

TRIGONOMETRY

d e l i g h t s



term

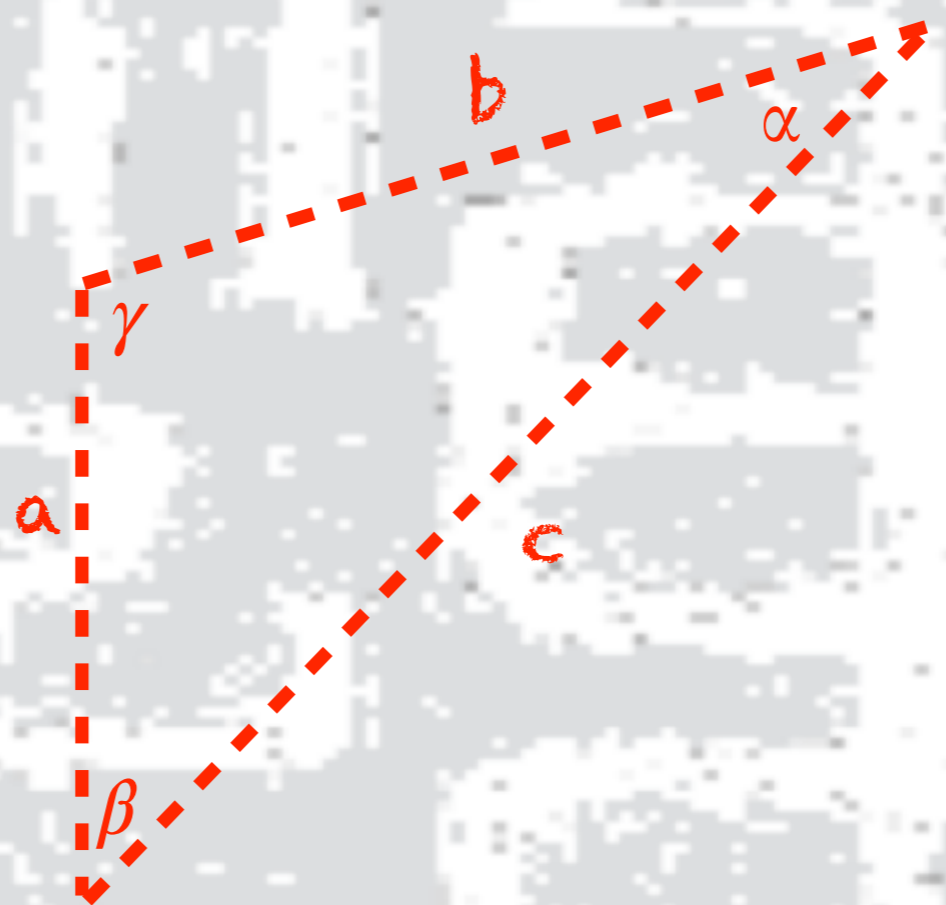
definition

TRIGONOMETRY

STUDY OF TRIANGLES

TRIANGLES

FIGURE WITH 3 SIDES AND 3 ANGLES



term

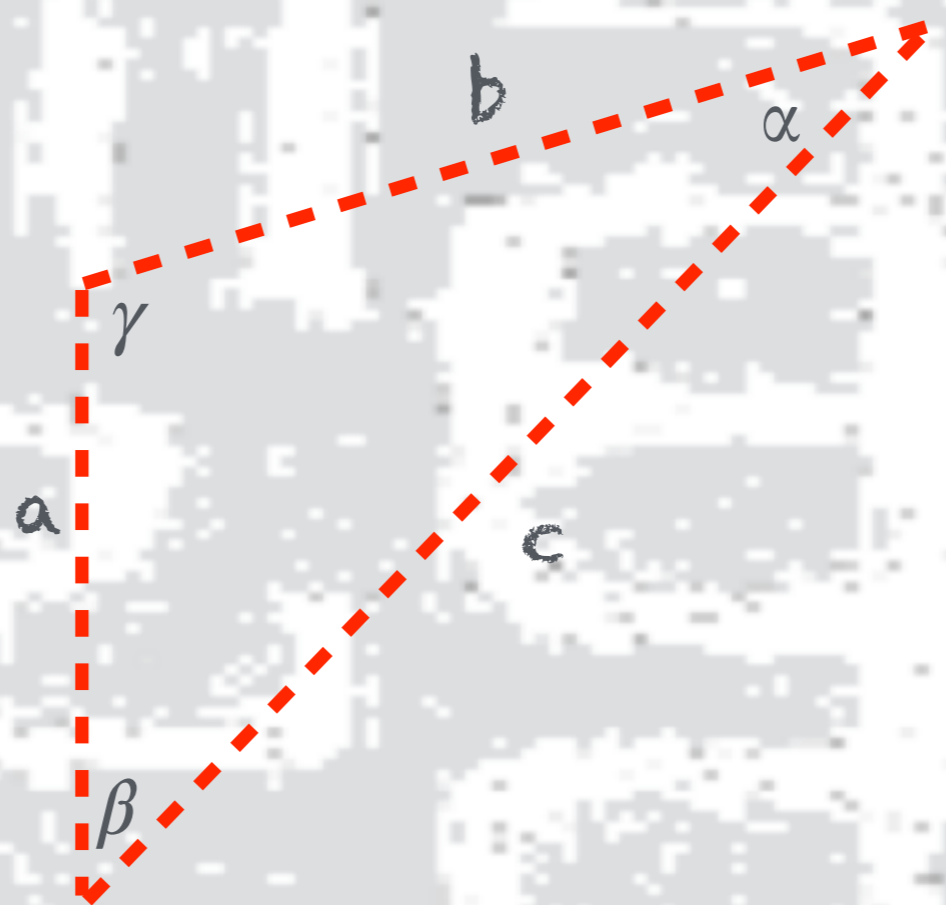
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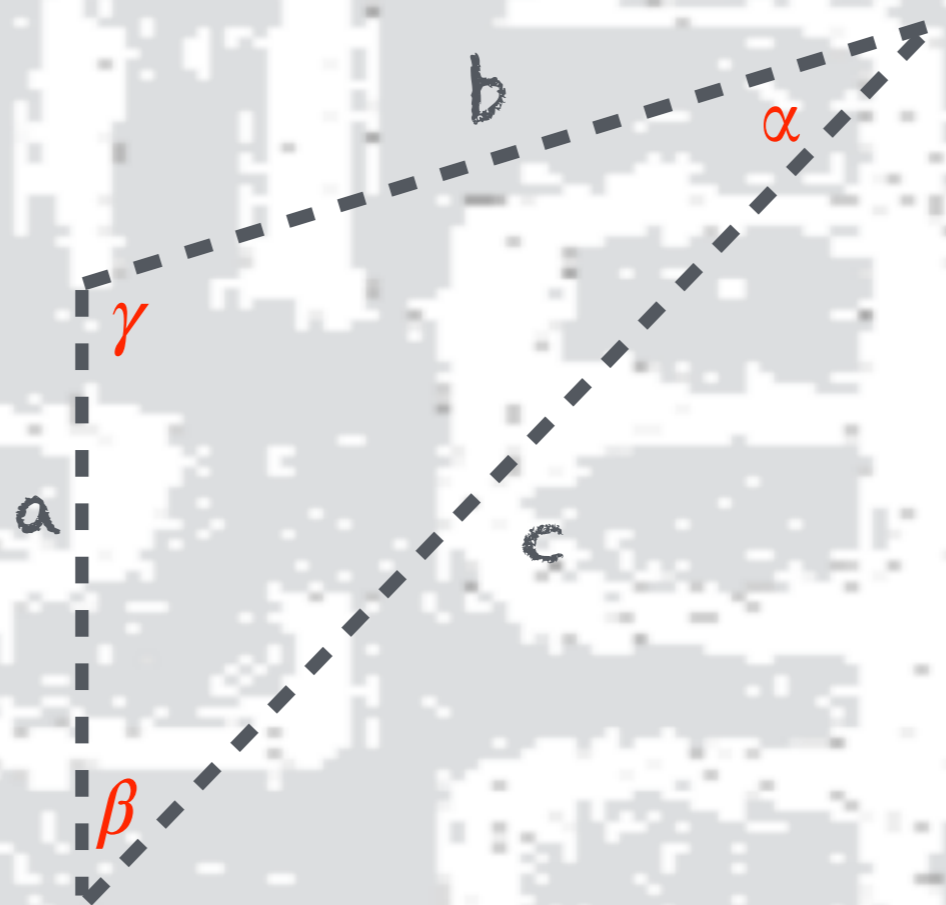
definition

