May 01, 2019

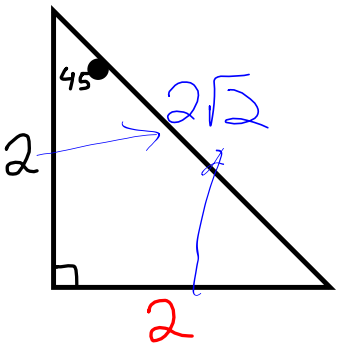
Pick Up The

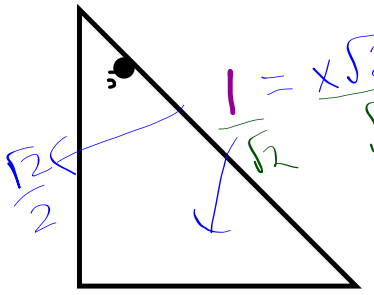
Warm Up

HW Questions

Add check marks asneeded.

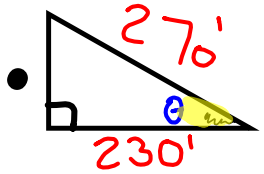
Answers





$$x = \frac{1}{\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}} = \frac{\sqrt{2}}{\sqrt{4}}$$

#2



find θ

$\cos\theta = \frac{\text{adj}}{\text{hyp}}$

$\cos^{-1}(\cos\theta) = \left(\frac{230}{270}\right)\cos^{-1}$

$\theta = \cos^{-1}\left(\frac{230}{270}\right)$

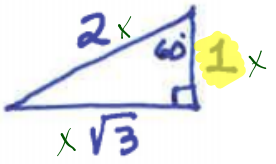
$\theta \approx 31.6^\circ$

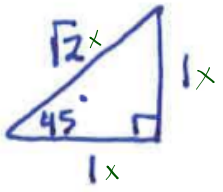
Questions on HW

May 01, 2019

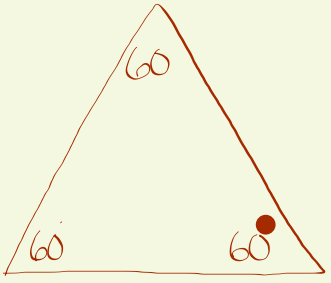
7-15

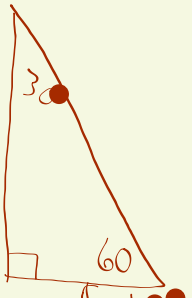
a.





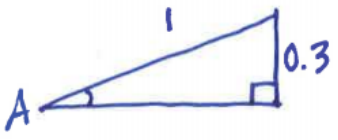
b.





this short leg must be ½ the hypotenuse

7-16



$\sin A = \frac{0.3}{1}$

$A = \sin^{-1}\left(\frac{.3}{1}\right) \approx 17.46^\circ$

7-18

(a) $\log(1) = n$

$10^n = 1$

$n = 0$

$\frac{\log 1}{\log 10}$

(b) $\log_{\bullet}(10^3) = n$

$10^n = 10^3$

$n = 3$

(c) $10^{\log(4)} = n$

convert to log form

$\log_{10} n = \log_{10} 4$

$n = 4$

(d) $10^{3\log(4)} = n$

convert to log form

$3\log_{10}(4) = \log_{10}(n)$

$\log(4^3) = \log(n)$

$4^3 = n$

$n = 64$

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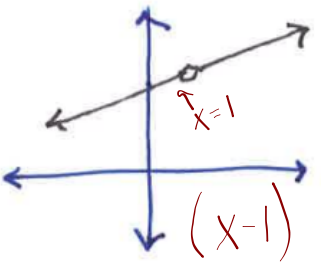
7-19

x	-2	-1	0	1	2	3
y	3	4	5	undefined	7	8

(a) Appears to be a linear function but there is a hole in the graph at $x=1$ (not an asymptote)



