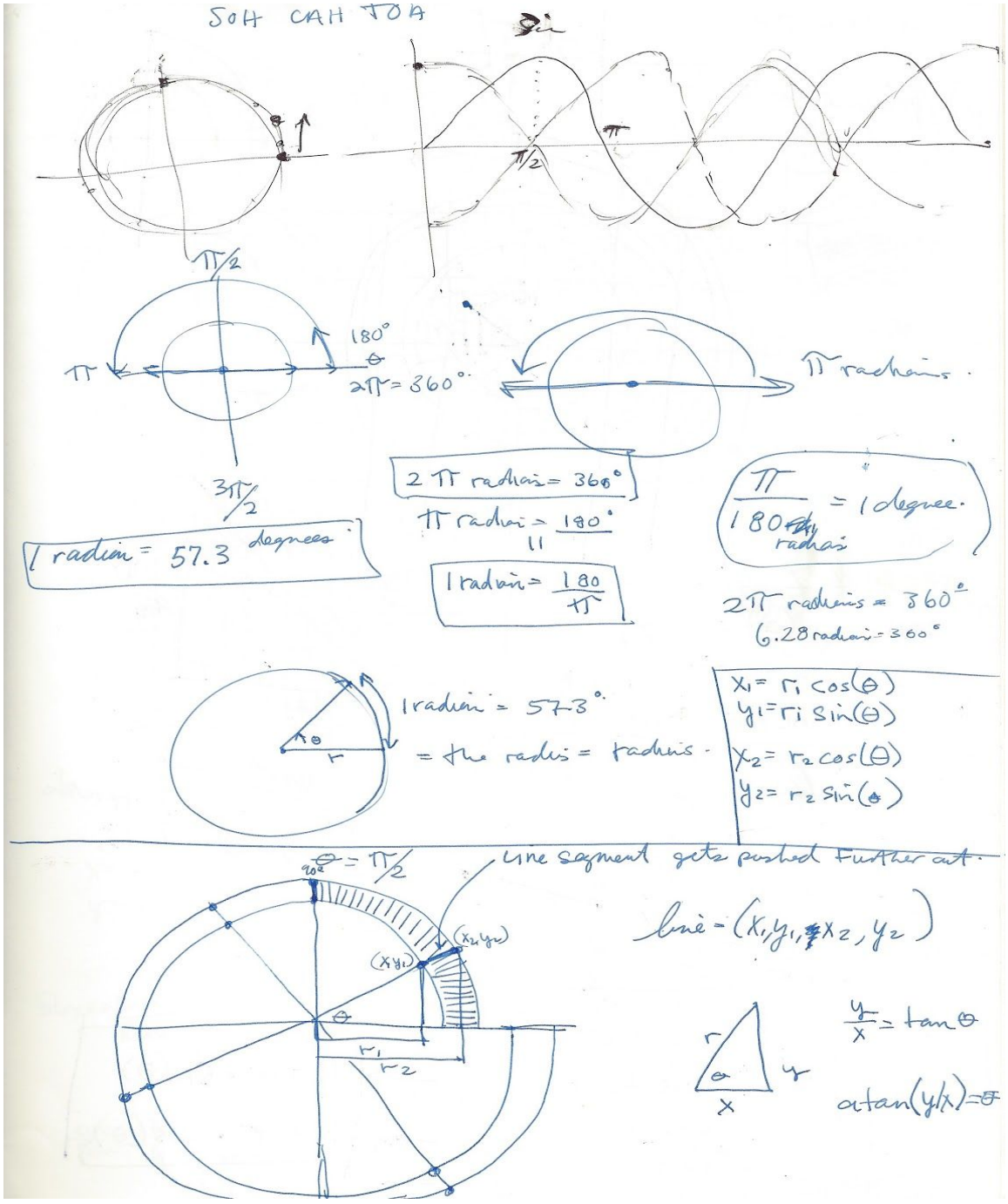
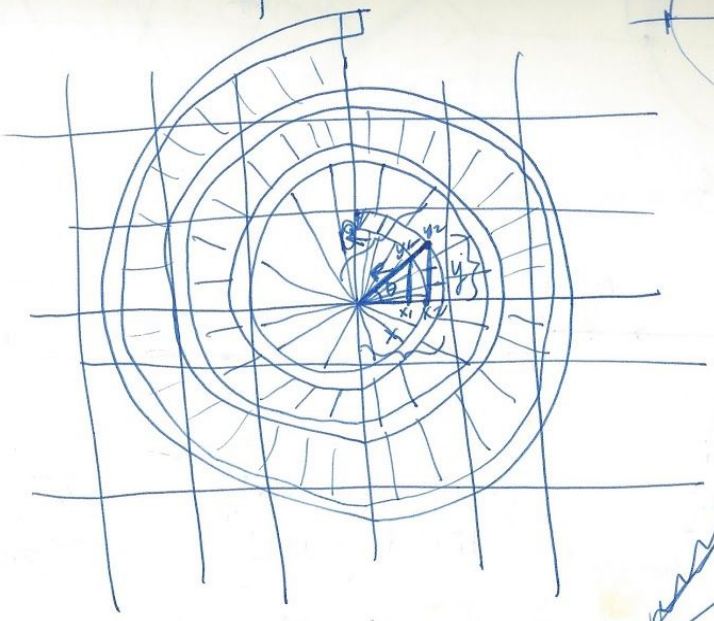
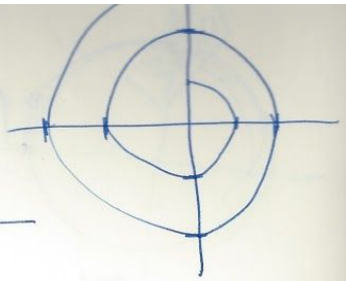
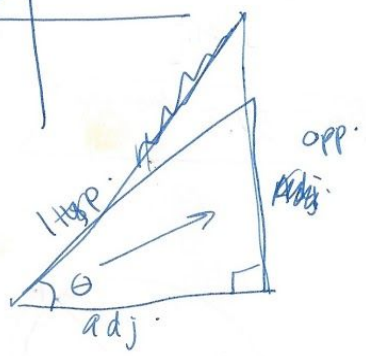
Lee Kuczewski
9/21//19
Follow up on Spiral Sketches and Math