TRIGONOMETRY

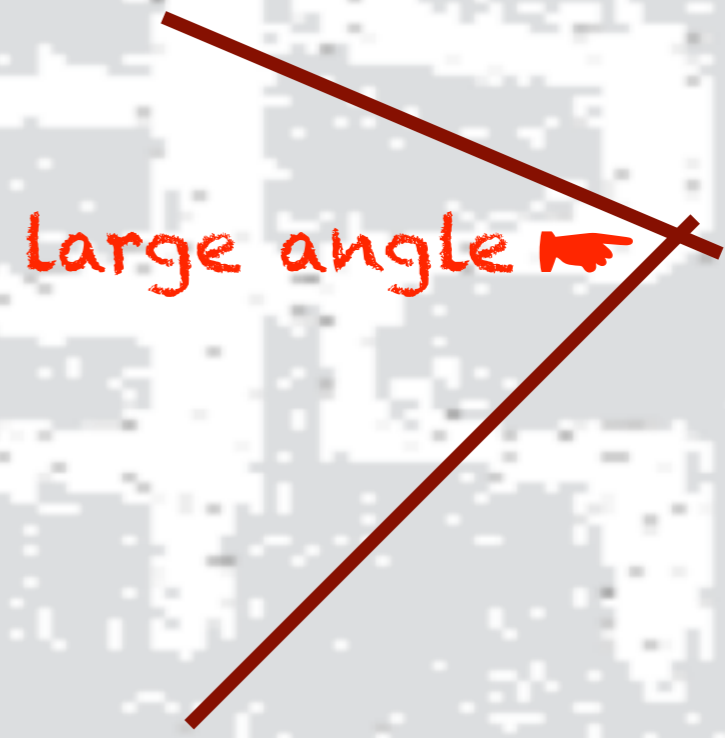
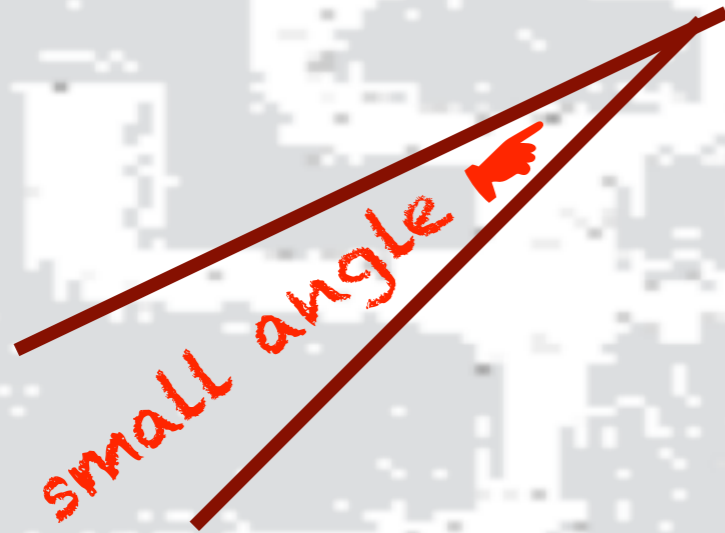
STUDY OF TRIANGLES

TRIANGLES

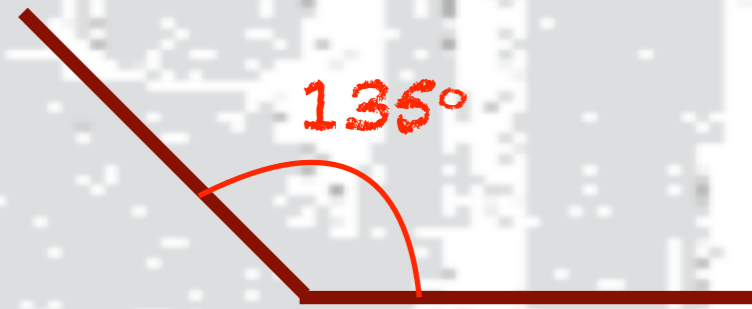
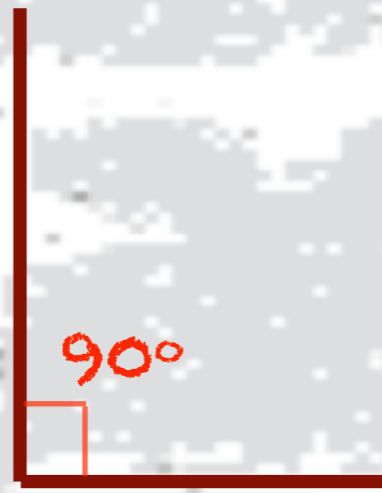
FIGURE WITH 3 SIDES AND 3 **ANGLES**



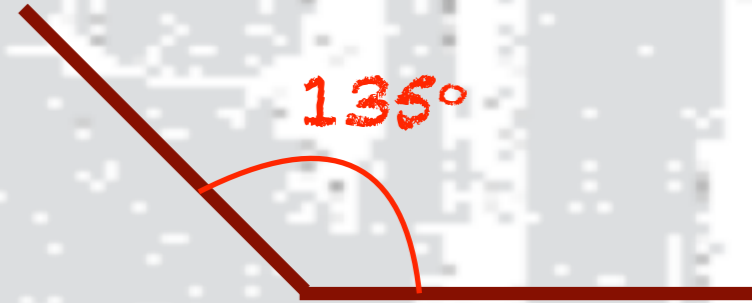
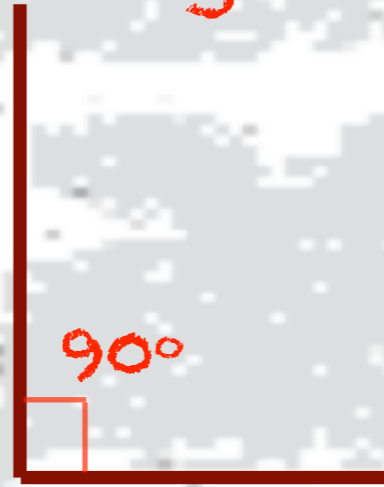
when 2 lines meet