b) the linear relationship is $y = x + 5$

$f(.9) = 5.9$
$f(1.1) = 6.1$ No asymptote

c) $f(x) = \dfrac{x^2+4x-5}{x-1} \Rightarrow \dfrac{(x-1)(x+5)}{x-1} = x-5$

the complete graph is a line, $y = x+5$, with a hole at $(1,6)$

May 01, 2019

7-20

a) Exponential is appropriate for population growth or decay

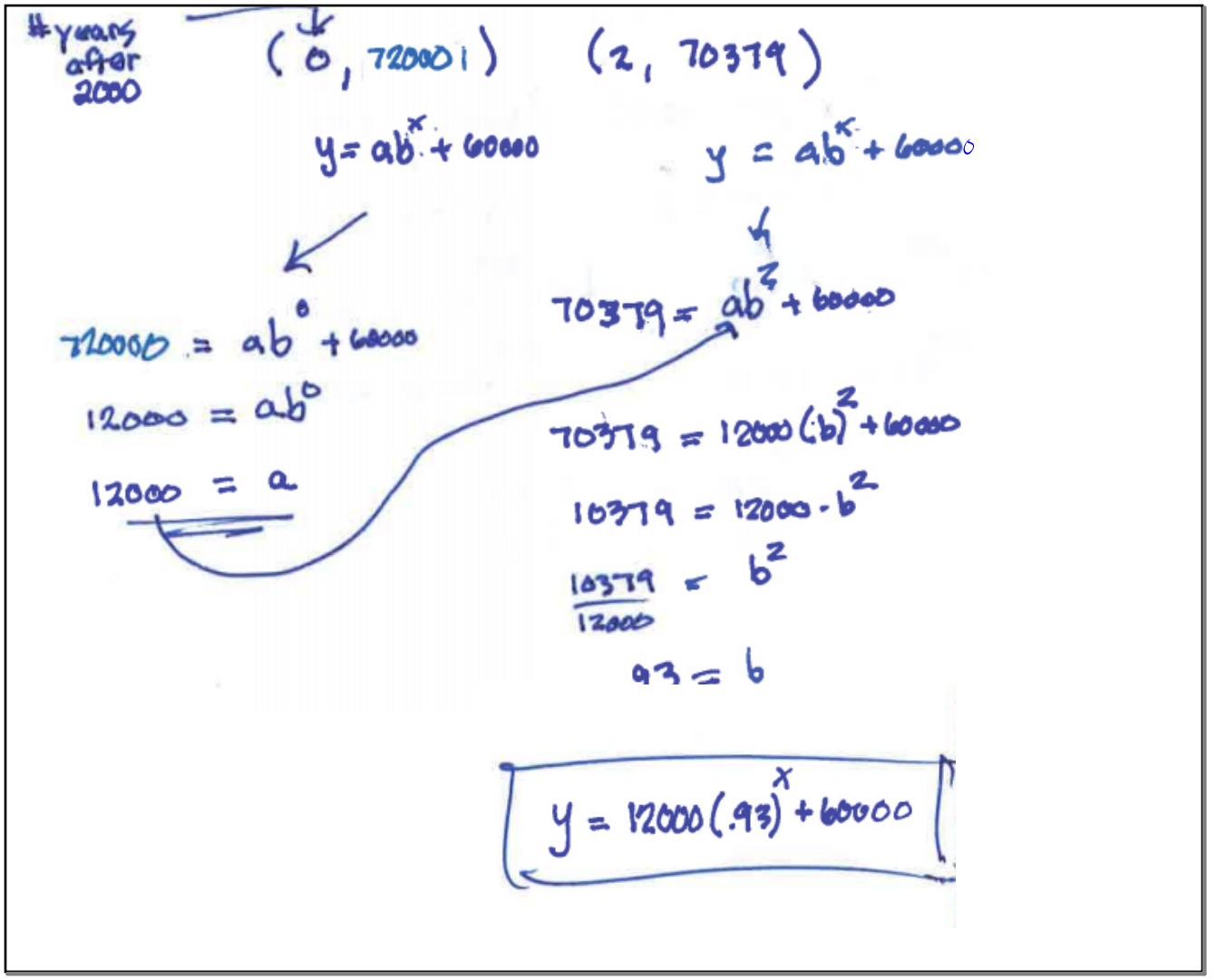
b) $y = ab^x + c$, $c = 60000$

years after 2000

(0, 72001) (2, 70379)