polar coordinates



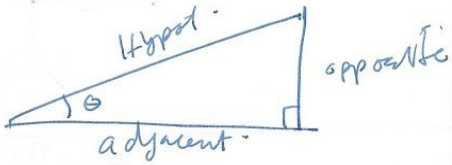


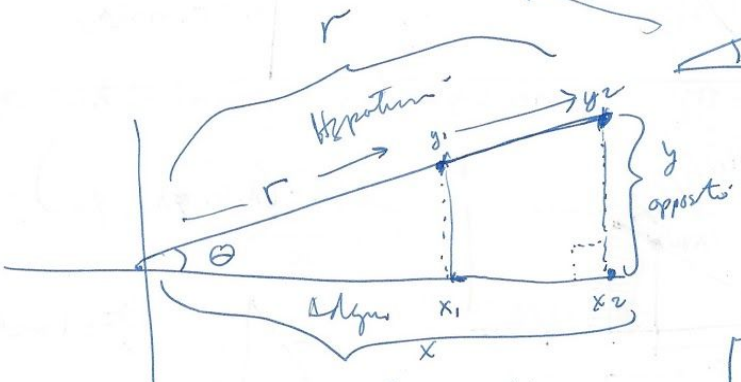


$\sin(\theta) = \text{opp}/\text{hyp}$

$\cos(\theta) = \text{adj}/\text{hyp}$

$\tan(\theta) = \text{opp}/\text{adj}$





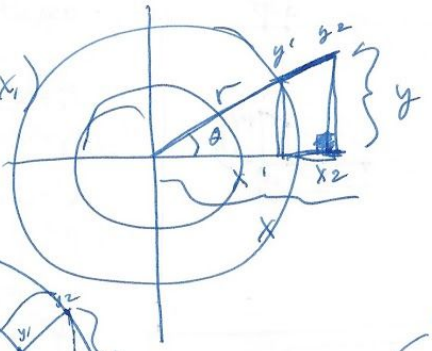
$\sin(\theta) = y/r \rightarrow y = r \cdot \sin(\theta)$

