punto)
assiale secondo asse Y, asse X
centrale secondo centro assi O

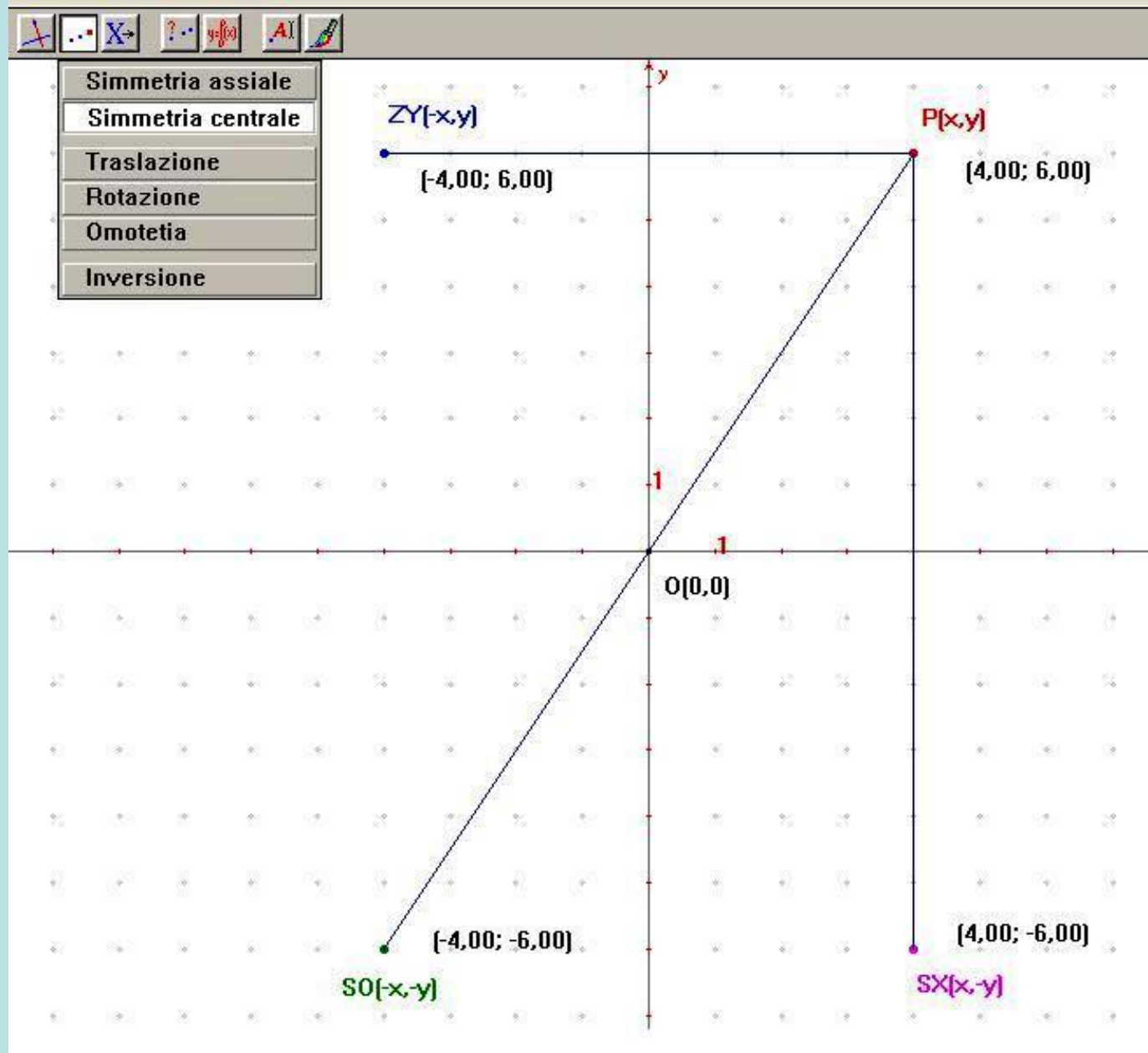
Calcolo valore coordinate con riferimento a x, y di P
valori assoluti (x, y)
segno uguale o opposto

Simmetria oggetto riferita ad asse Y,
asse X,
centro assi O

$P(4,6)$
 $SY(-4,6)$
 $SX(4,-6)$
 $SO(-4,-6)$



Segno valori letti su assi , positivo (tratto solido) o negativo (punteggiato)



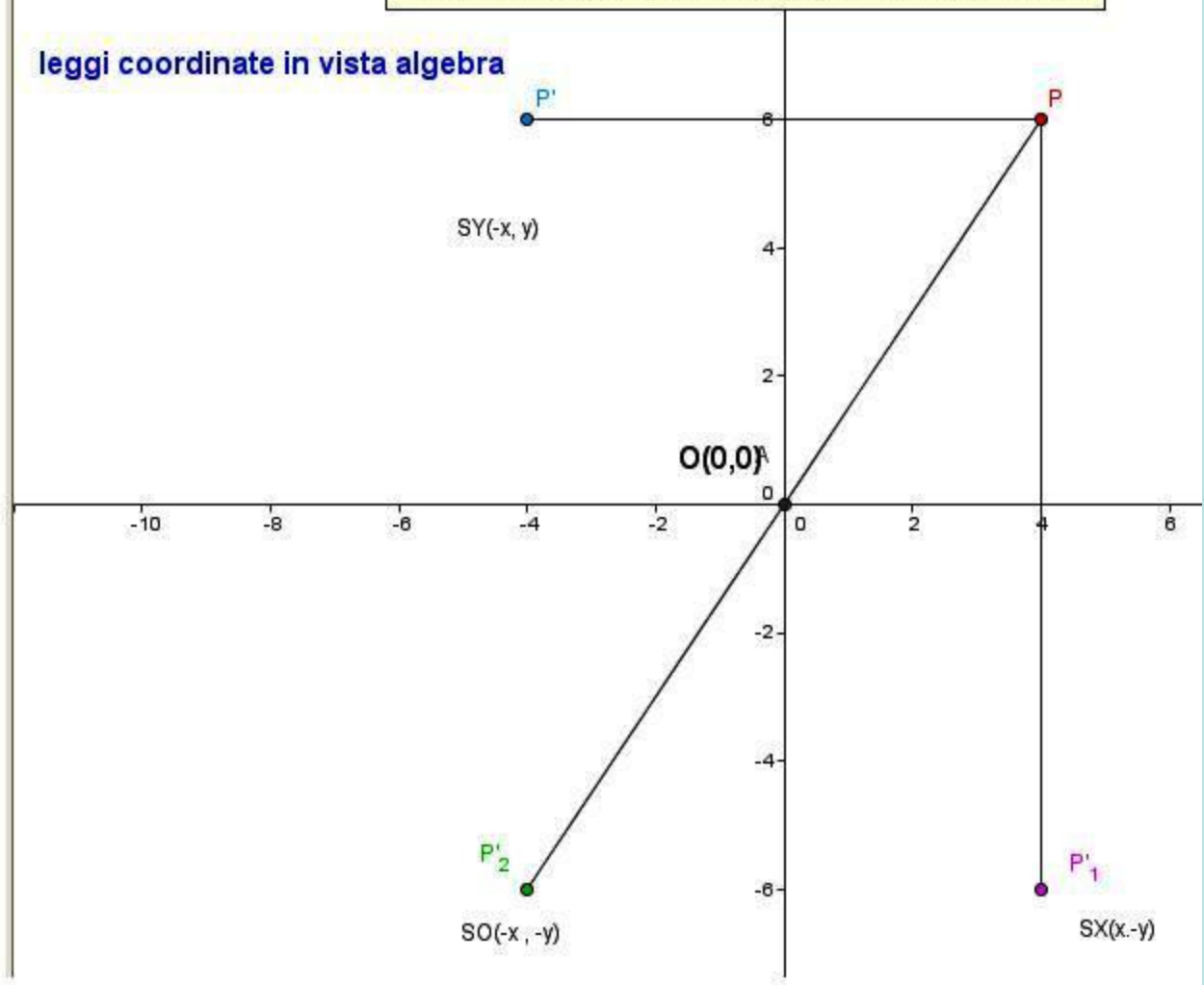
geogebra



- Vista Algebra
- Vista Grafica
- Punto
 - $A = (0, 0)$
 - $P = (4, 6)$
 - $P' = (-4, 6)$
 - $P'_1 = (4, -6)$
 - $P'_2 = (-4, -6)$
- Segmento
 - $a = 8$
 - $b = 12$
 - $c = 14.42$

