VISUALISING COMPLEX LOCI USING GEOGEBRA (PART A)

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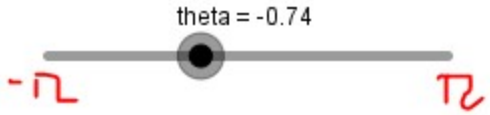
Brief guidelines

$|z_1|=3$

→ input line: z_1=3(cos(theta)+j sin(theta))

→



(Increment 0.1)

→Get the trace on for the point z_1
→Move the slider
→Verify your answer using: **locus(z_1, theta)**

arg(z1)=π/3

→ z_1=r(cos(π/3)+j sin(π/3))

→

(Increment 0.01)

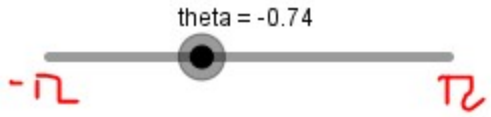
→get the trace on for the point z_1
→Move the slider
→Verify your answer using: **locus(z_1, r)**

$3 \le |z1| \le 5$

→z_1=r(cos(theta)+j sin(theta))

→

→



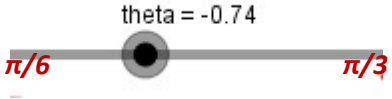
→ **Input line: Loc1= locus(z_1, theta)**
→**Get the trace on for the Loc1**
→**Move the slider for r**

π/6≤arg≤π/3

→z_1=r(cos(theta)+j sin(theta))

→

→



→ Input line: Lo21= locus(z_1, r)

→Get the trace on for the Loc2

→Move the slider for theta

Your challenge

Draw on Argand diagram the set of points z_1 for which

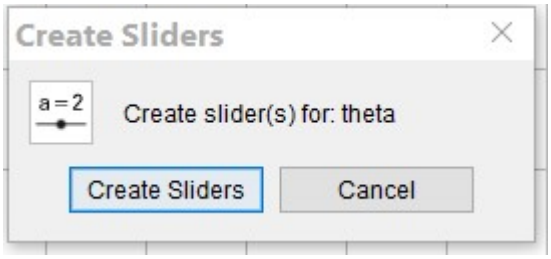
$\pi/6 \leq \arg(z_1) \leq 5$ AND $3 \leq |z_1| \leq 5$

Analytic guidelines

Loci 1: Draw on Argand diagram the set of points z_1 for which $|z_1|=3$

1.

2.



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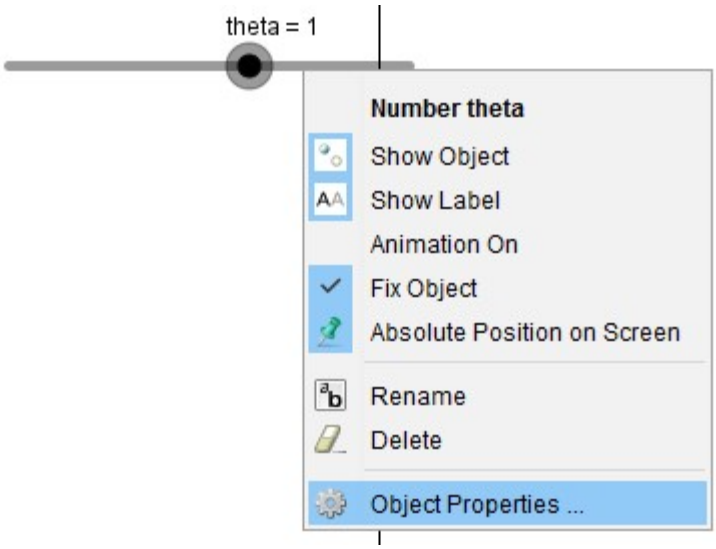

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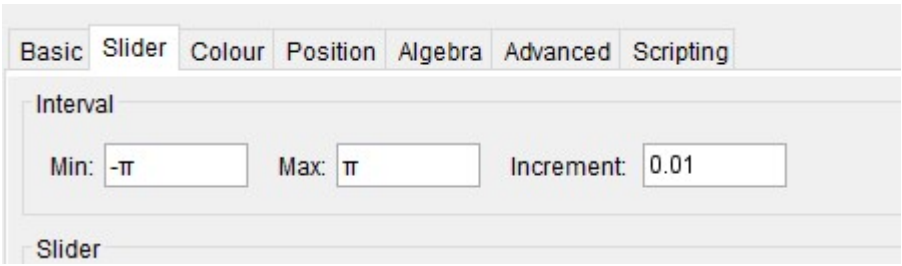