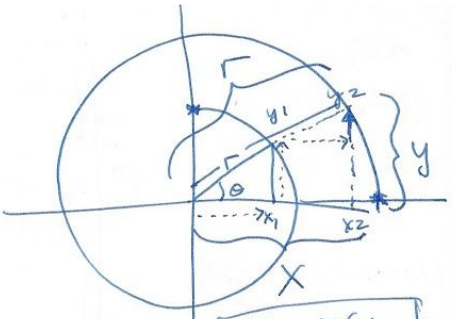
$\cos(\theta) = x/r \rightarrow x = r \cdot \cos(\theta)$

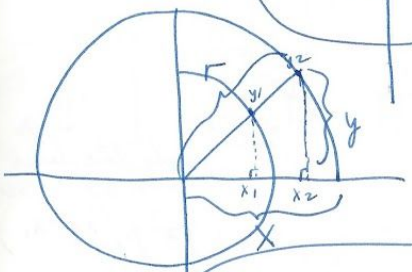
$\tan(\theta) = y/x \rightarrow$

Slope=

$m = (y_2 - y_1)/(x_2 - x_1)$







$x = r \cdot \cos(\theta)$

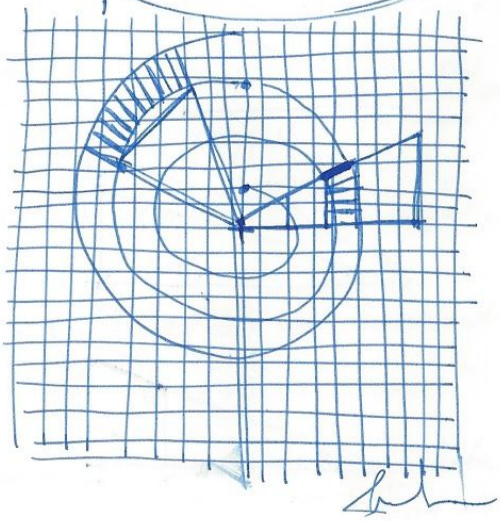
$y = r \cdot \sin(\theta)$

$\sin(\theta) = y/r$ → ~~$y = \sin(\theta)$~~

$\cos(\theta) = x/r$ → ~~$x = \cos(\theta)$~~

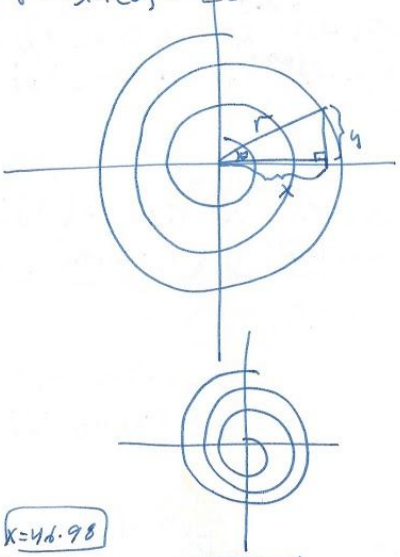
$x = \cos(\theta) \cdot R$

$y = \sin(\theta) \cdot R$



$x = \cos(\theta) \cdot 20$

$y = \sin(\theta) \cdot 20$

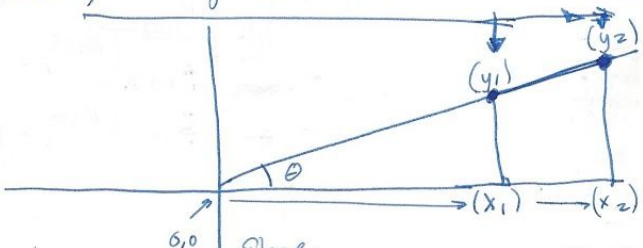


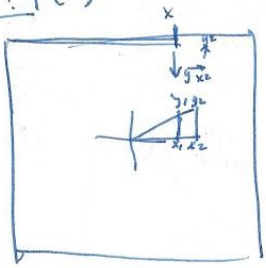
`x= r · cos(a);` → `x = 50·cos(20);` → x= 46.98