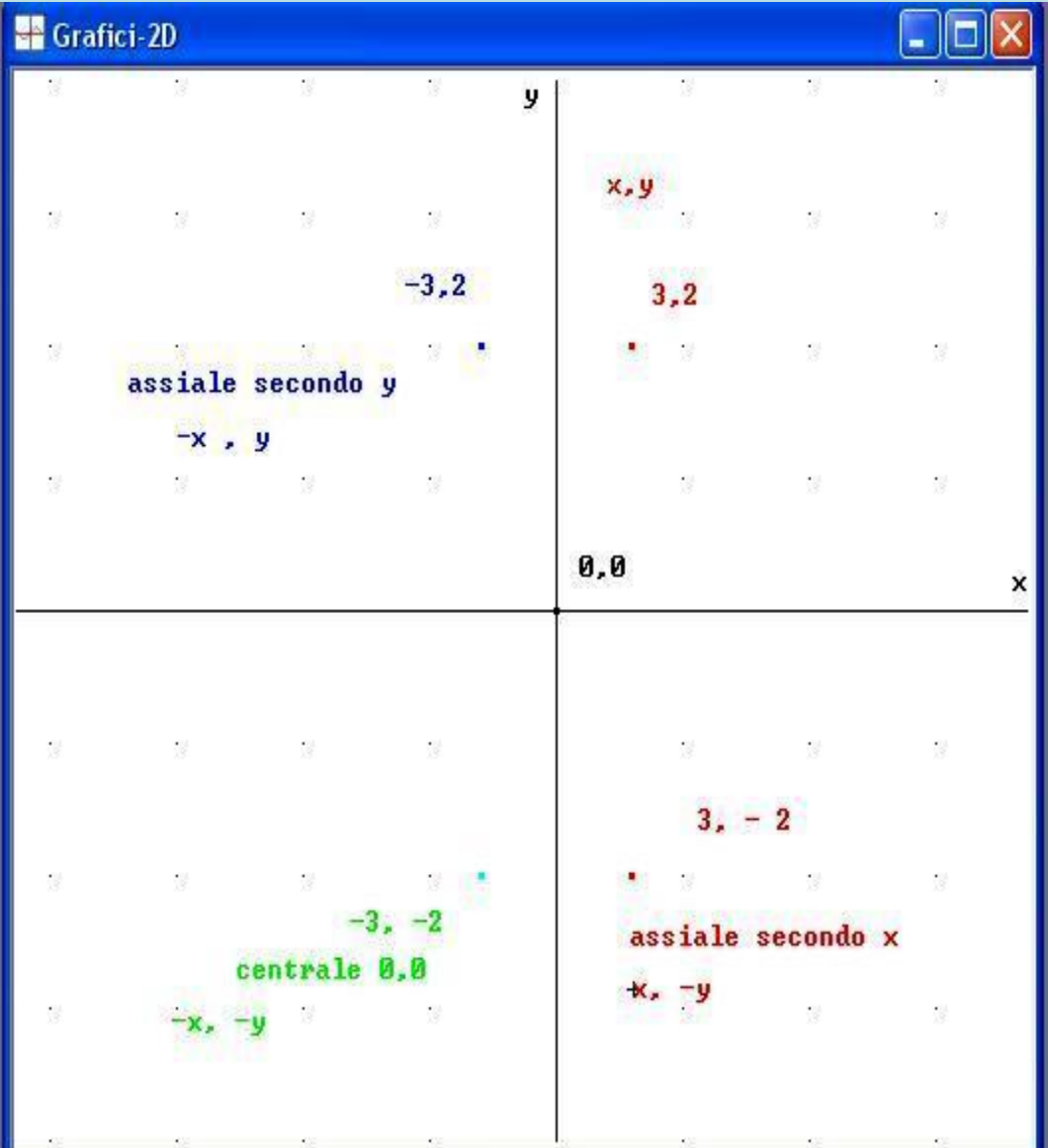
Simmetria centrale
Selezionare l'oggetto da trasformare, quindi il centro di simmetria

leggi coordinate in vista algebra



derive

```
Algebra ???MTH
#1: "simmetria punto"
#2: [3, 2]
#3: [3, -2]
#4: [-3, 2]
#5: [0, 0]
#6: [-3 - 2]
#7: [-3, -2]
```



derive

```
#4: p := [3, 2]
#5: "funzione simmetria assiale secondo y"
#6: "cambia segno primo elemento, riscrive secondo"
#7: "funzione SY(v):=(-v↓1,v↓2)"
#8: "v nome del vettore"
#9: SY(p) :=  $\begin{bmatrix} -p_1 & p_2 \\ 1 & 2 \end{bmatrix}$ 
#10: "semplifica-approssima"
#11: [-3, 2]
#12: "seleziono nuovo vettore e disegno"
#13: x = 3
#14: y = 2
#16: x = -3
```

Grafici-2D



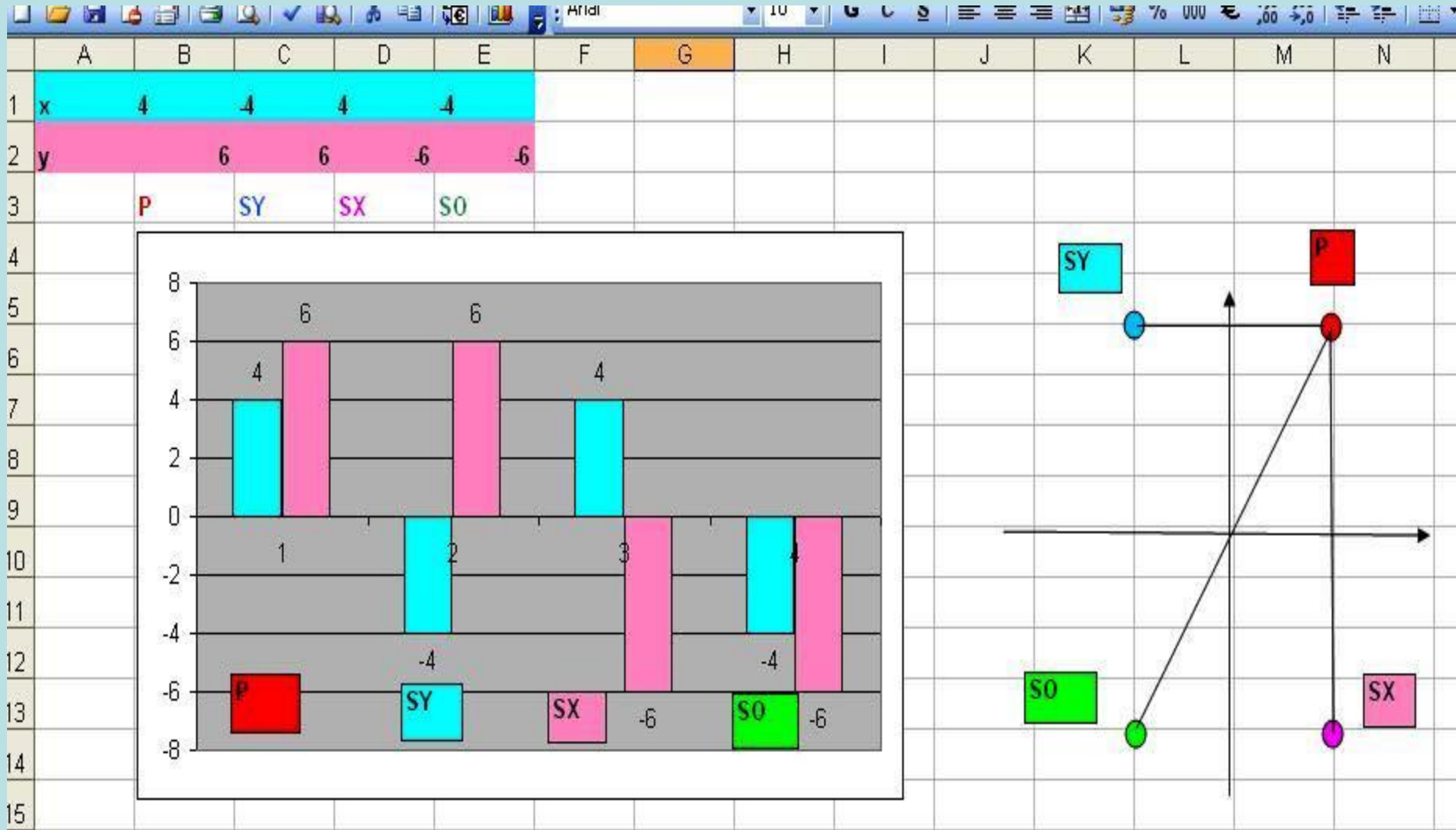
Algebr...