angles from small to large



right angle



straight line

180°



270°



full circle

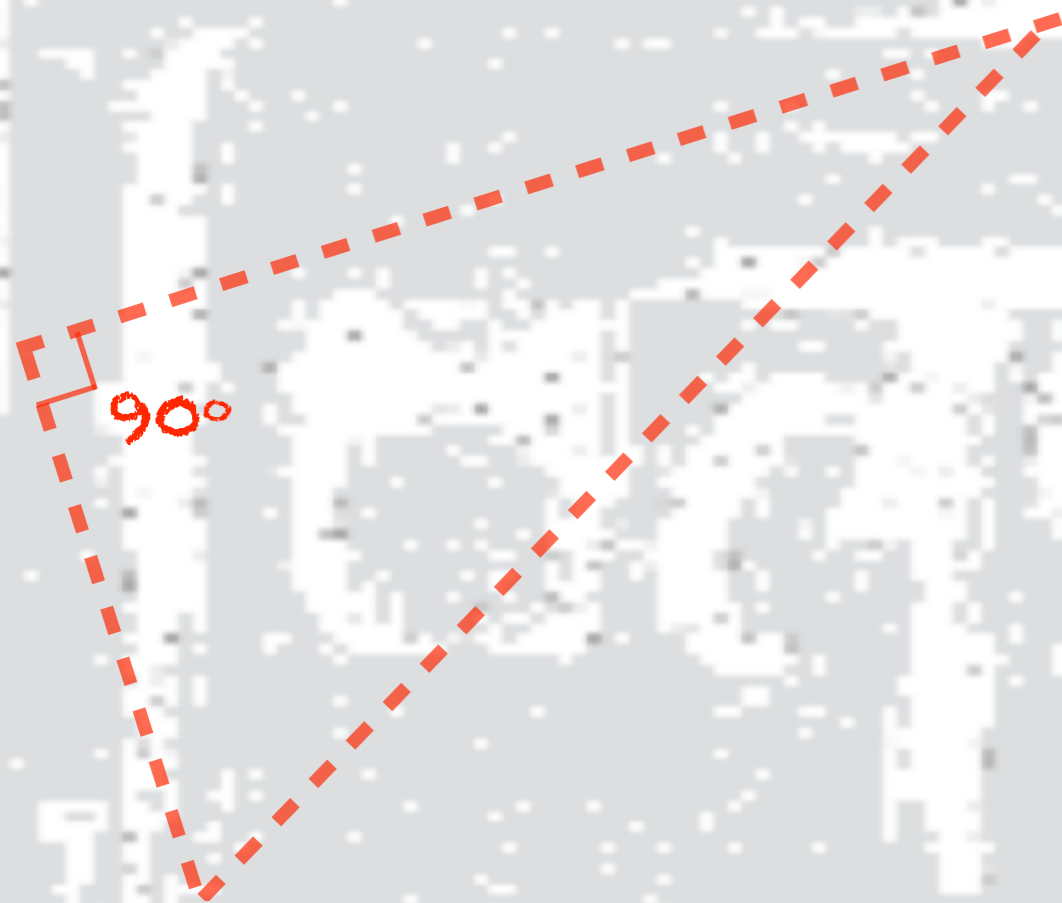
360°



if $\gamma = 90^\circ$



SO LONG AS THIS IS TRUE



THESE WILL BE TRUE

$$c^2 = a^2 + b^2$$

$$\sin \alpha = a/c$$

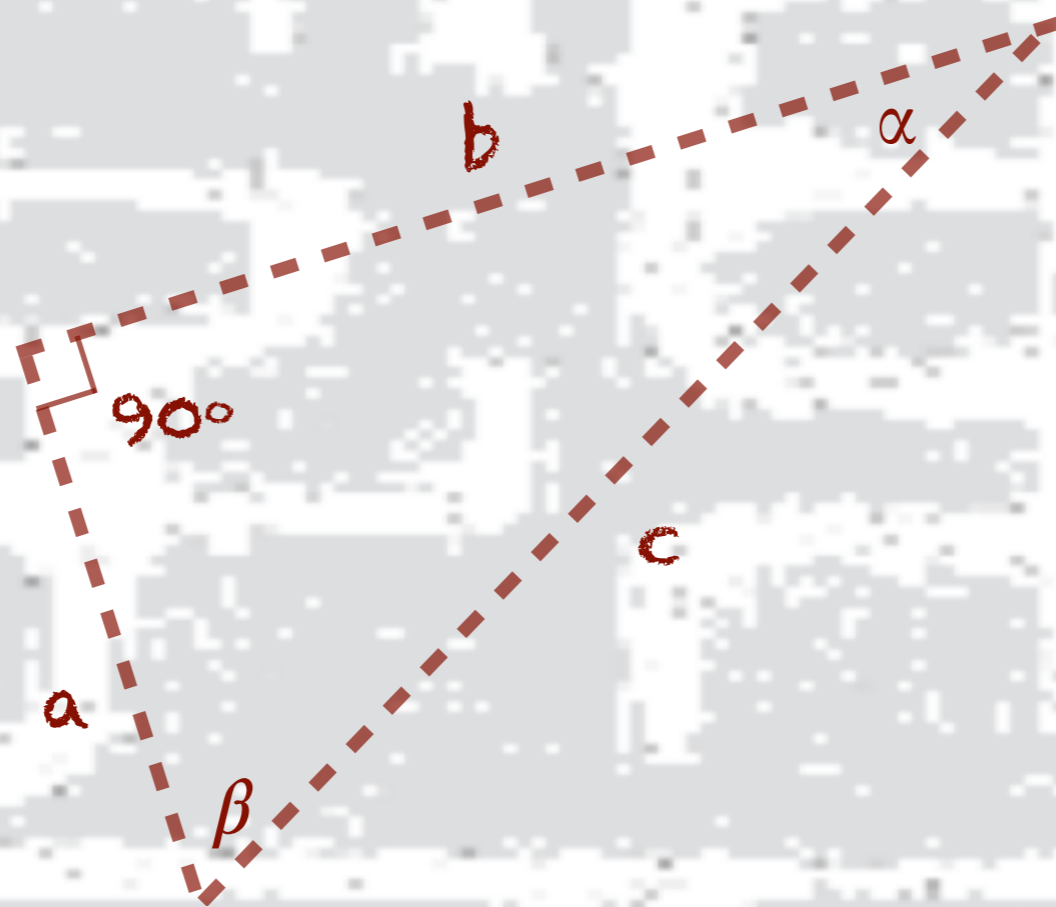
$$\sin \beta = b/c$$

$$\cos \alpha = b/c$$

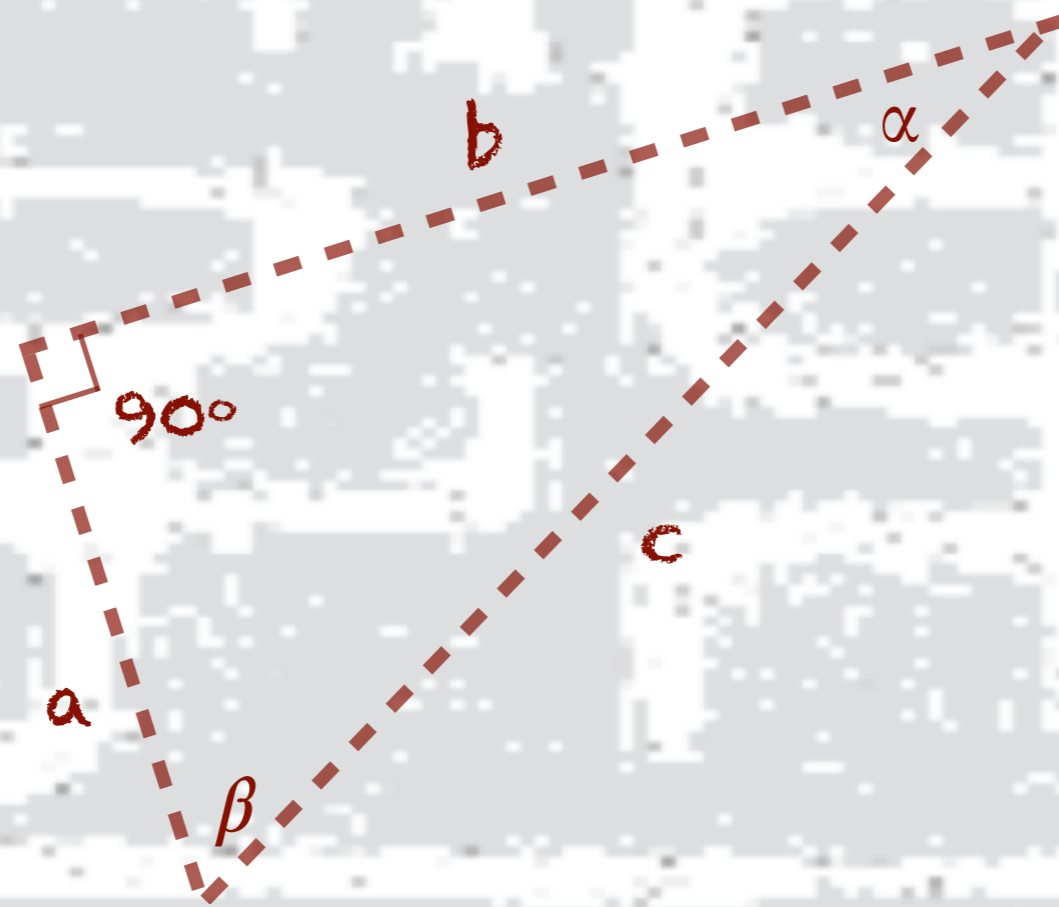
$$\cos \beta = a/c$$

$$\tan \alpha = a/b$$

$$\tan \beta = b/a$$



PYTHAGOREAN THEOREM $\Rightarrow c^2 = a^2 + b^2$



$$\sin \alpha = a/c$$

$$\sin \beta = b/c$$

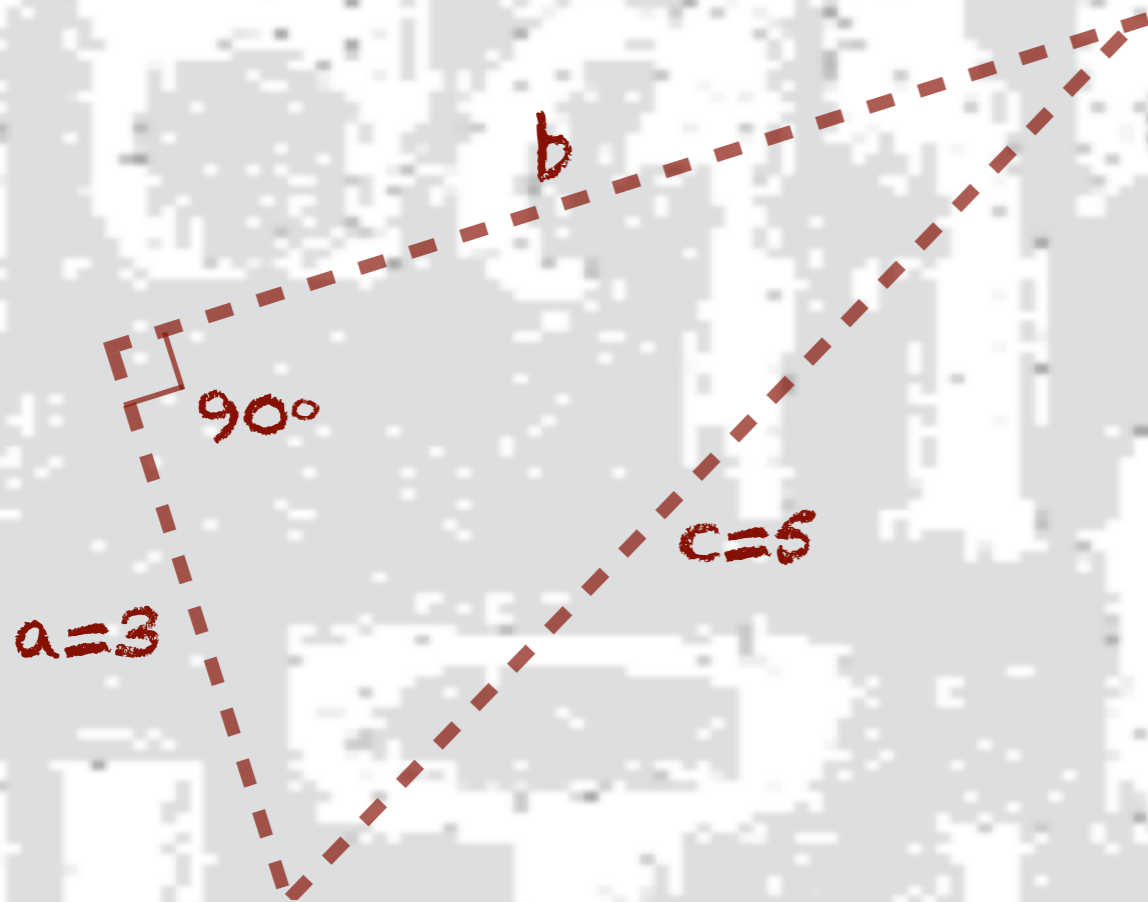
$$\cos \alpha = b/c$$

$$\cos \beta = a/c$$

$$\tan \alpha = a/b$$

$$\tan \beta = b/a$$