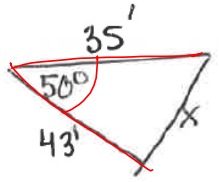
$y = ab^x + 60000$

$y = ab^x + 60000$


years after 2000
(0, 72000)
(2, 70379)
$y = ab^x + 60000$
$y = ab^x + 60000$
$72000 = ab^0 + 60000$
$12000 = ab^0$
$12000 = a$
$70379 = ab^2 + 60000$
$70379 = 12000(b)^2 + 60000$
$10379 = 12000 \cdot b^2$
$\frac{10379}{12000} = b^2$
$.93 = b$
$y = 12000(.93)^x + 60000$

May 01, 2019

7-22



NOT A RIGHT Triangle so SohCahToa is not Useable

Given info is SAS so Law of Cosines works

(a)

$$c^2 = a^2 + b^2 - 2ab\cos C$$

$$x^2 = 43^2 + 35^2 - 2(43)(35)\cos 50^\circ$$

$$x^2 = 1139.209....$$

$$x = 33.752 \text{ feet}$$

(b)

LAW OF SINES

$$\frac{\sin 25^\circ}{x} = \frac{\sin 41^\circ}{15}$$

↙ cross multiply

$$x(\sin 41^\circ) = 15(\sin 25^\circ)$$

$$x = \frac{15 \sin 25^\circ}{\sin 41^\circ} = 9.663 \text{ feet}$$

7-23

$x + y + z = 40$

$y = x - 5$

$x = 2z$

substitute to get

$x + (x - 5) + z = 40$

substitute $x = 2z$ to get

$2z + (2z - 5) + z = 40$

$2z + 2z - 5 + z = 40$

$5z = 45$

$z = 9$

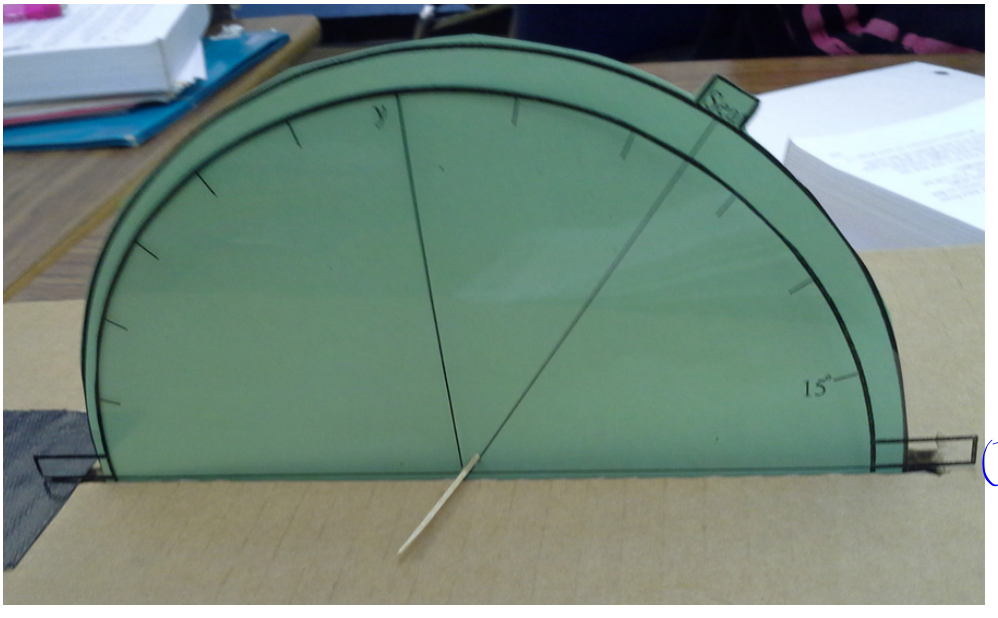
$x = 2(9)$

Summary and Ramifications from the Ferris Wheel Activity

Have one person from your group:

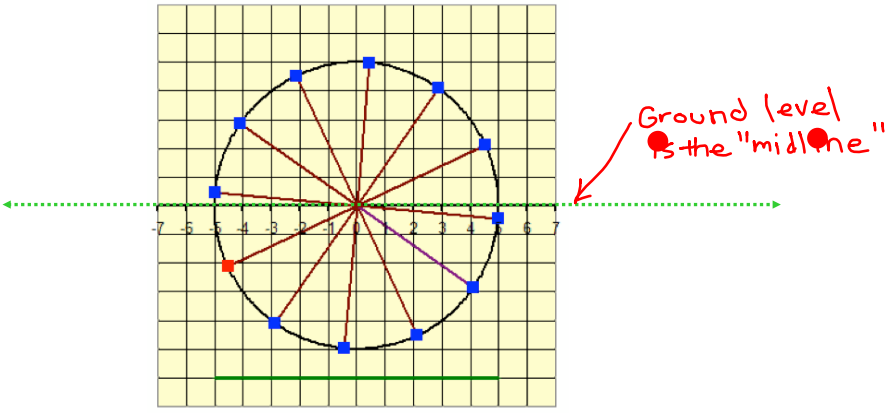
Pick up your Ferris Wheel data and graph from the last class.

Then explain what we did to anyone who was absent ! If absent, you do not have to make up this particular activity, but you do need to understand it!



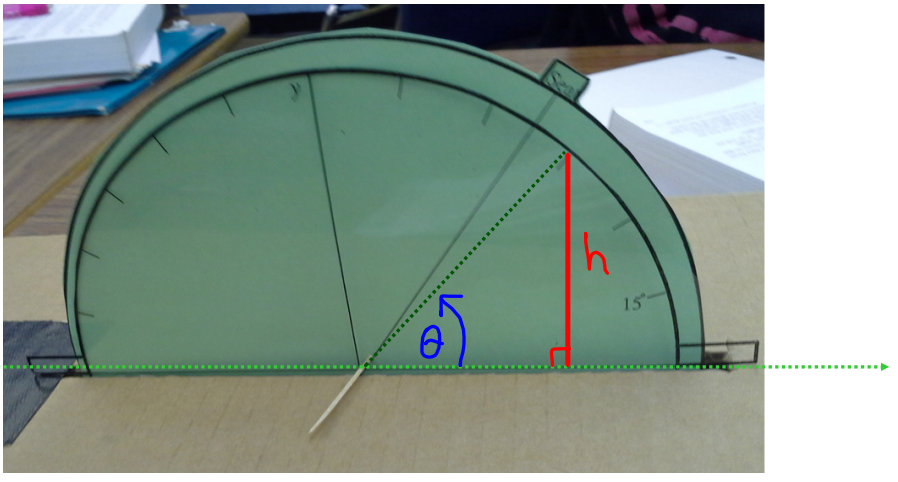
We created a new parent function called the:

The Sine Function



The ground is indicated by the **GREEN line!**

The Sine function is the connection between the heights above (and below) the midline AND the angle of rotation (θ)

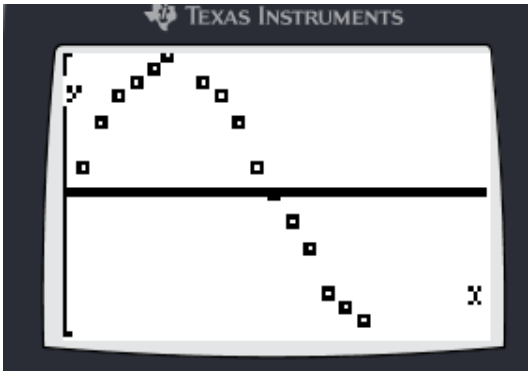


θ

the Greek letter θ

theta

1. We collected periodic data (heights around the circle)
2. We plotted those heights against the various angles of rotation.