Croce: -2.9434, 1.9167

Centro: 0, 0

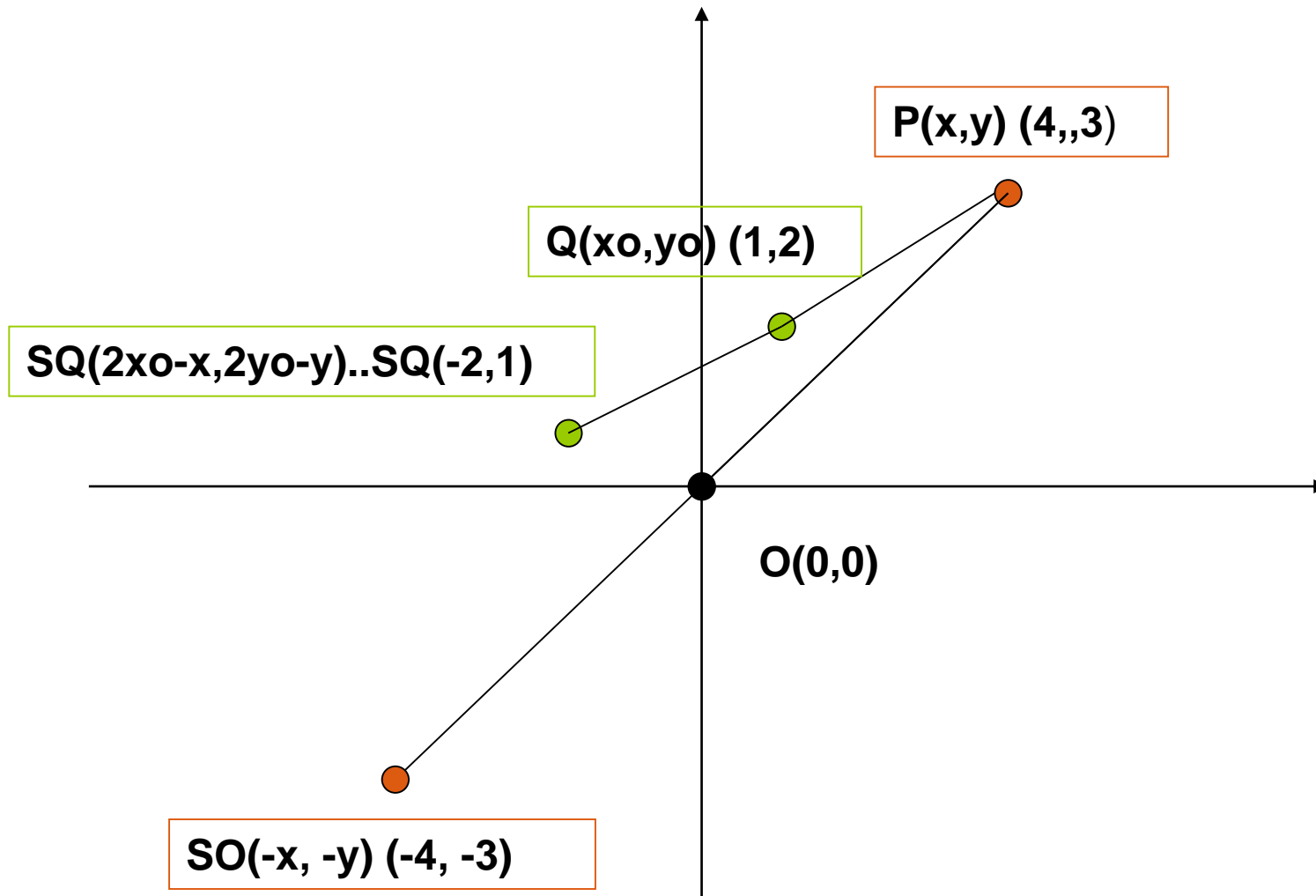
Scala: 1:1

excel

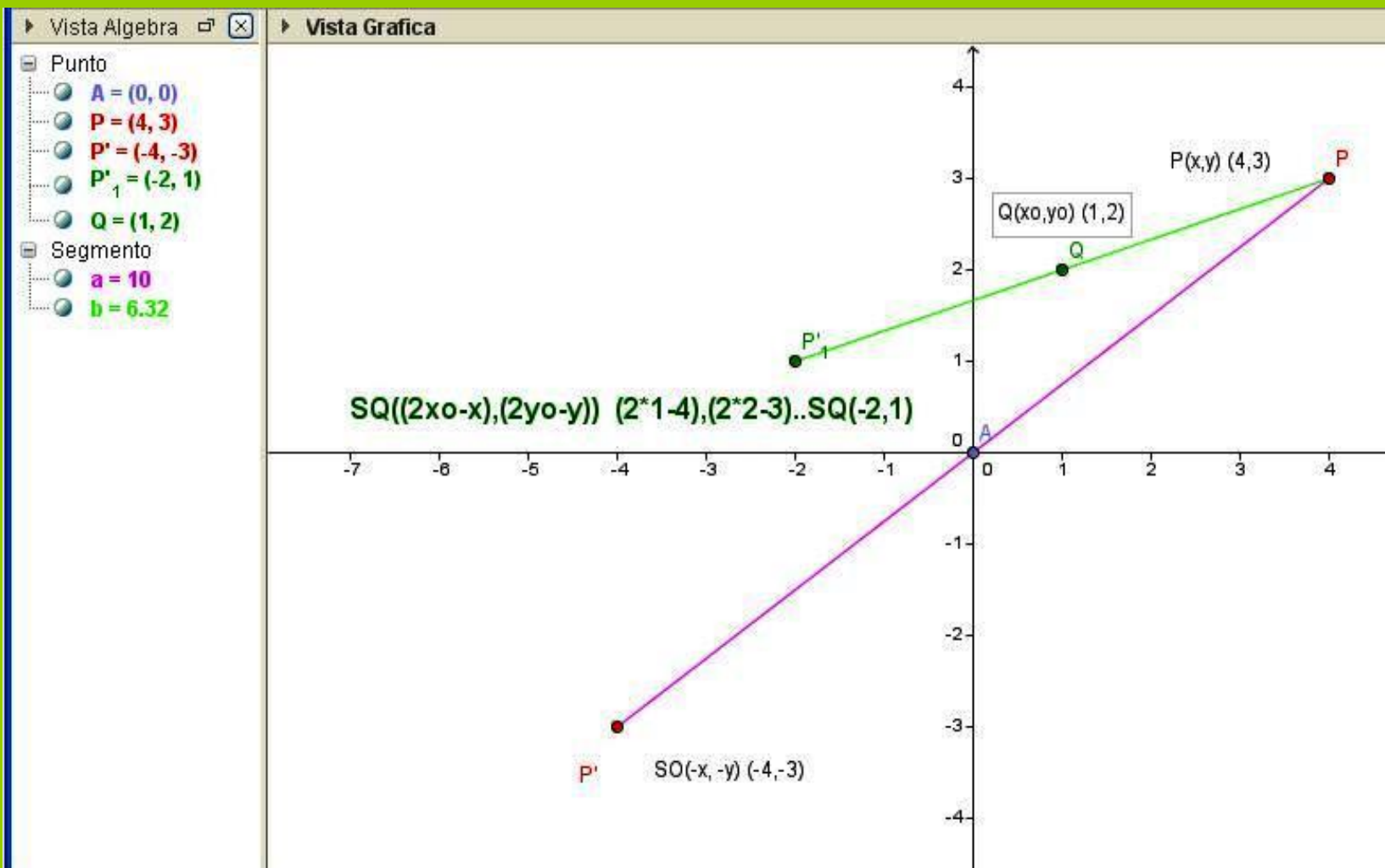


Secondo retta parallela
ad asse Y , asse X ,
centro Q (diverso da O)

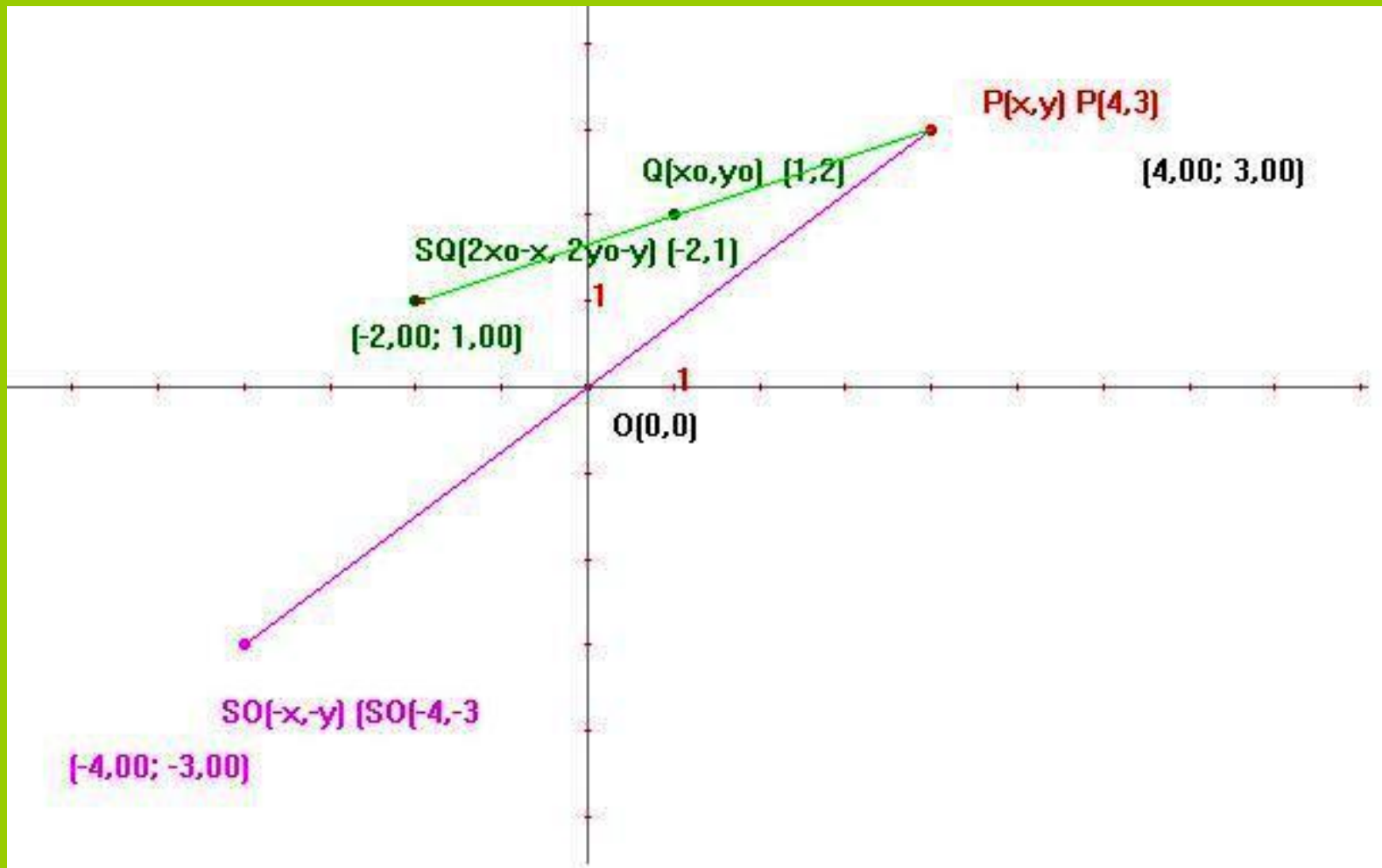
Simmetria centrale Q
diverso da O



geogebra

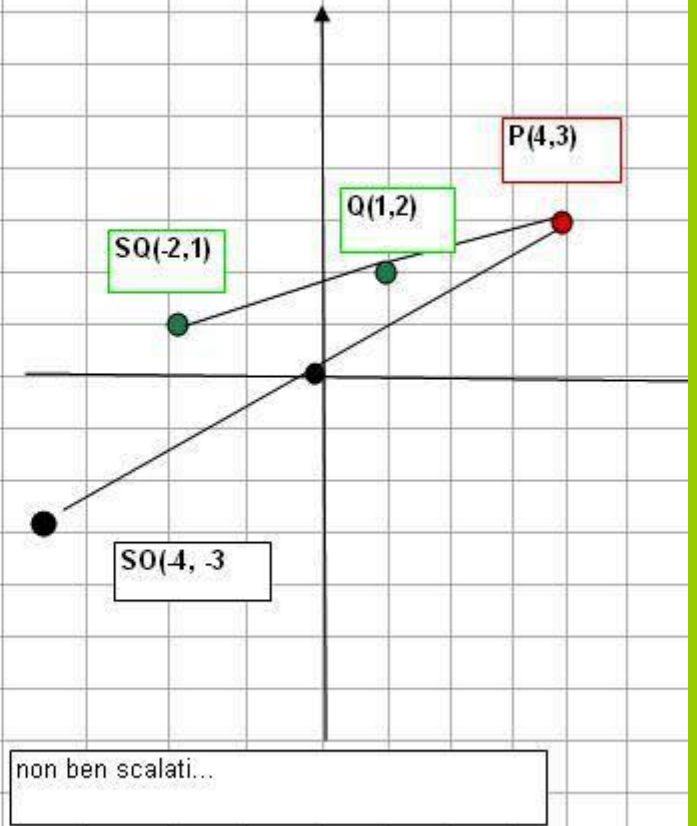
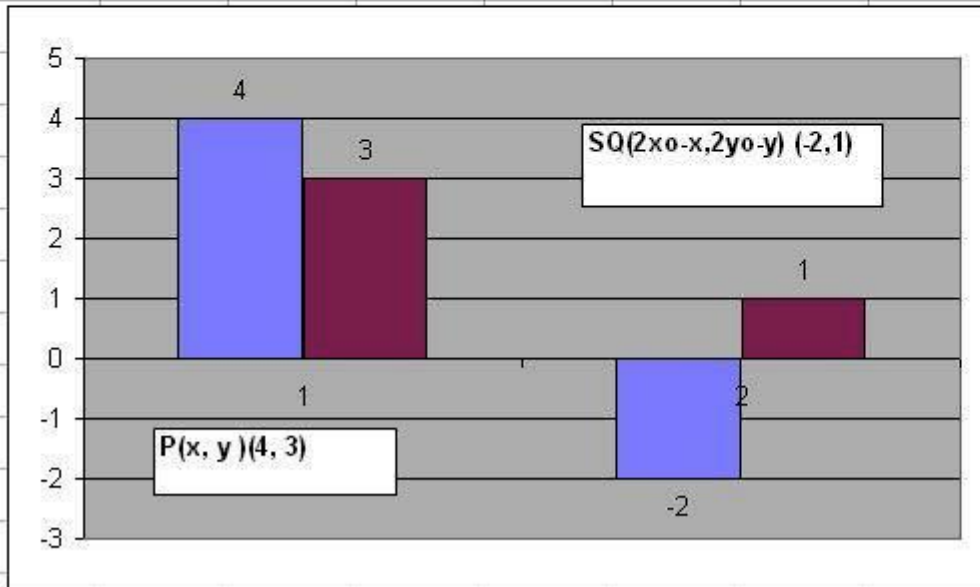