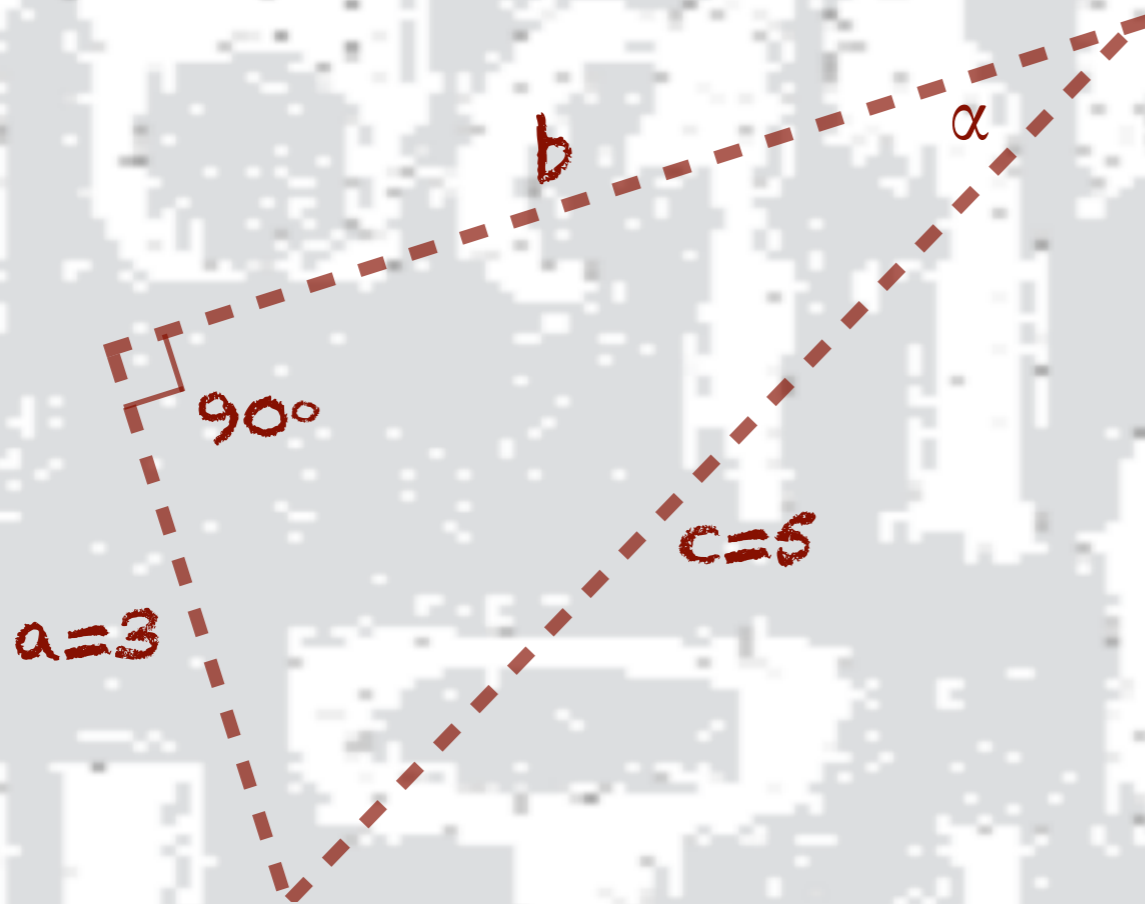
example
Find b



$$c^2 = a^2 + b^2$$
$$b = ?$$

example

Different ways of finding α



$$\sin \alpha = a/c$$

$$\alpha = \sin^{-1} a/c = ?$$

$$\cos \alpha = b/c$$

$$\alpha = \cos^{-1} b/c = ?$$

$$\tan \alpha = a/b$$

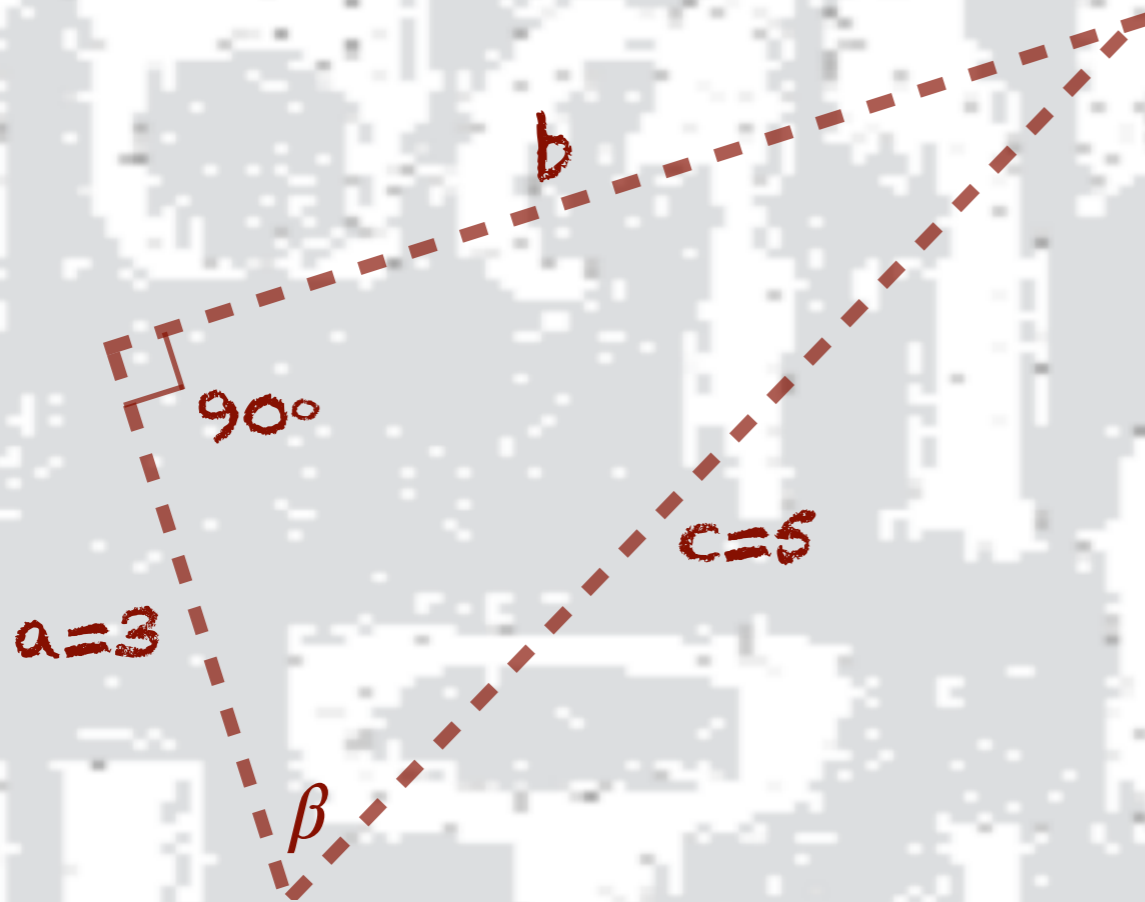
$$\alpha = \tan^{-1} a/b = ?$$

1. try with calculator

2. try with spreadsheet / Excel

example

Different ways of finding β



$$\sin \beta = b/c$$

$$\beta = \sin^{-1} b/c = ?$$

$$\cos \beta = a/c$$

$$\beta = \cos^{-1} a/c = ?$$

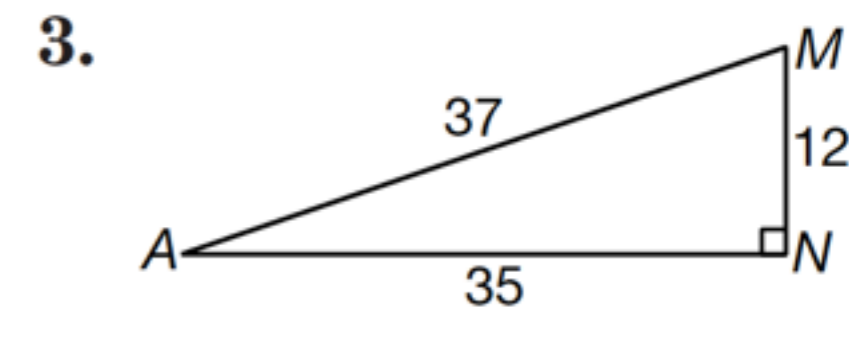
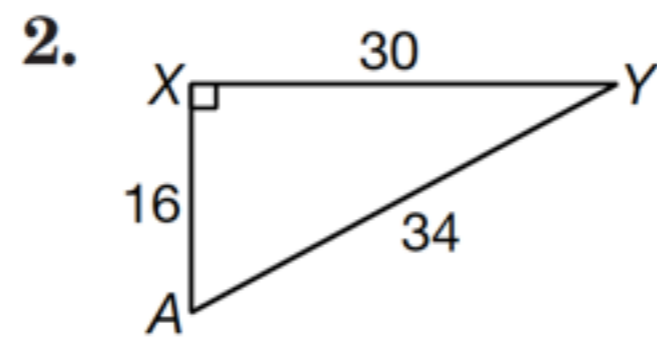
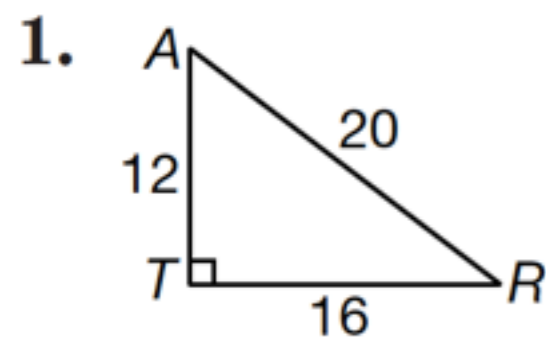
$$\tan \beta = b/a$$