`y= r · sin(a);` → `y = 50·sin(20);` → y= 17.10

atan ??? ( )

Slope = Rise / Run





Slope

$m = (y_2 - y_1)/(x_2 - x_1)$

line(x_1, y_1, x_2, y_2)

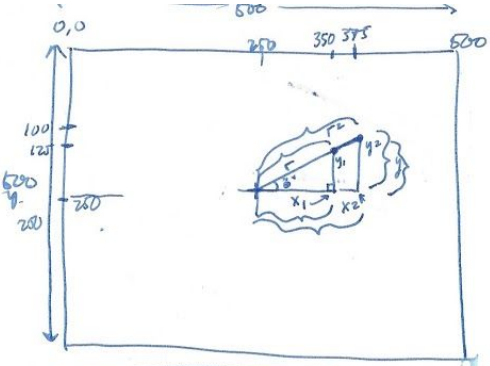
Rise / Run

$y = mx + b$ ← y-intercept

$y = mx + b$

↑ Slope.

$y = mx + b$ ← y-intercept.



(250, 250) = center.

r_1 = radius 1

r_2 = radius 2

$X_1 = x_1$

$y_1 = y_1$

$X_2 = x_2$

$y_2 = y_2$

$(350_{x_1}, 125_{y_1})$

$(375_{x_2}, 100_{y_2})$

$(100-125)/(375-350)$

$-25 / 25$

slope = −1

we need for point 1
(r_1, x_1, y_1)
we need for point #2
(r_2, x_2, y_2)

make the line
we need: slope?)
(y_2-y_1/x_2-x_1)

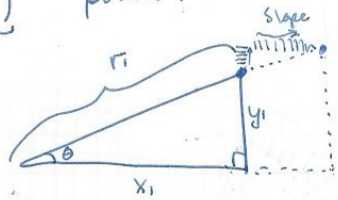
Forloop ??

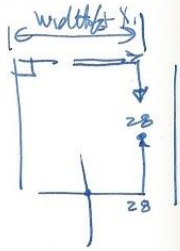
incremented ++

index θ

1 → 360

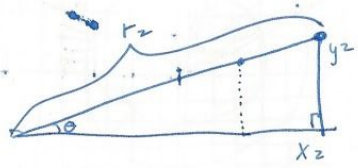
point 1





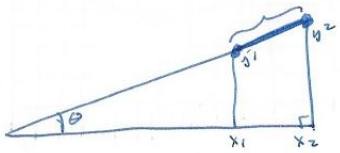
$X_1 = 40 \cdot \cos(45)$; (28,28) $X_1 = r_1 \cdot \cos(\theta)$;

$y_1 = 40 \cdot \sin(45)$; (28,28) $y_1 = r_1 \cdot \sin(\theta)$;



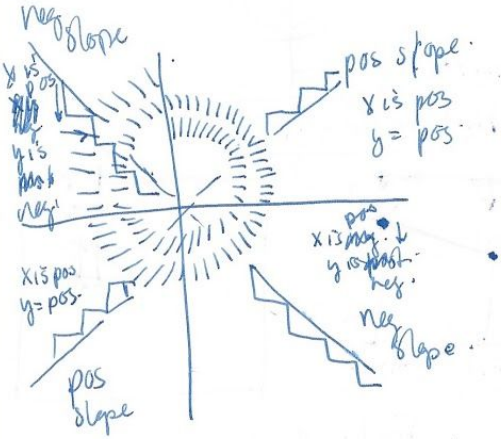
$X_2 = 50 \cdot \cos(45)$; (35,35) $X_2 = r_2 \cdot \cos(\theta)$;

$y_2 = 50 \cdot \sin(45)$; (35,35) $y_2 = r_2 \cdot \sin(\theta)$;