cabri

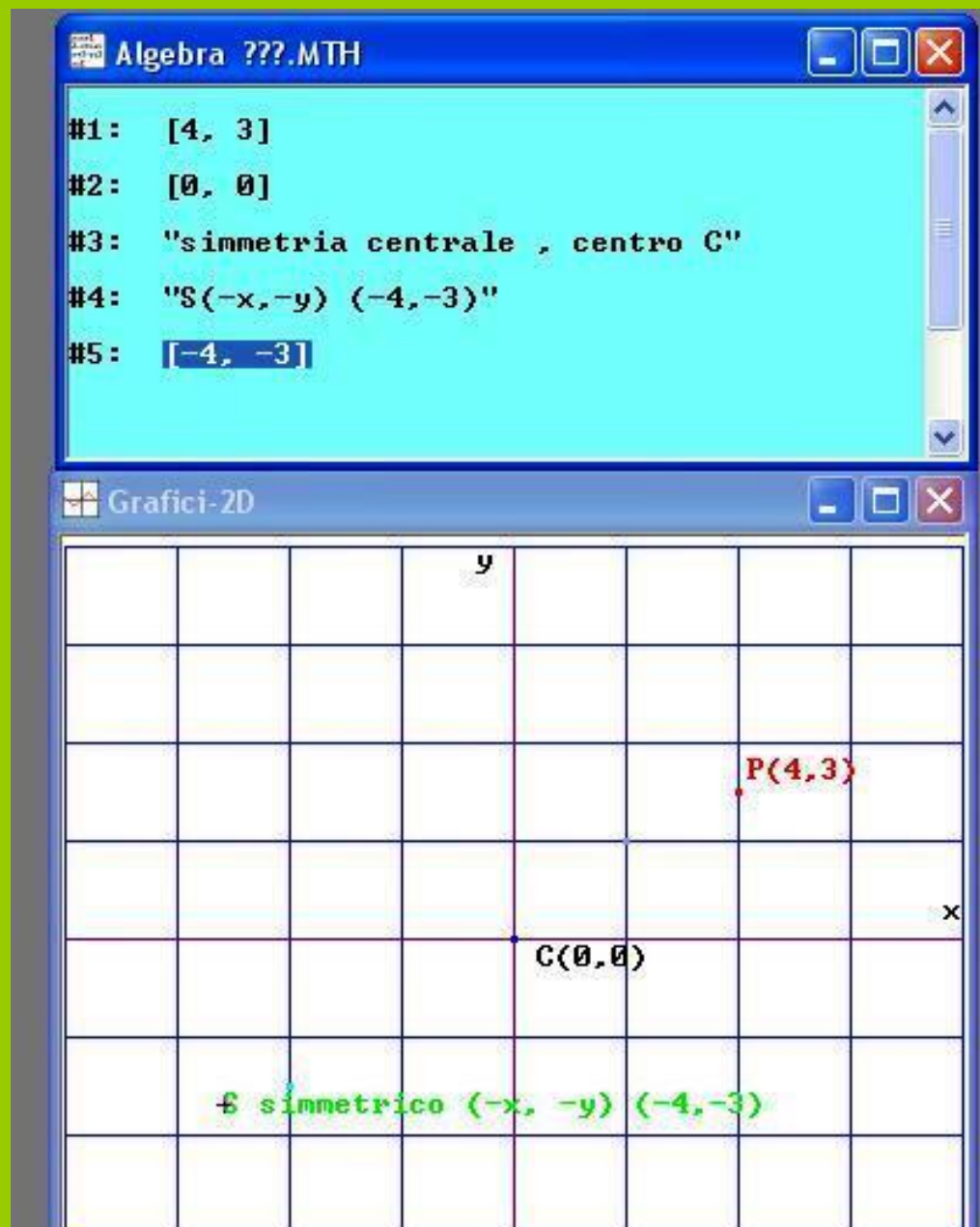


excel

1	xP	4	-2
2	yP	3	1
3			
4	Q		
5	xo	1	
6	yo	2	
7			



derive



derive

The image shows a software interface with two windows: "Algebra ??? .MTH" and "Grafici-2D".

Algebra ??? .MTH window:

```
#1: [4, 3]
#2: [0, 0]
#3: "simmetria centrale , centro C"
#4: "S(-x,-y) (-4,-3)"
#5: [-4, -3]
#6: "...con funzione SC centro C"
#7: "vettore p(x,y)"
#8: p := [4, 3]
#9: SC(p) :=  $\begin{bmatrix} -p_1 & -p_2 \\ 1 & 2 \end{bmatrix}$ 
#10: [-4, -3]
#11: "seleziona, disegna S(-4,-3)"
```

Grafici-2D window:

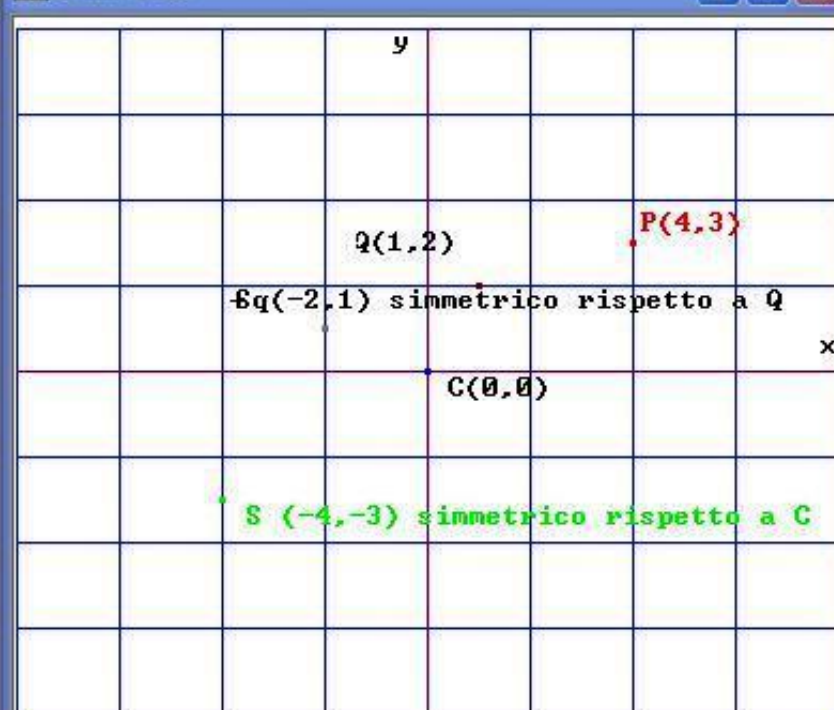
A 2D coordinate system with x and y axes. The origin is labeled $C(0,0)$. A point $P(4,3)$ is plotted in red. A text label in green indicates: $P(4,3)$ simmetrico rispetto a C.

derive

Algebra ??? .MTH

```
#3: simmetria centrale , centro C
#4: "S(-x,-y) (-4,-3)"
#5: [-4, -3]
#6: "...con funzione SC centro C"
#7: "vettore p(x,y)"
#8: p := [4, 3]
#9: SC(p) :=  $\begin{bmatrix} -p_1 & -p_2 \end{bmatrix}$ 
#10: [-4, -3]
#11: "seleziona, disegna S(-4,-3)"
#12: ".... centro Q (1,2) ..."
#13: [1, 2]
#14: q := [1, 2]
#15: "funzione SQ(p,q):=[2q↓1-p↓1,2q↓2-p↓2]"
#16: SQ(p, q) :=  $\begin{bmatrix} 2 \cdot q_1 - p_1 & 2 \cdot q_2 - p_2 \end{bmatrix}$ 
#17: [-2, 1]
#18: "semplifica, approssima, disegna"
```