$$\beta = \tan^{-1} b/a = ?$$

1. try with calculator

2. try with spreadsheet / Excel

practice questions

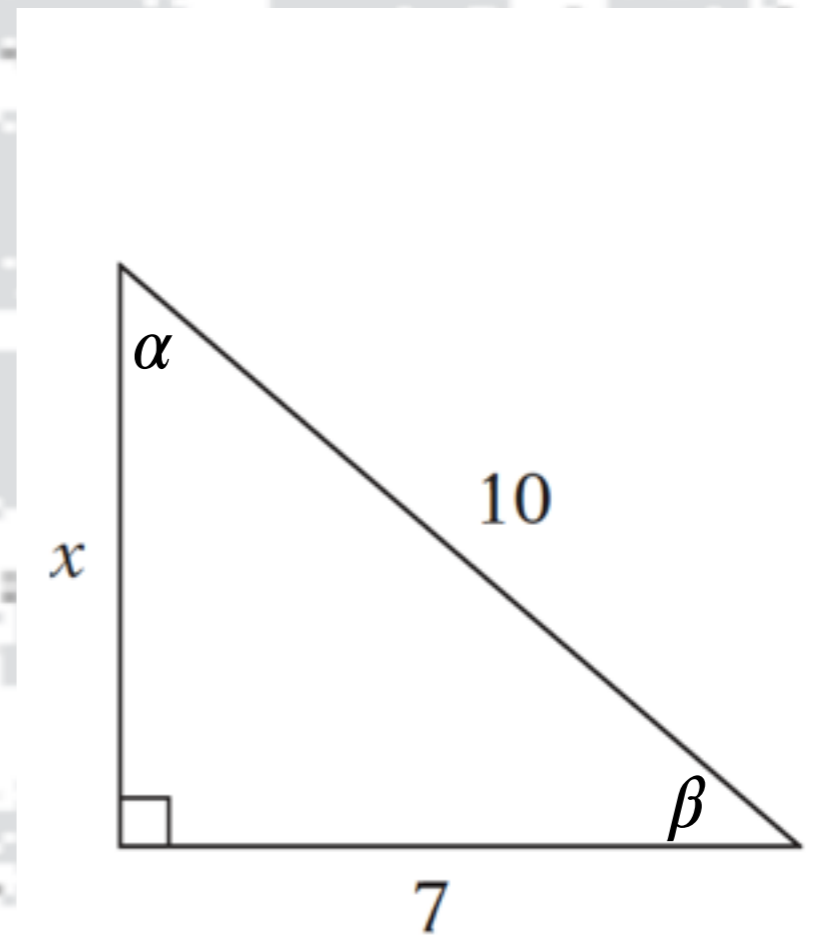


$\sin A =$
 $\cos A =$
 $\tan A =$
 $\sin R =$
 $\cos R =$
 $\tan R =$

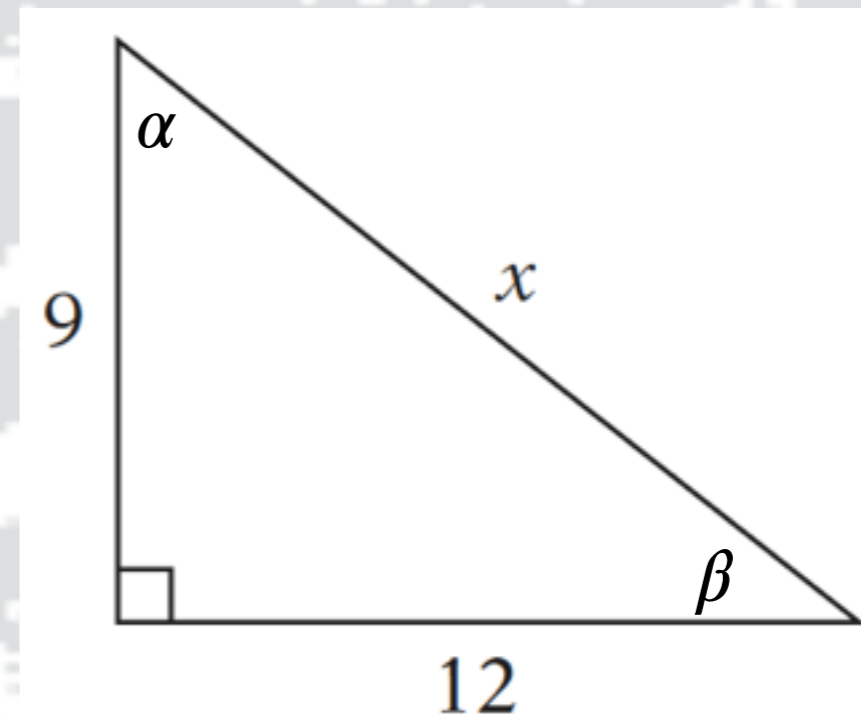
$\sin A =$
 $\cos A =$
 $\tan A =$
 $\sin Y =$
 $\cos Y =$
 $\tan Y =$

$\sin A =$
 $\cos A =$
 $\tan A =$
 $\sin M =$
 $\cos M =$
 $\tan M =$

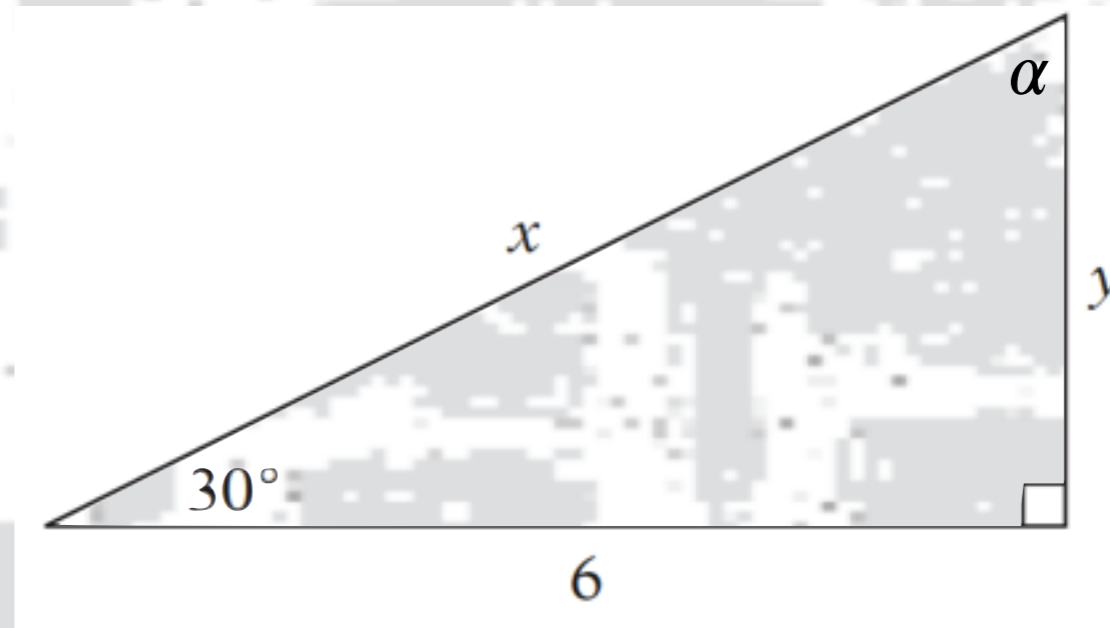
Solve all the unknowns.



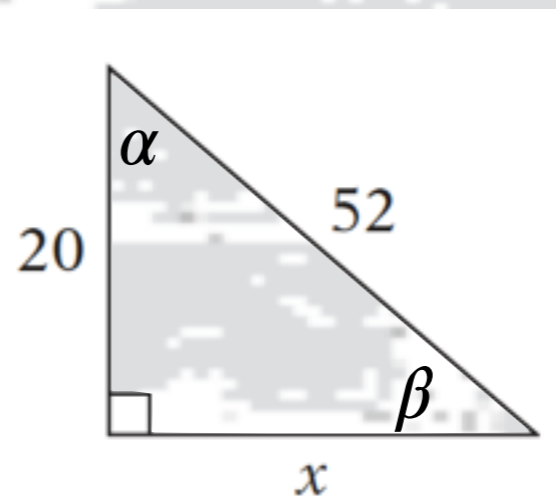
Solve all the unknowns.



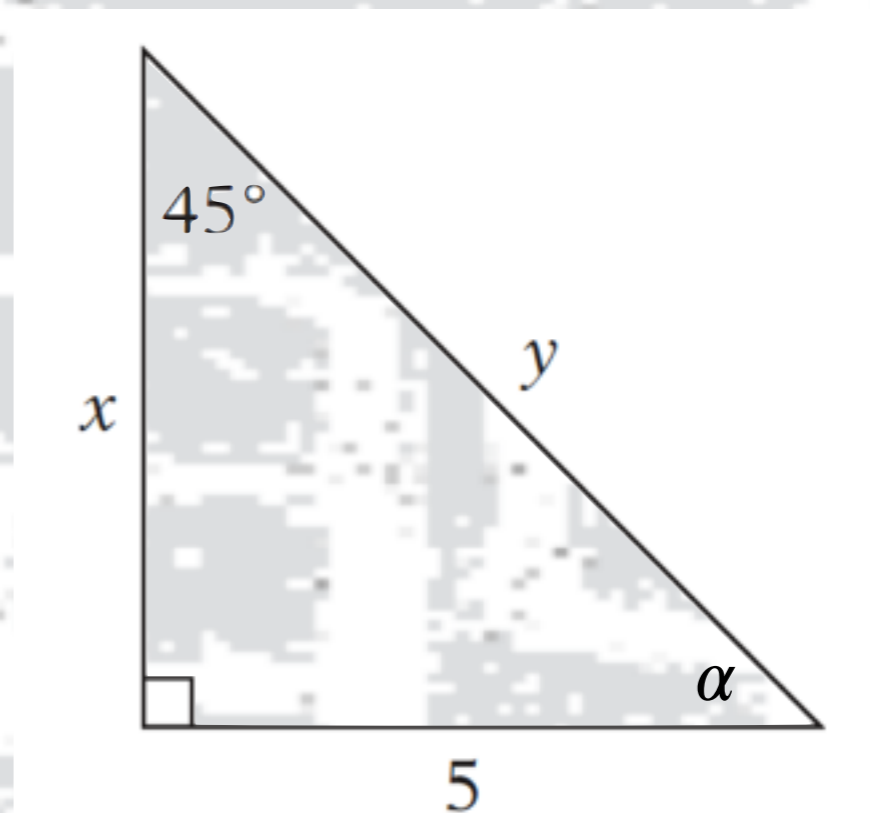
Solve all the unknowns.