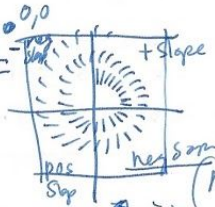


$x = r \cdot \cos(\theta)$;

$y = r \cdot \sin(\theta)$;



rise / run = −

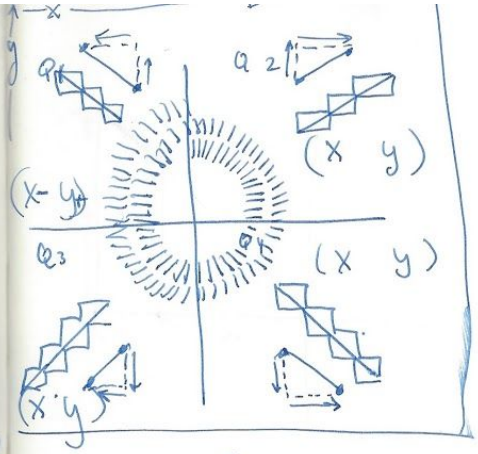


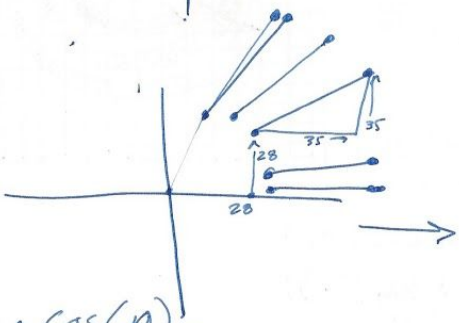
$(350_{x_1}, 125_{y_1})$

$(375_{x_2}, 100_{y_2})$ = −1 slope

rise = ← → in x $(\text{rise}_{x_1} - x)$

run = ← → in y $(\text{run}_{y_1} - y)$





Line = (x_1, y_1, x_2, y_2)

Line = (28, 28, 35, 35)

x_1 = radius · cos(θ);

↑ increase this radius as theta increases.

↑ go from 0–360° or 0 → 2π

~~Line(x1, r · cos(θ))~~

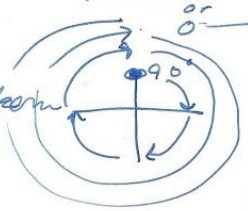
Line ($R_1 \cdot \cos(\theta)$, $R_1 \cdot \sin(\theta)$, $R_2 \cdot \cos(\theta)$, $R_2 \cdot \sin(\theta)$);

x_1 y_1 x_2 y_2

x_1 = radius · cos(θ) → increase the radius as ~~it~~ theta goes from 0 → 360 or 0 → 2π

y_1 = radius · sin(θ) → "SAME"

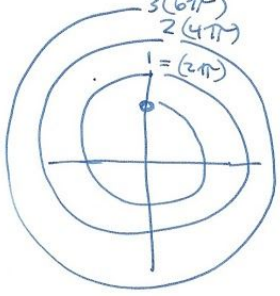
increase the radius ++ as theta goes from



2π = 1 rotation

4π = 2 rotations

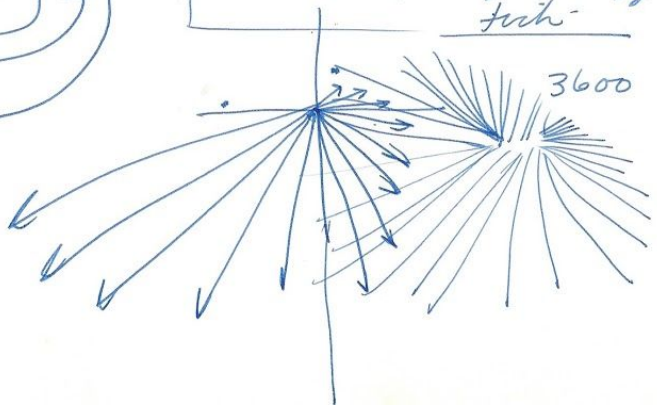
6π = 3 rotations



radius increases by 10 every change in theta. θ

radius changes by 1 every tick

3600 ticks



86

↓

60.50.5