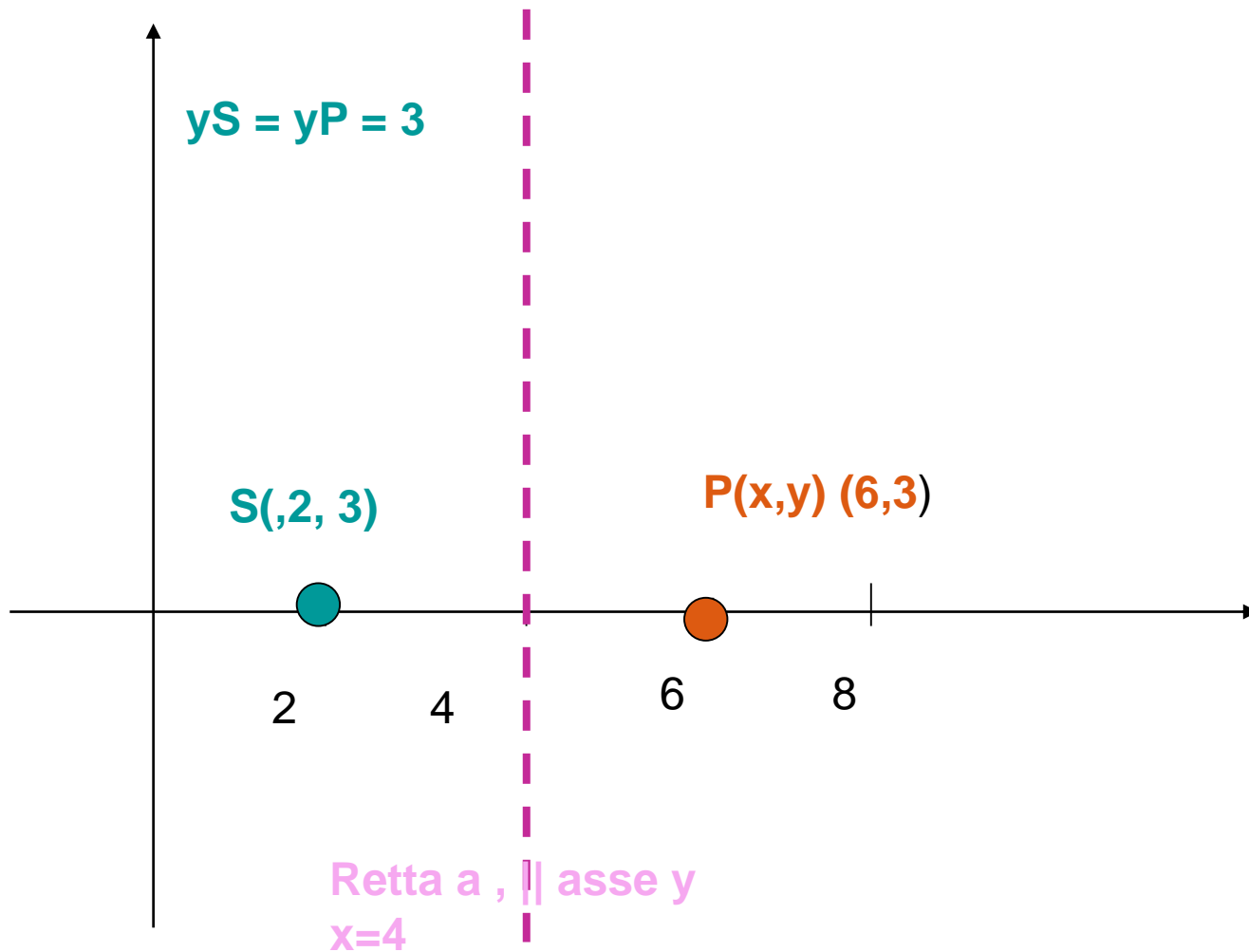
Grafici-2D



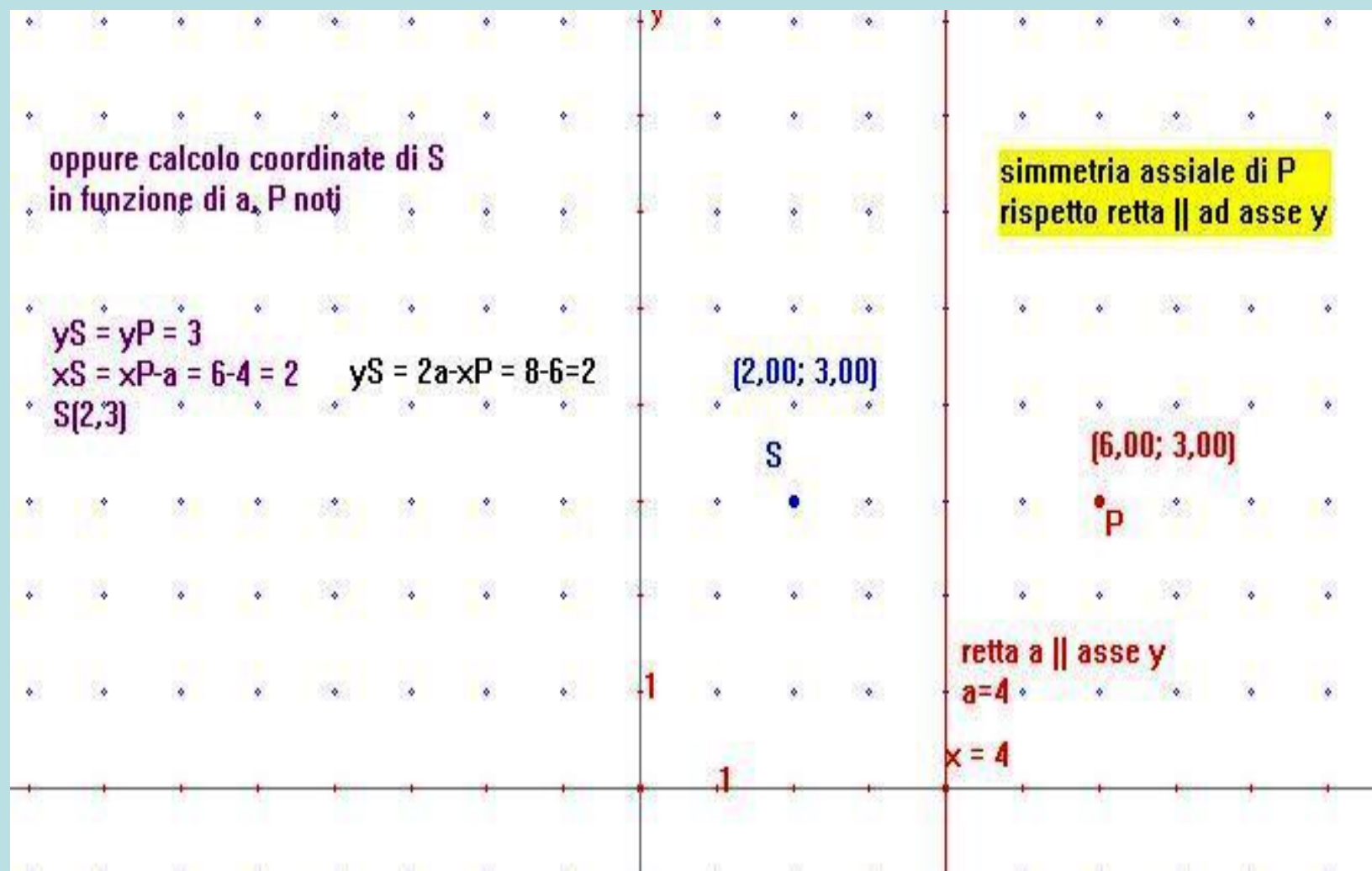
Simmetria di punto
rispetto a retta parallela
ad asse y

$$x_S = x_P - a = 6 - 4 = 2$$

$$x_S = 2^\circ - x_P = 8 - 6 = 2$$

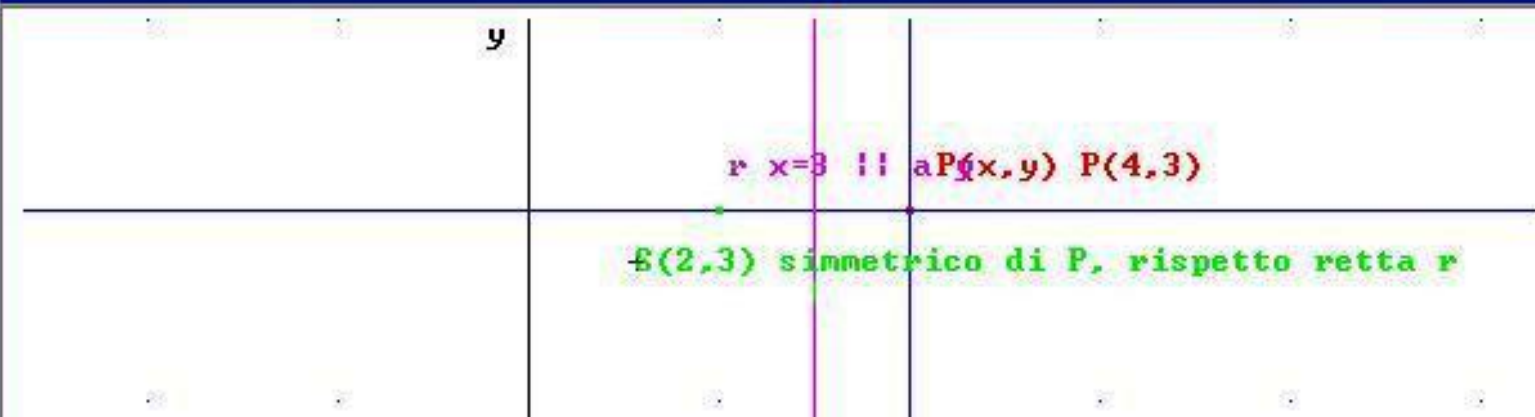


cabri



Algebra ??? .MTH

```
#1: "simmetria assiale P , rispetto retta r || asse y "  
#2: [4, 3]  
#3: x = 4  
#4: y = 3  
#5: x = 3  
#6: "S(2r-xP, xP) ((6-4),3) S(2,3)"  
#7: [2, 3]
```



Algebra ??? .MTH

#1: "simmetria assiale P , rispetto retta r || asse y "

#2: [4, 3]

#3: x = 3

#4: "vettore p; numero r" . ""

#5: p := [4, 3]

#6: r := 3

#7: "SPY(p,r) fornisce coordinate punto simmetrico S"

#8: "funzione SPY(p,r):=[2r-p+1,p+2]"

#9: $SPY(p, r) := \begin{bmatrix} 2 \cdot r - p_1 & p_2 \end{bmatrix}$

#10: "semplifica-approssima"

#11: [2, 3]

#12: "seleziona #10"