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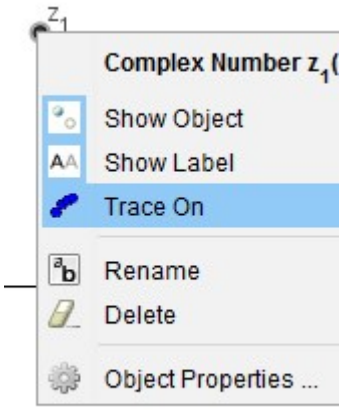
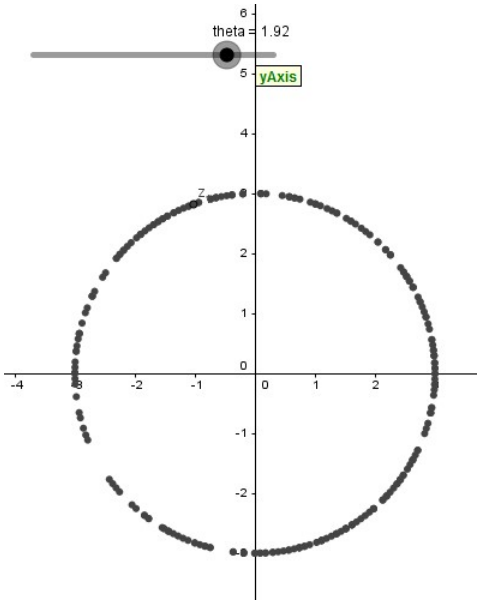


6. moving the slider we get

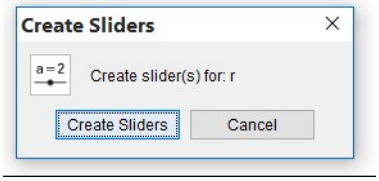


7. to verify our findings

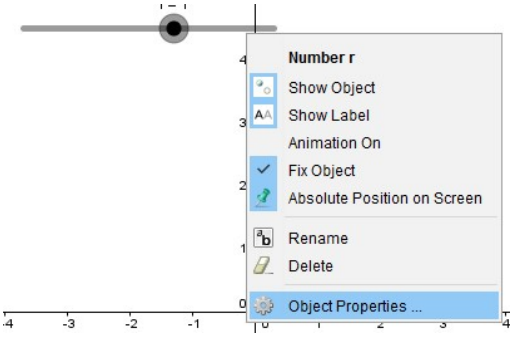
Locus[z_1, theta]

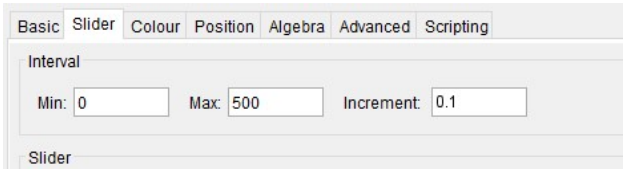
Loci 2: Draw on Argand diagram the set of points z_1 for which $\arg(z_1)=\pi/3$

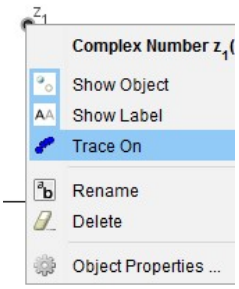
1. 

2. 

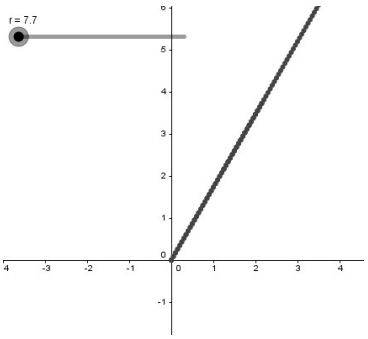
3. right click on slider r



4. 

5. 

6. move slider r
your result:



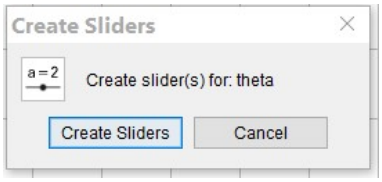
7. to verify your findings

Locus[z_1, r] So the loci is half a line with initial point the axis origin.

Loci 3: Draw on Argand diagram the set of points z_1 for which $3 \leq |z_1| \leq 5$

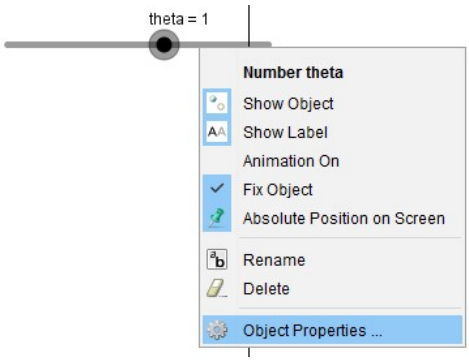
1. Input: z_1=r(cos(theta)+ ί sin(theta))

2.