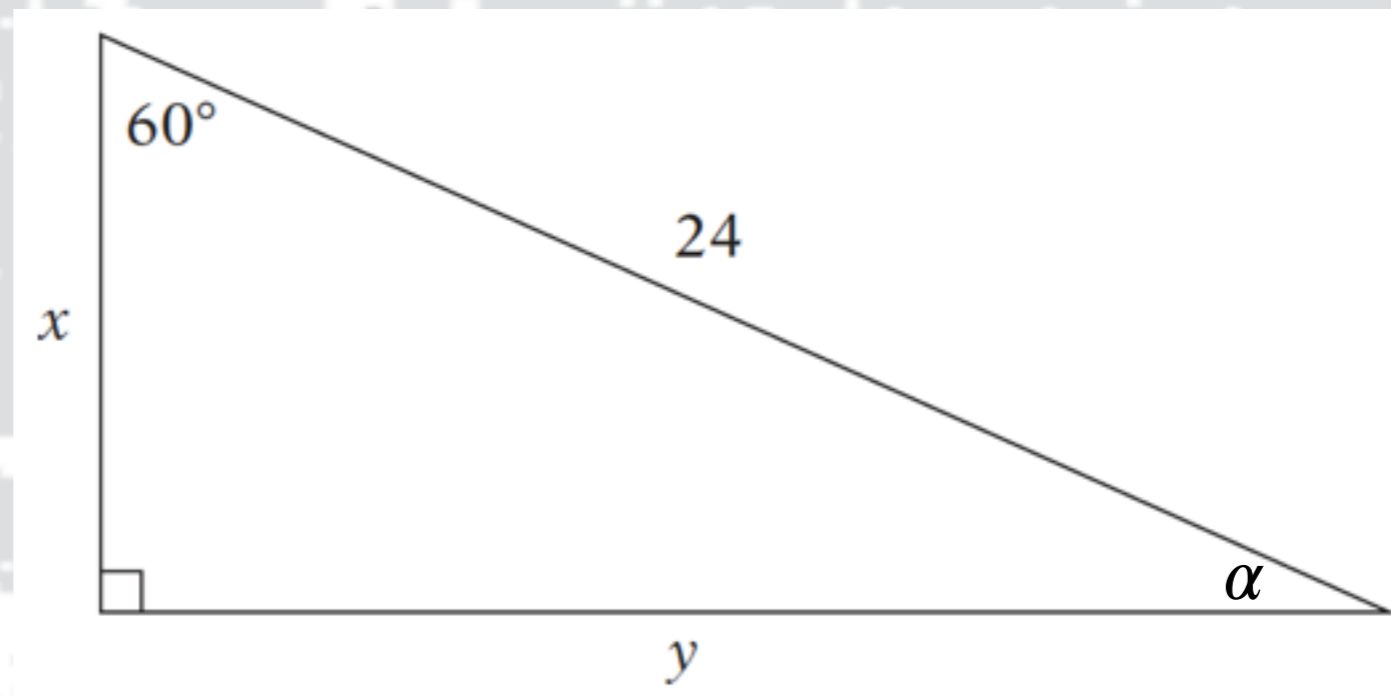
Solve all the unknowns.



Solve all the unknowns.



Solve all the unknowns.



complete the table

x	sin x
0	
30	
45	
60	
90	
120	
135	
150	
180	
210	
225	
240	
270	
300	
315	
330	
360	

plot the graph



complete the table

x	cos x
0	
30	
45	
60	
90	
120	
135	
150	
180	
210	
225	
240	
270	
300	
315	
330	
360	

plot the graph



complete the table

x	$\tan x$
0	
30	
45	
60	
90	
120	
135	
150	
180	
210	
225	
240	
270	
300	
315	
330	
360	