#13: "traccia S verde S(2,3) "

y

P(x,y) P(4,3) originale

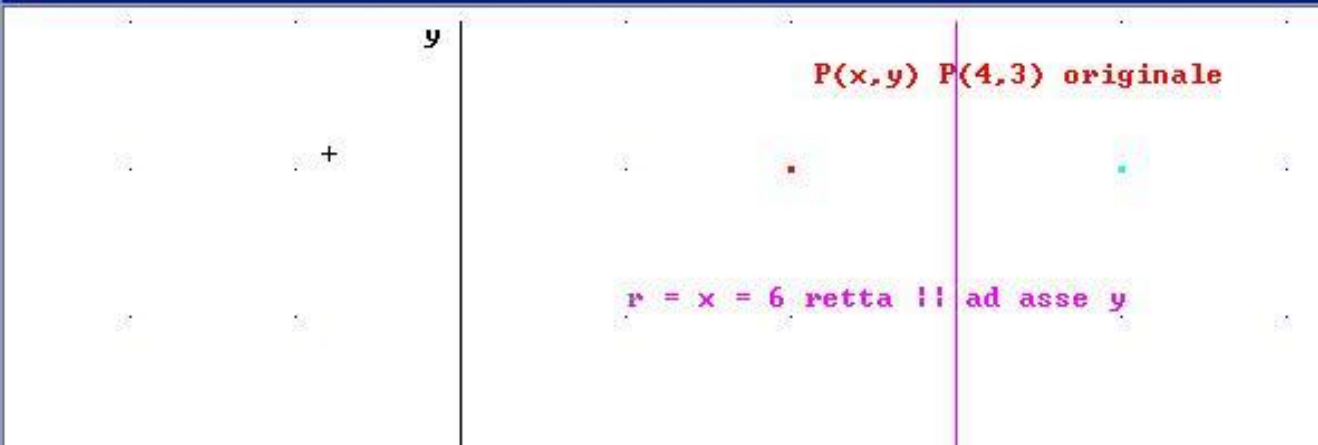
r x=3 || a y

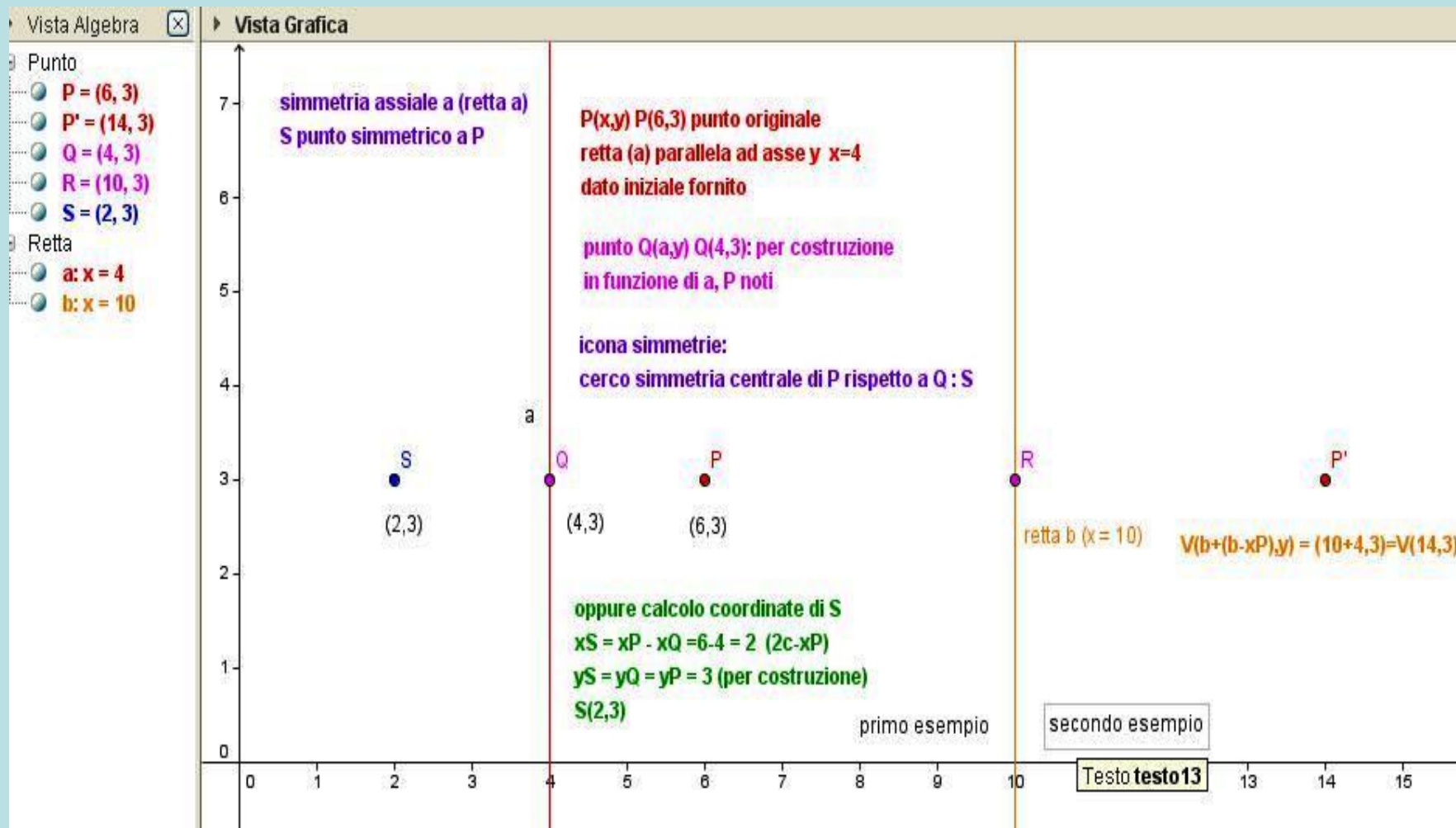
S(2,3) simmetrico di P rispetto r || asse y

```

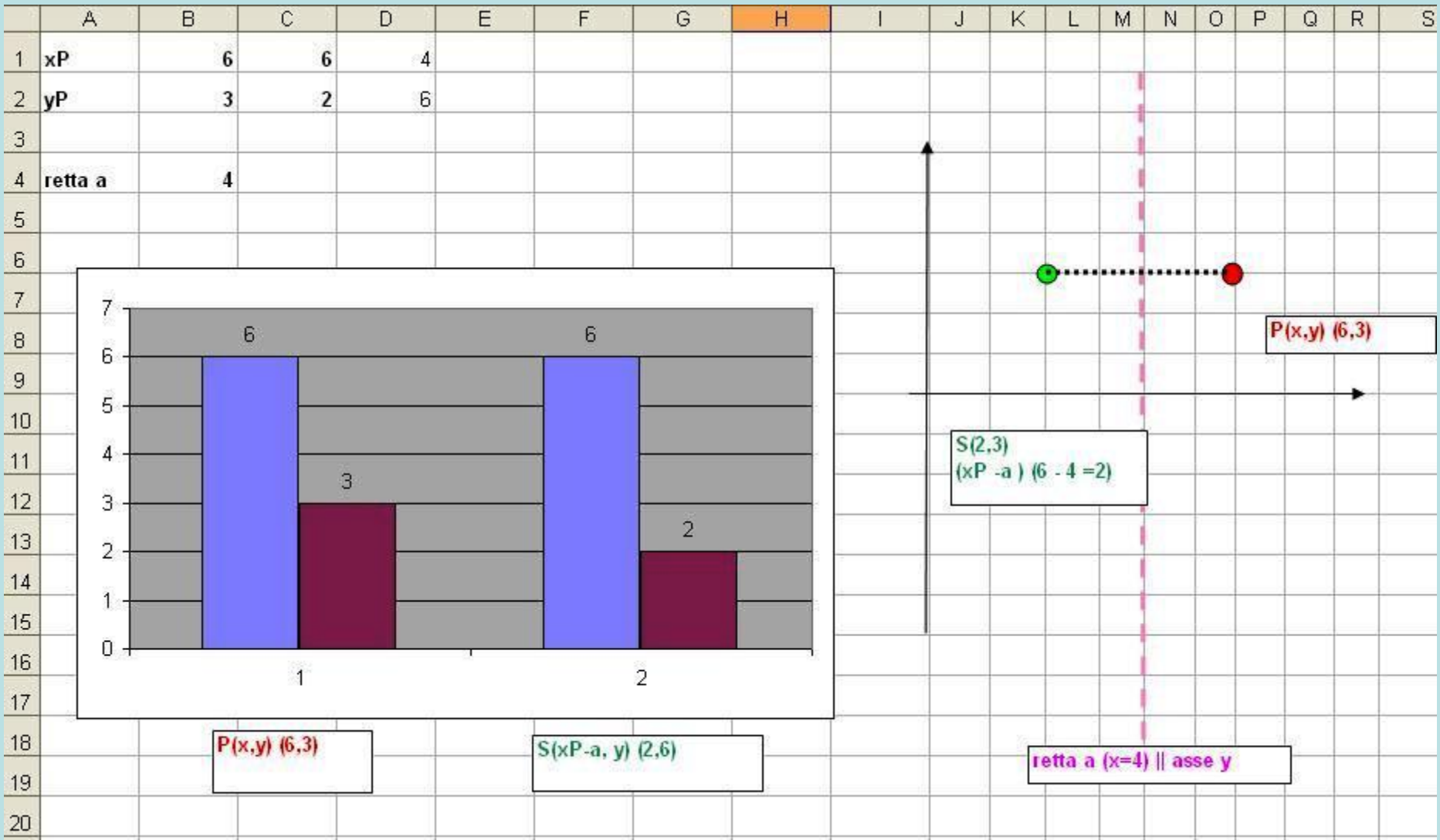
#1: "simmetria assiale P , rispetto retta r !! asse y "
#2: [4, 3]
#3: x = 6
#4: r := 6
#5: "vettore p; numero r".""
#6: p := [4, 3]
#7: "SPY(p,r) fornisce coordinate punto simmetrico S"
#8: "funzione SPY(p,r):=[2r-p+1,p+2]"
#9: SPY(p, r) := [2·r - p1, p2]
#10: "2*6-4 =8 ; S(8,3)"
#11: "semplifica-approssima"
#12: [8, 3]