3.

4.



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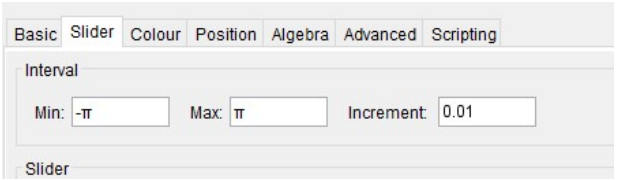
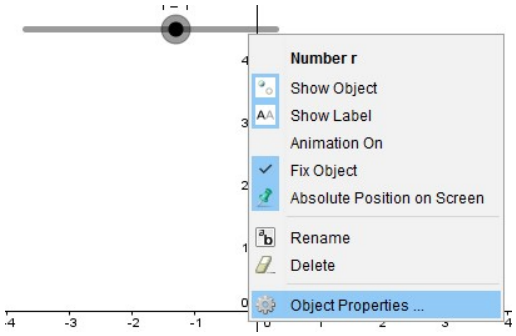


6. right click on slider r



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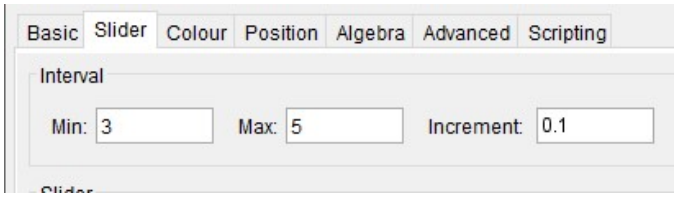
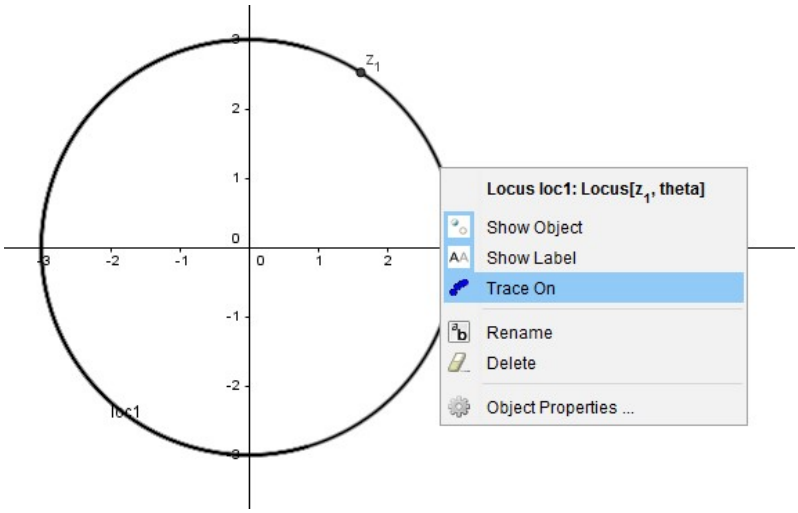


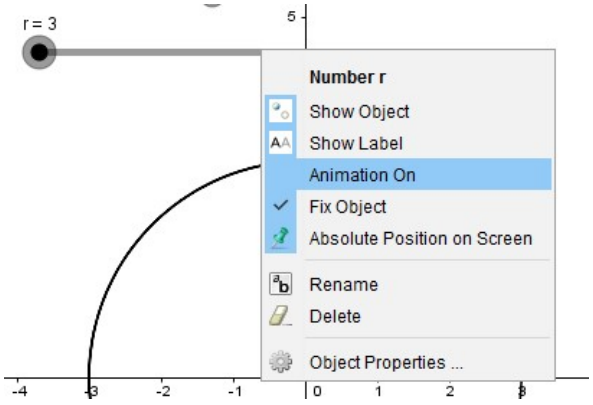
8.

Locus[z_1, theta]

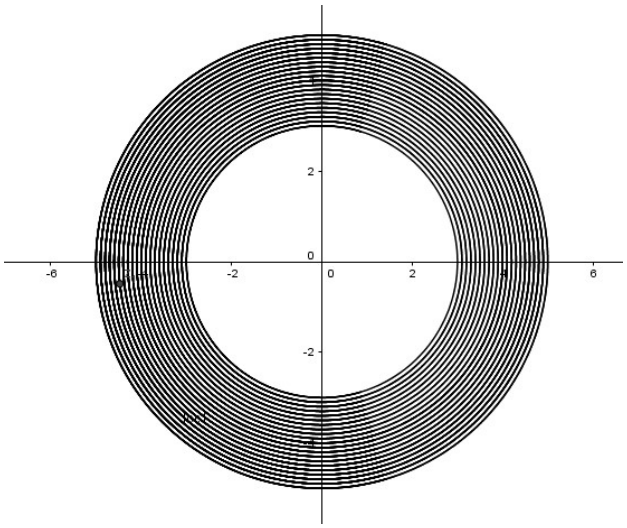
9.