plot the graph



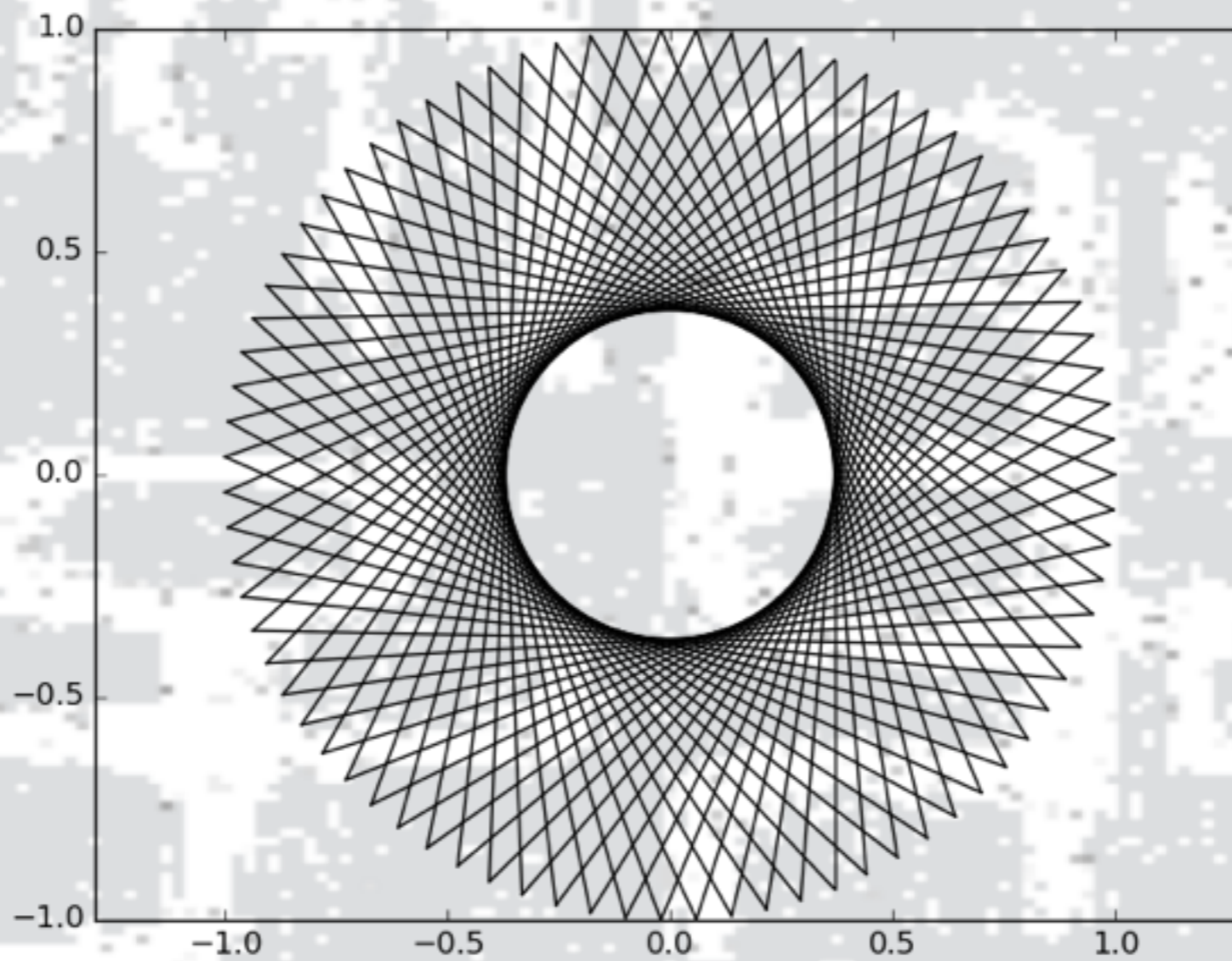
overlay the 3 graphs you just plotted



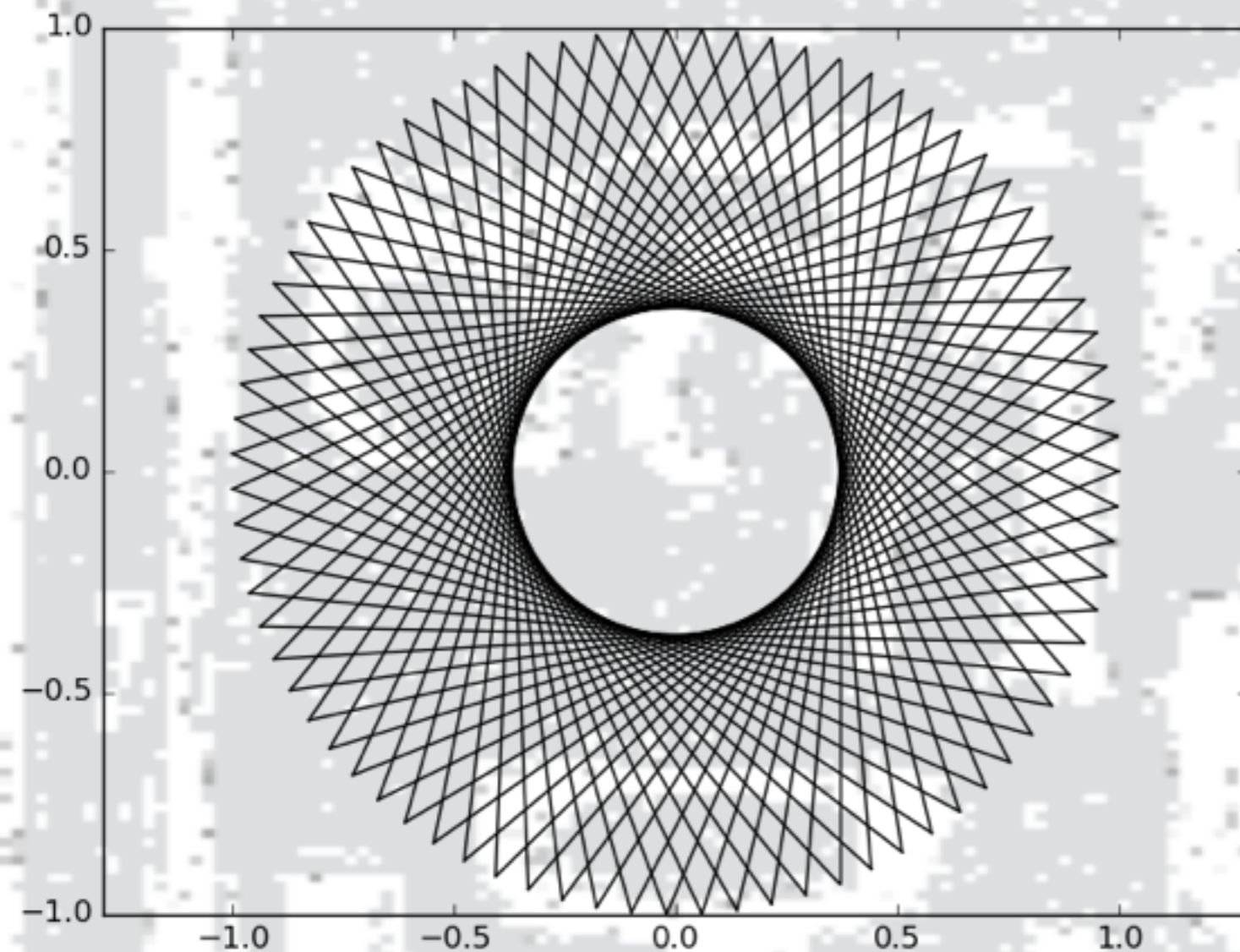
sin x
cos x
tan x

CHALLENGE

plot this

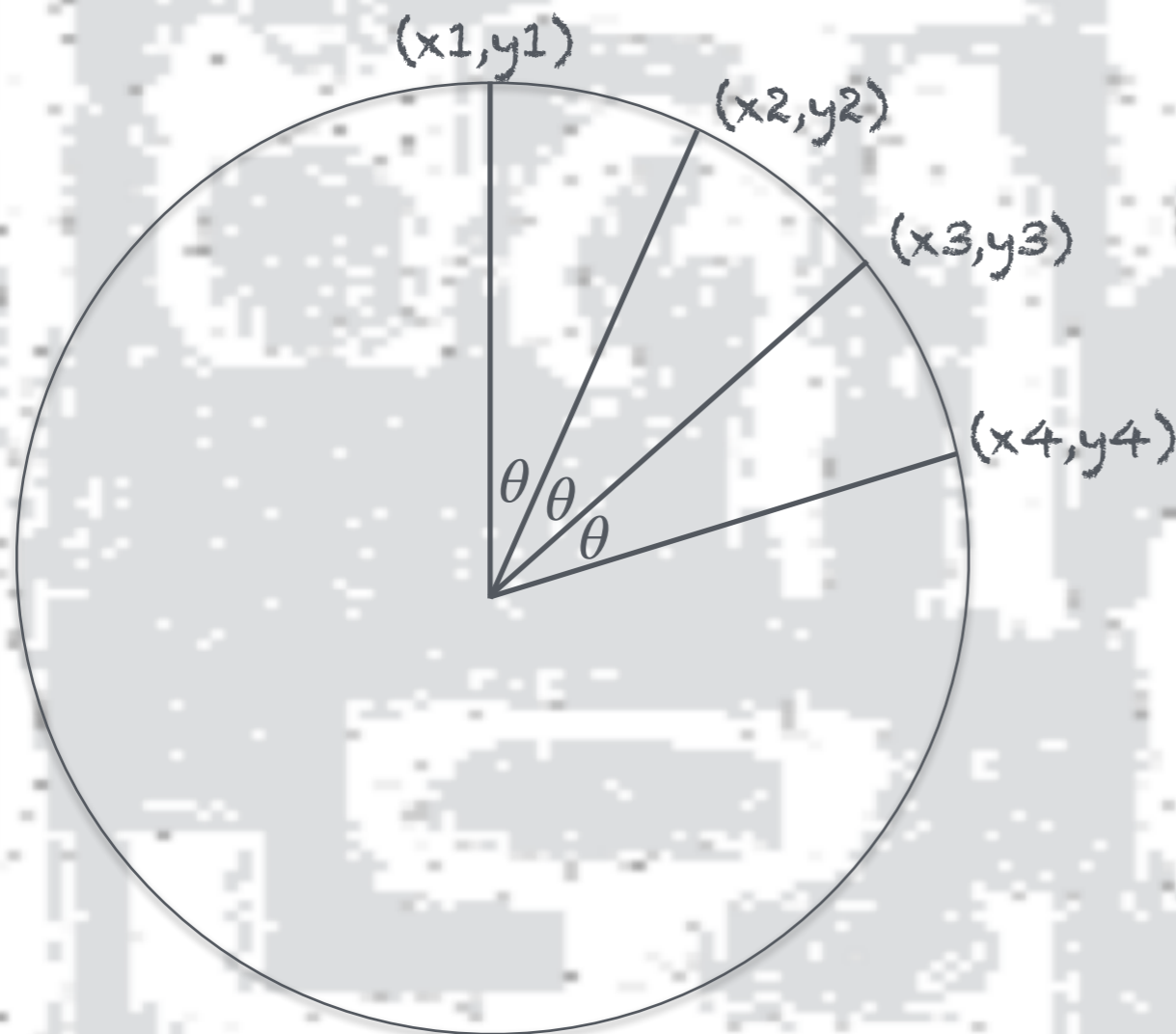


HOW TO



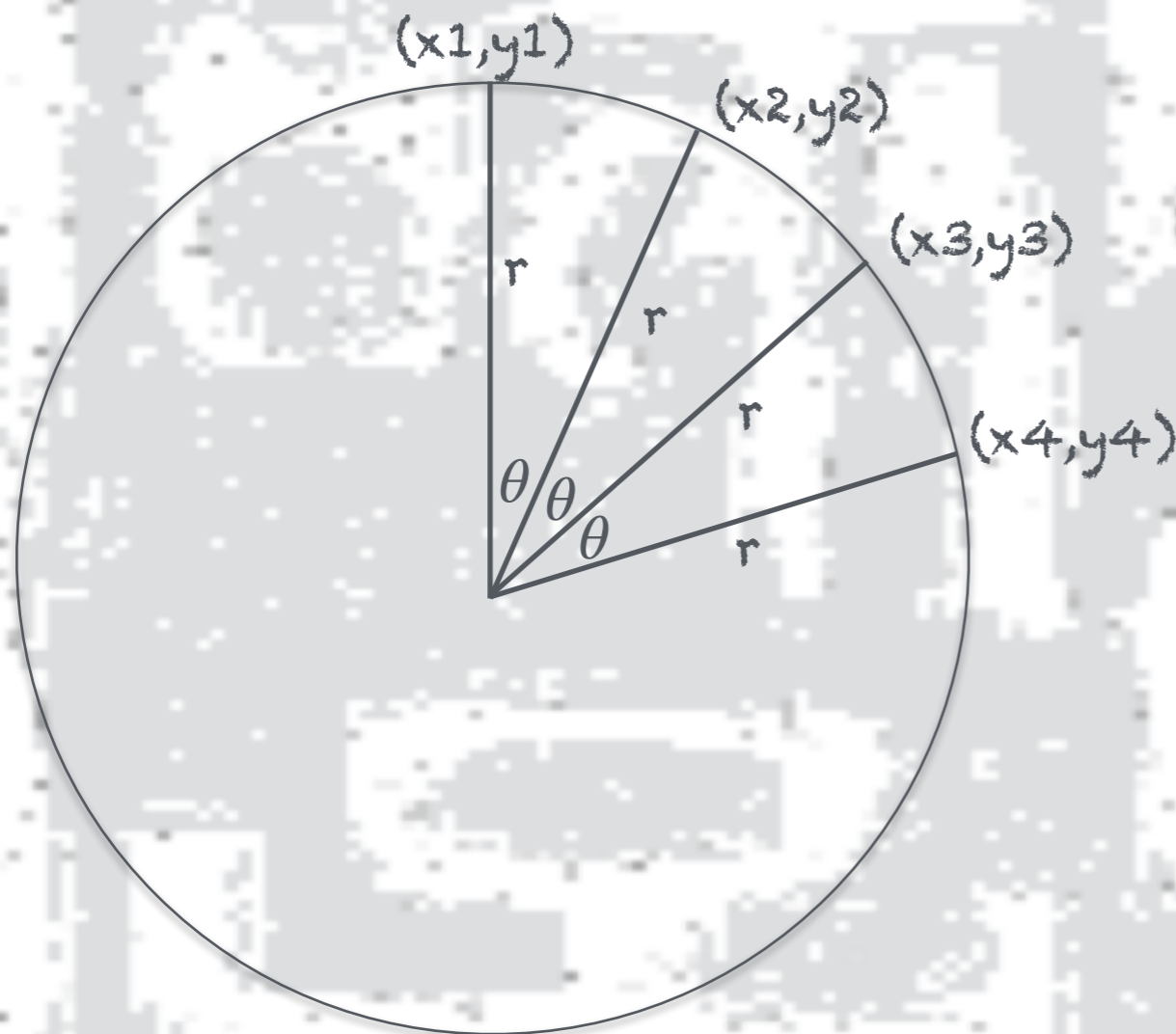
1. divide the circumference into equal parts
2. find the coordinates of each point along the circumference

start with less number of points first (more manageable)
you can increase later



1. divide the circumference into **equal parts**
2. find the coordinates of each point along the circumference