```

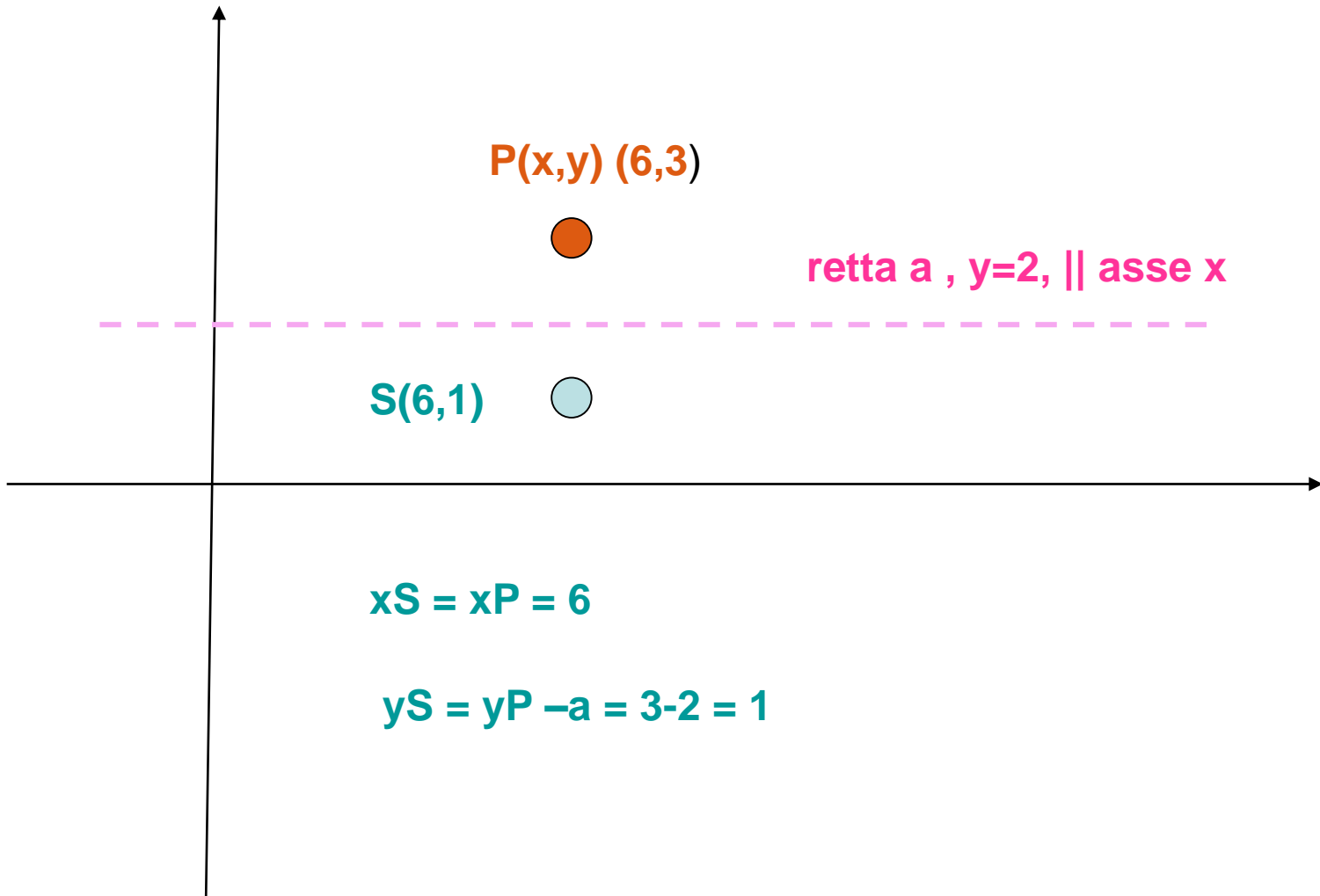




excel



Simmetria di punto
rispetto a retta parallela
ad asse x



oppure calcolo coordinate di S
in funzione di a, P noti

$$x_S = x_P = 6$$

$$y_S = y_P - a = 3 - 2 = 1$$

$$S(6,1)$$

simmetria assiale di P
rispetto retta \parallel ad asse x

(6,00; 3,00)

P

retta a \parallel ad asse x ; $y=2$

$$y = 2$$

S

(6,00; 1,00)

1

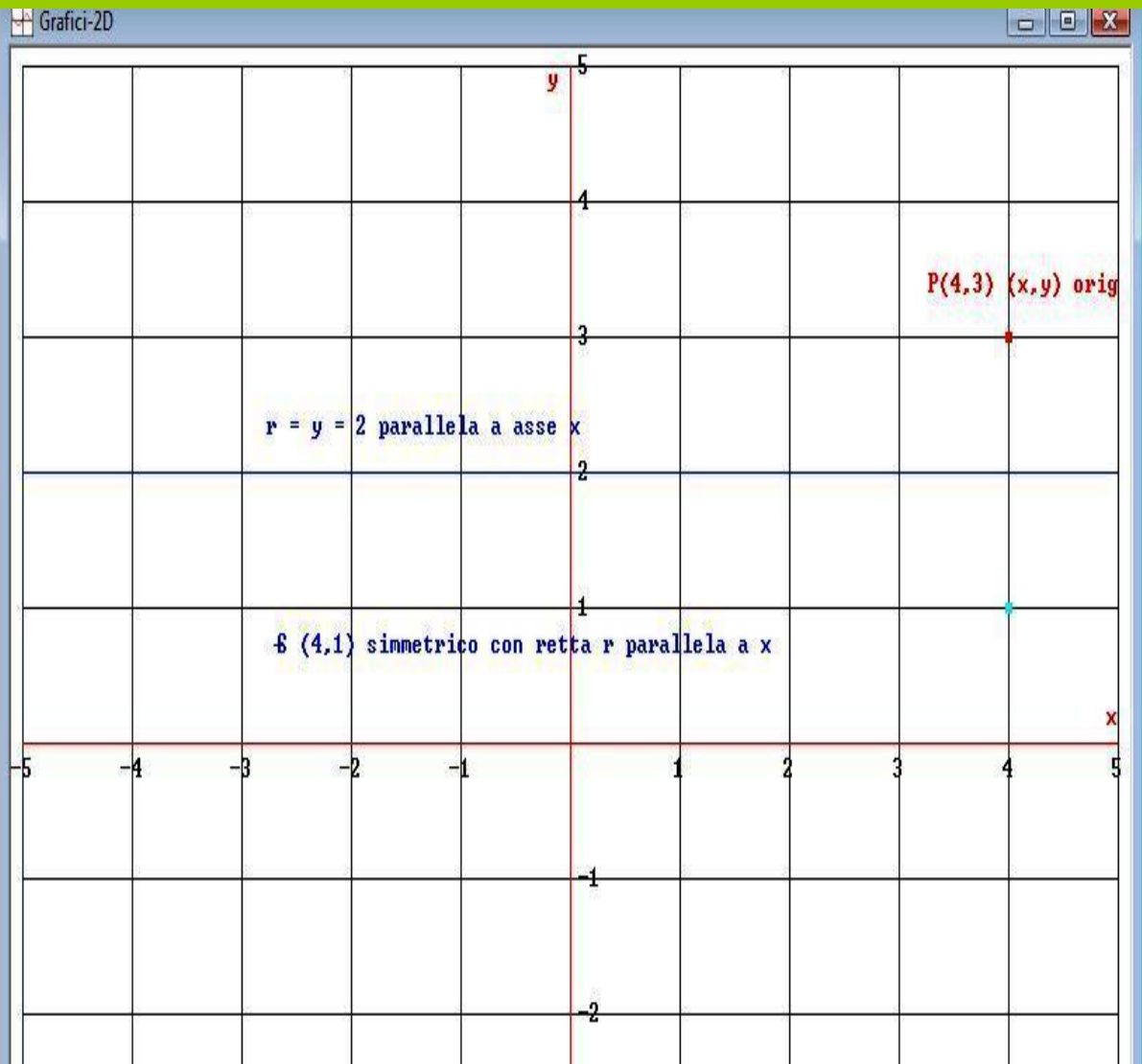
1

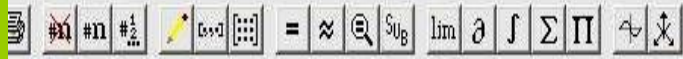
#1: [4, 3]

#2: $y = 2$

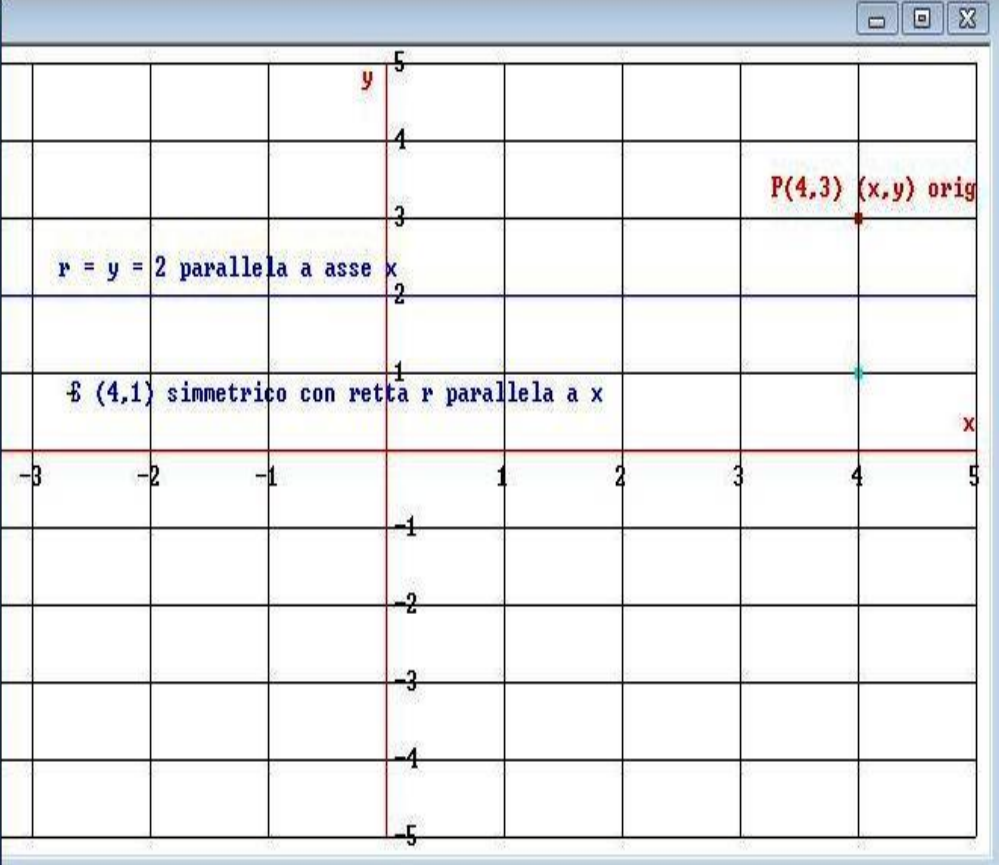
#3: " $S = (x, y-r)..(4, 3-2)...S(4,1)$ "