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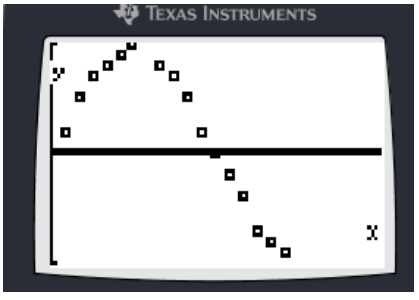
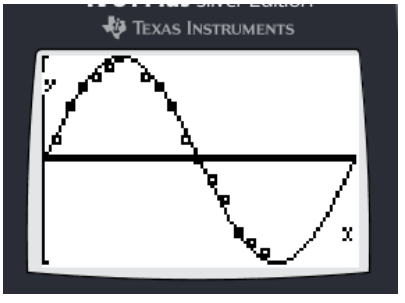




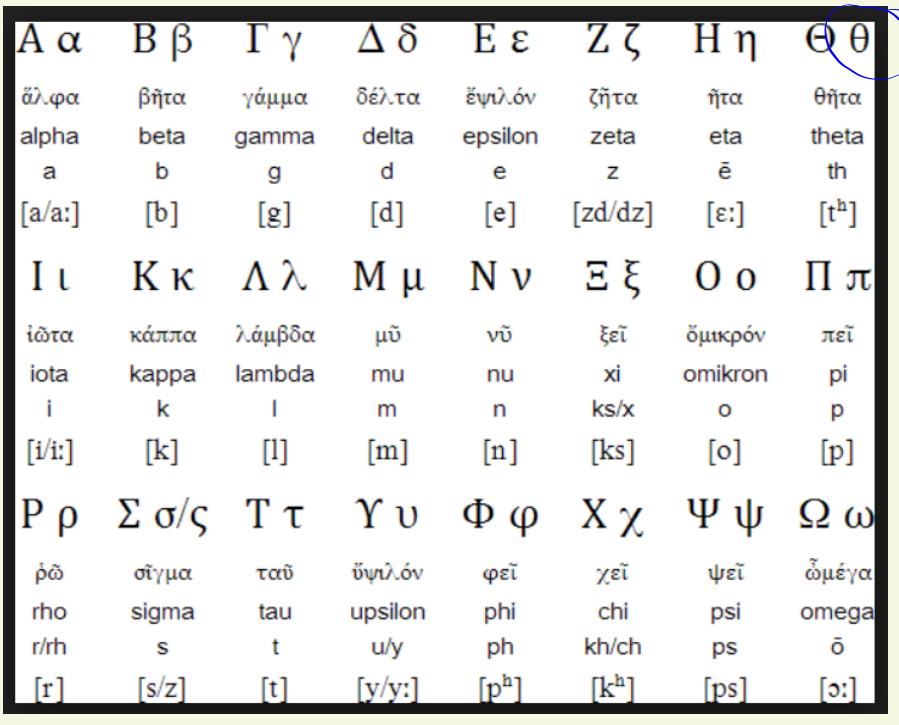
We then graphed the function $h(\theta) = \sin\theta$

and it fit pretty well.