'equal parts'
means periodic sequence
of the same angle



$$x_1 = 0$$

$$y_1 = r$$

$$x_2 = r \sin \theta$$

$$y_2 = r \cos \theta$$

$$x_3 = r \sin 2\theta$$

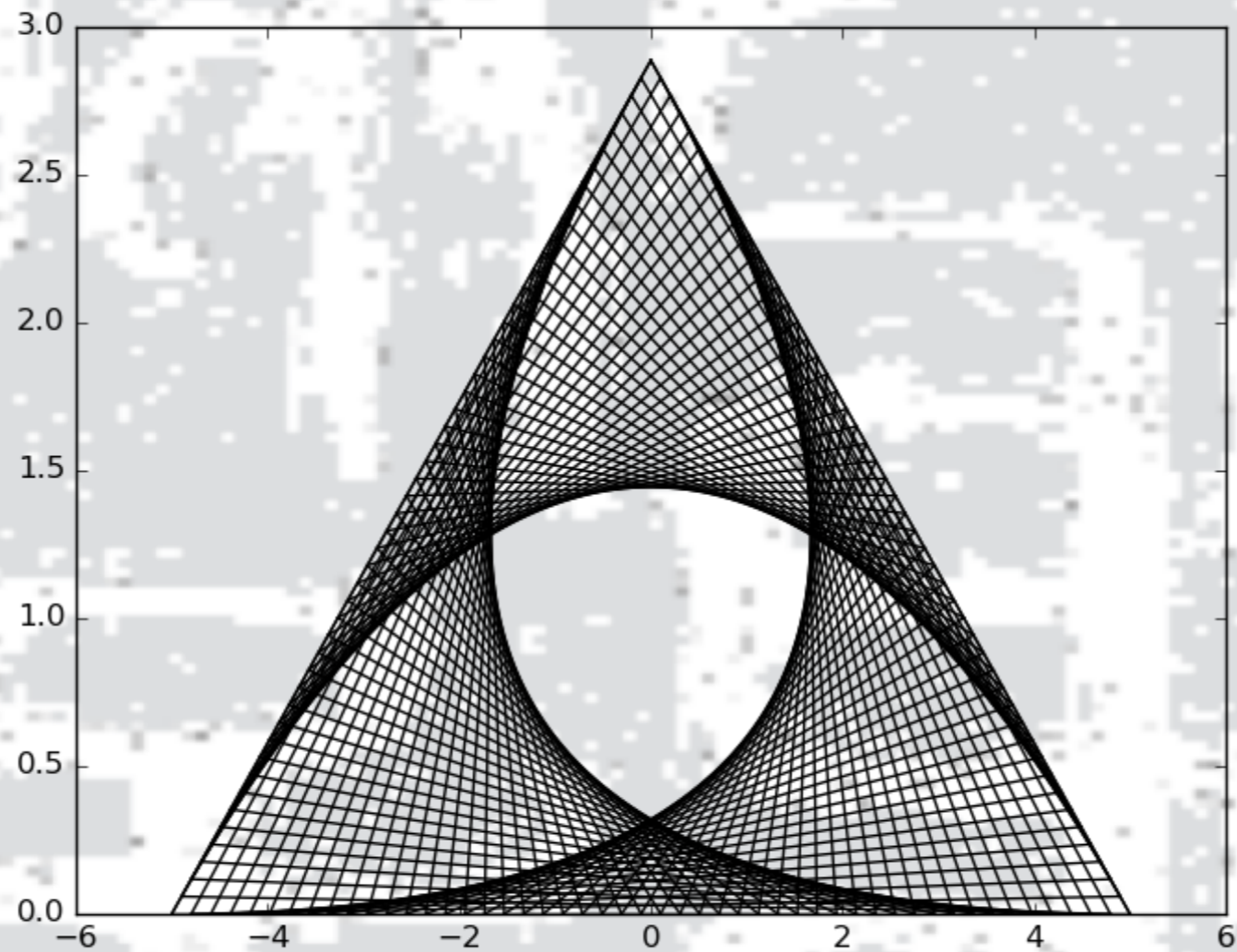
$$y_3 = r \cos 2\theta$$

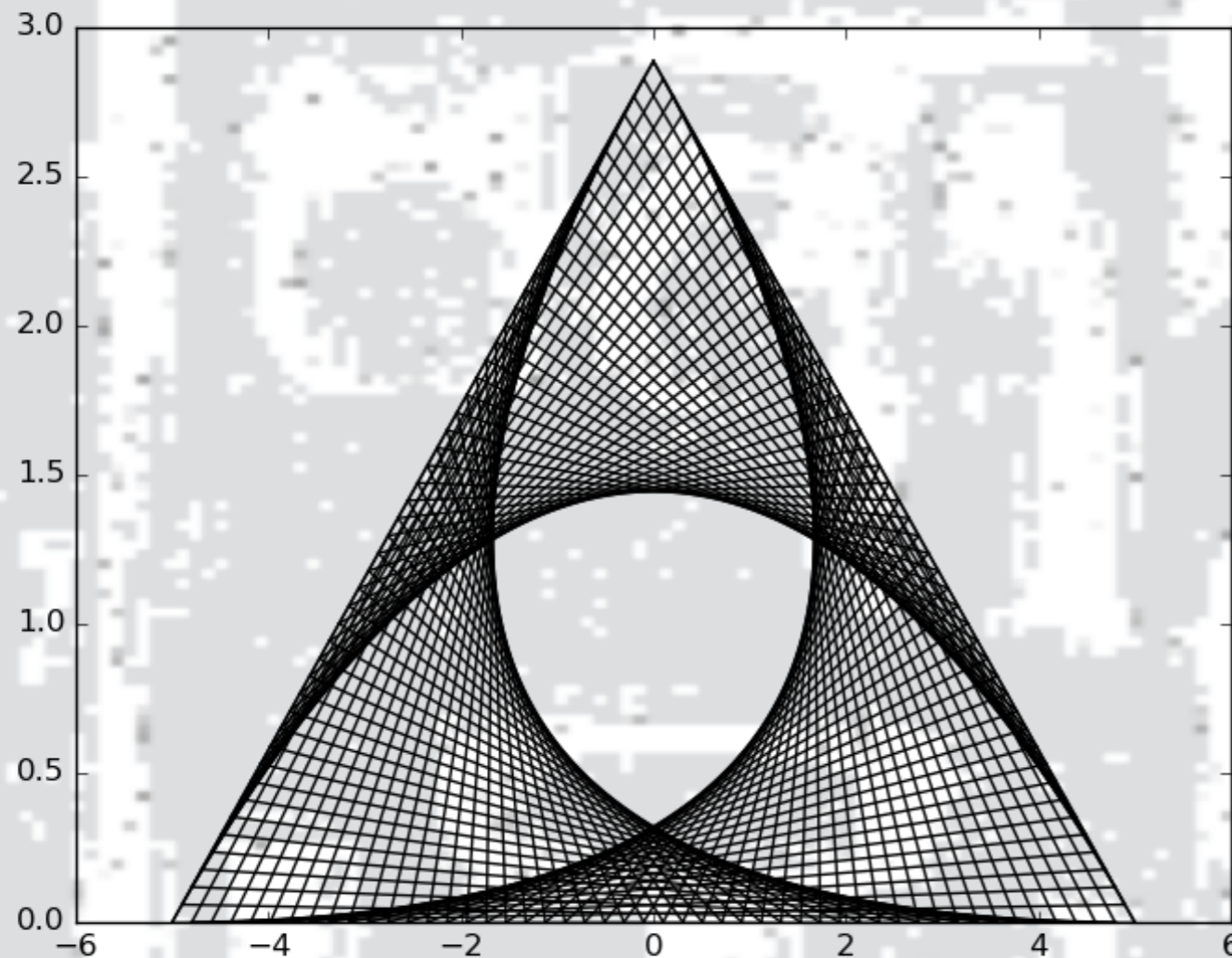
$$x_4 = r \sin 3\theta$$

$$y_4 = r \cos 3\theta$$

CHALLENGE

plot this



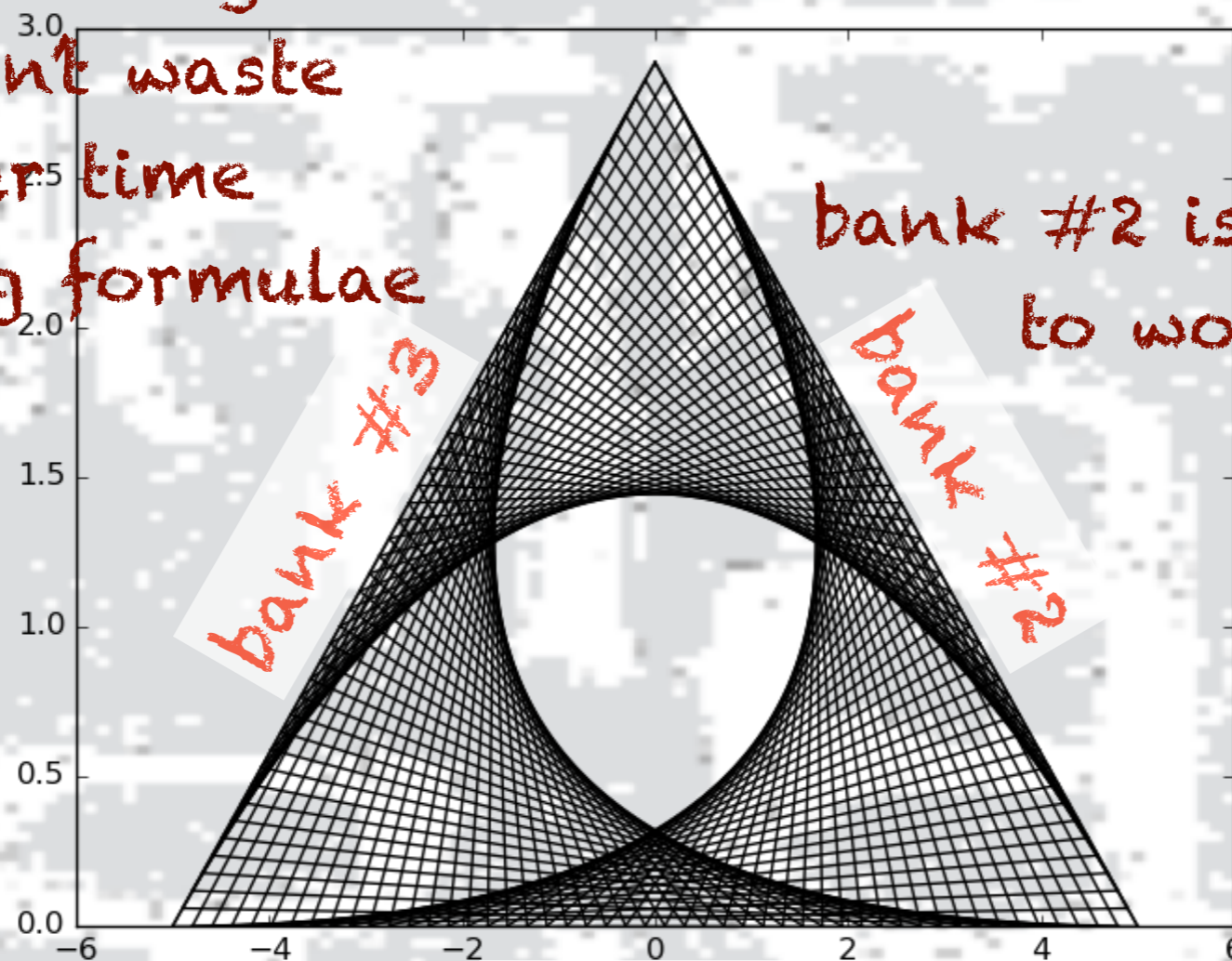


for this challenge
we need to divide
the three sides
into equal parts, and
find the (x,y) coordinates
of these points

start with less number of points first
(mine has 50 points on each side)
u can increase later

bank #3 is just a reflection of
bank #2 along $x=0$.

So don't waste
your time
deriving formulae



bank #2 is the one u need
to work a bit on

bank #1

this is easy:
 y is the same for all points
 x can be provided by range