#4: [4, 1]

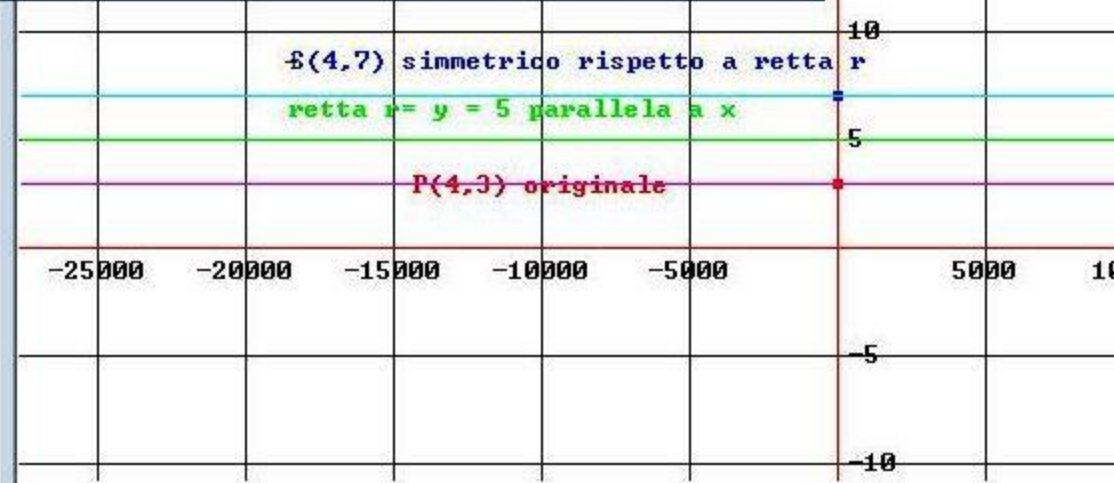




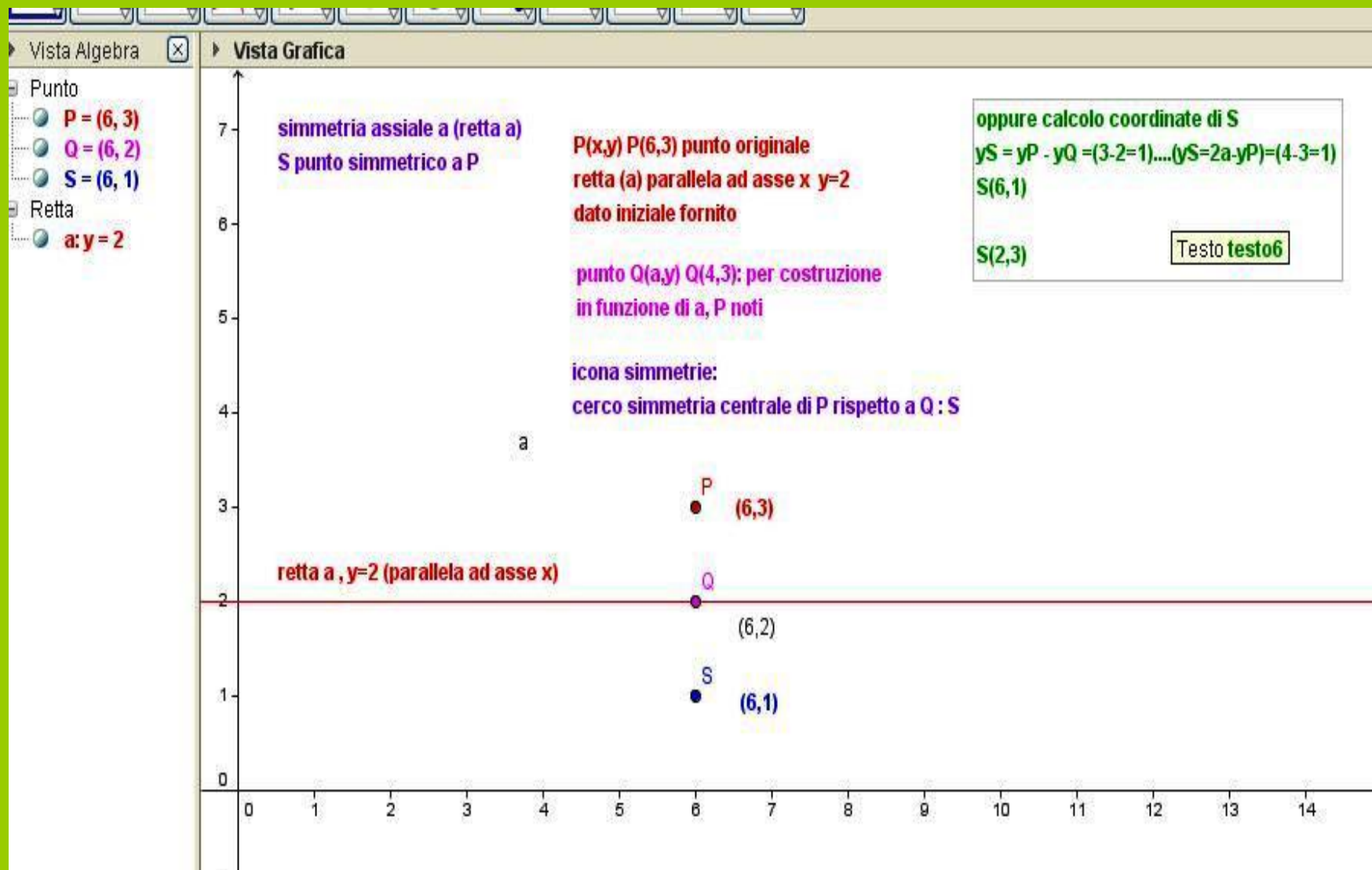
```
Algebra ???MTH
#1: [4, 3]
#2: y = 2
#3: p := [4, 3]
#4: r = 2
#5: "vettore p, numero r: funzione SPX(p,r)"
#6: SPX(p, r) := [p_1, p_2 - r]
#7: [4, 3 - r]
```



```
Algebra ???MTH
#1: [4, 3]
#3: p := [4, 3]
#5: "vettore p, numero r: funzione SPX(p,r)"
#8: y = 5
#12: r := 5
#10: SPX(p, r) := [p_1, 2·r - p_2]
#13: [4, 7]
#14: y = 3
#15: y = 7
```

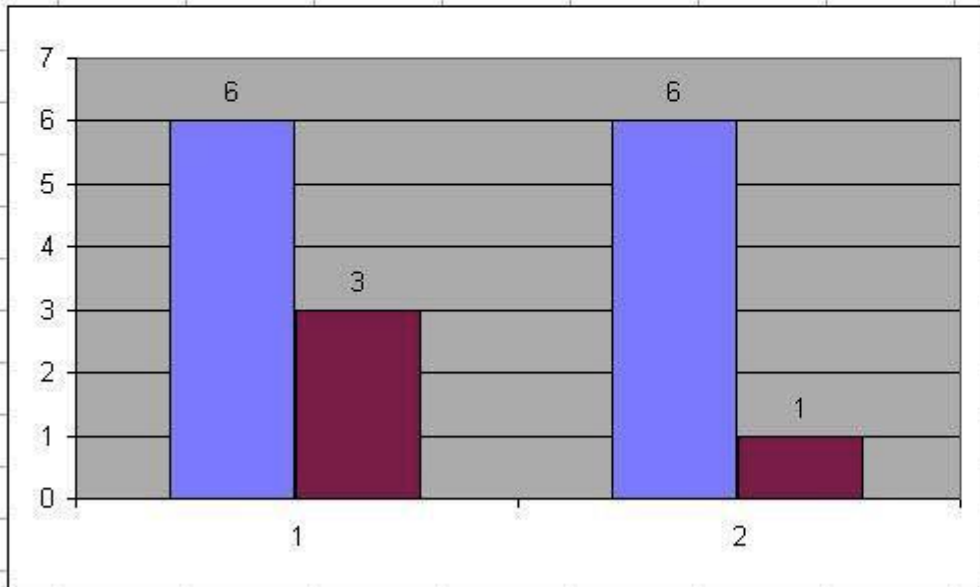


geogebra



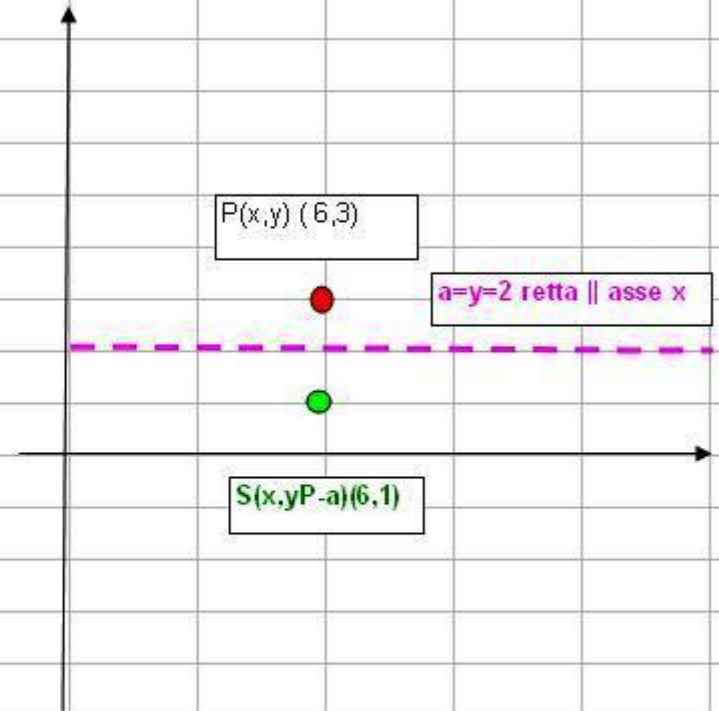
excel

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1	xP	6	6											
2	yP	3	1											
3														
4	retta a	2												
5														
6														



$P(x,y) (6,3)$

$S(x, yP-a) (6,1)$



Fine presentazione
arrivederci