10.



your result

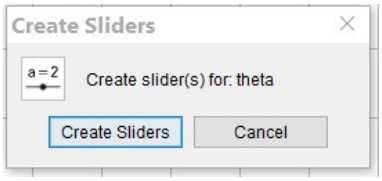


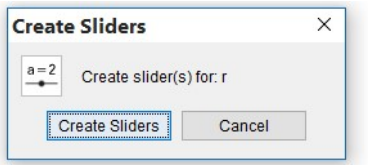
This is called **annulus** and it's the a plane figure consisting of the area between the pair of concentric circles: one with radius 3 and another with radius 5.

Loci 4: Draw on Argand diagram the set of points z_1 for which $\pi/6 \leq \arg(z_1) \leq \pi/3$

1. Input: z_1=r(cos(theta)+ i sin(theta))

2.





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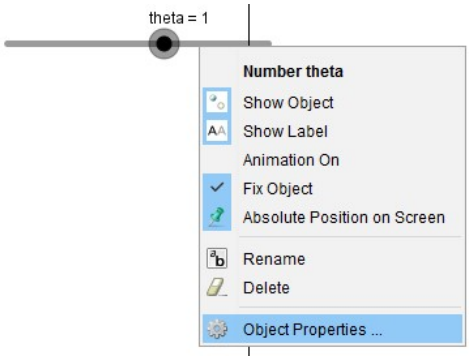
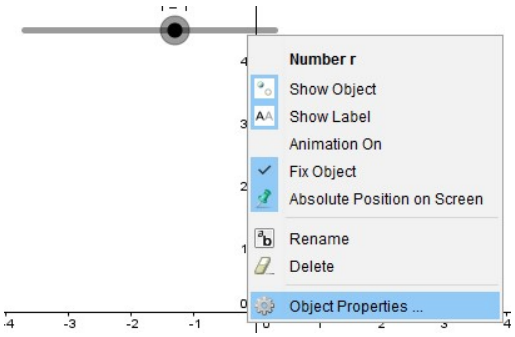


5.

6. right click on slider r



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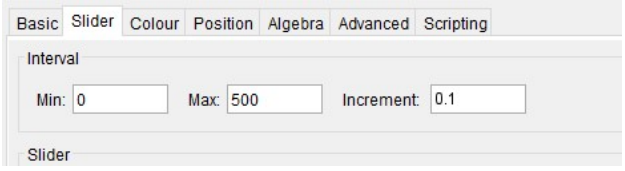
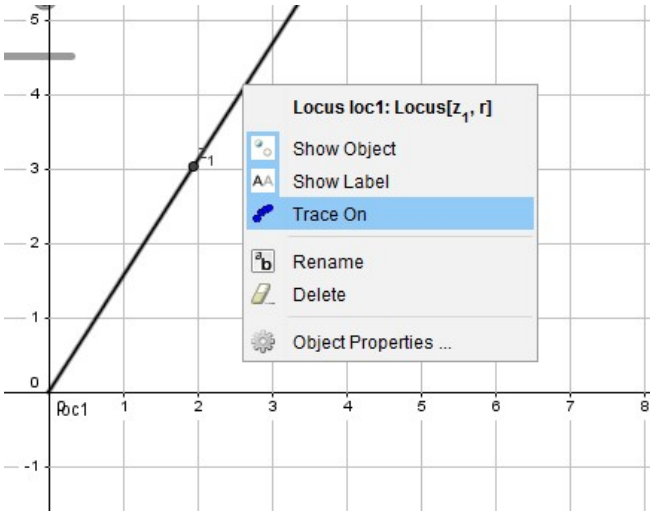


8.

Locus[z_1, r]

9.



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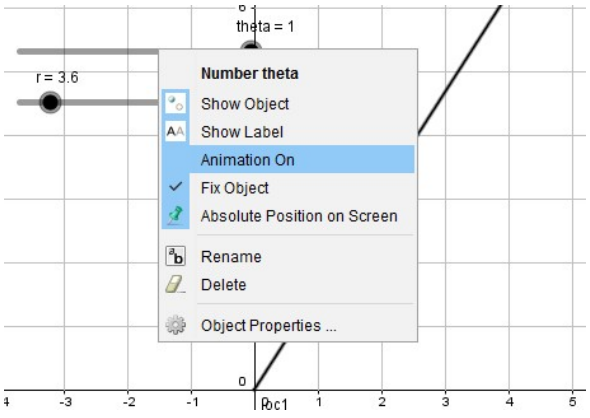

your result