Aim TODAY

Understand the relationship of the function

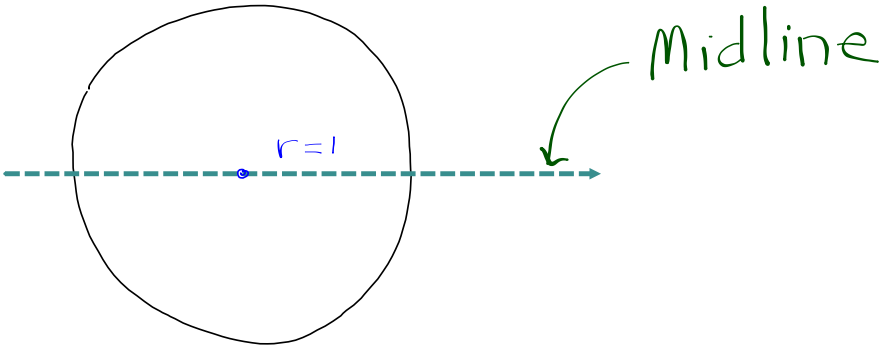
$$f(\theta) = \sin(\theta)$$

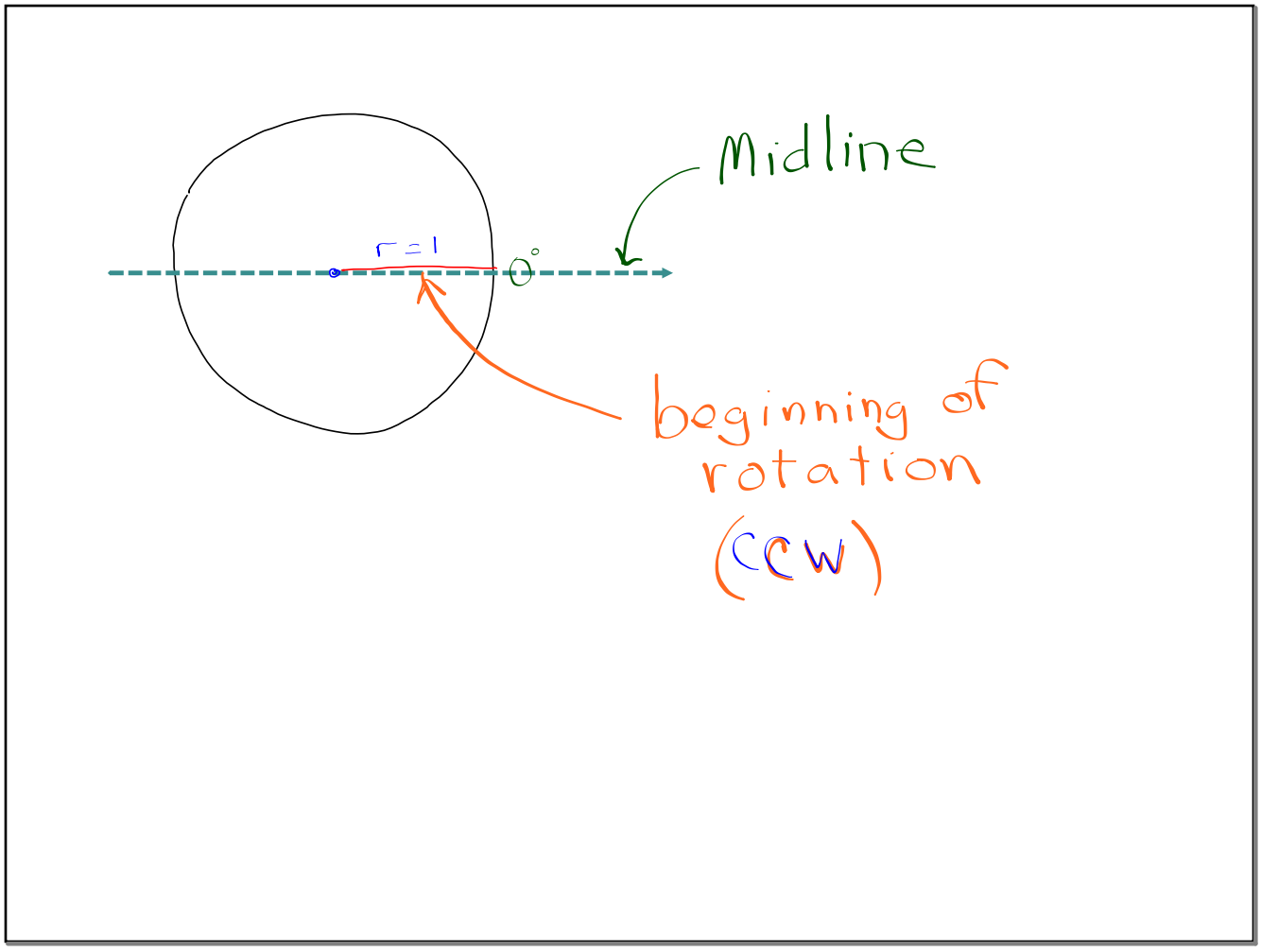


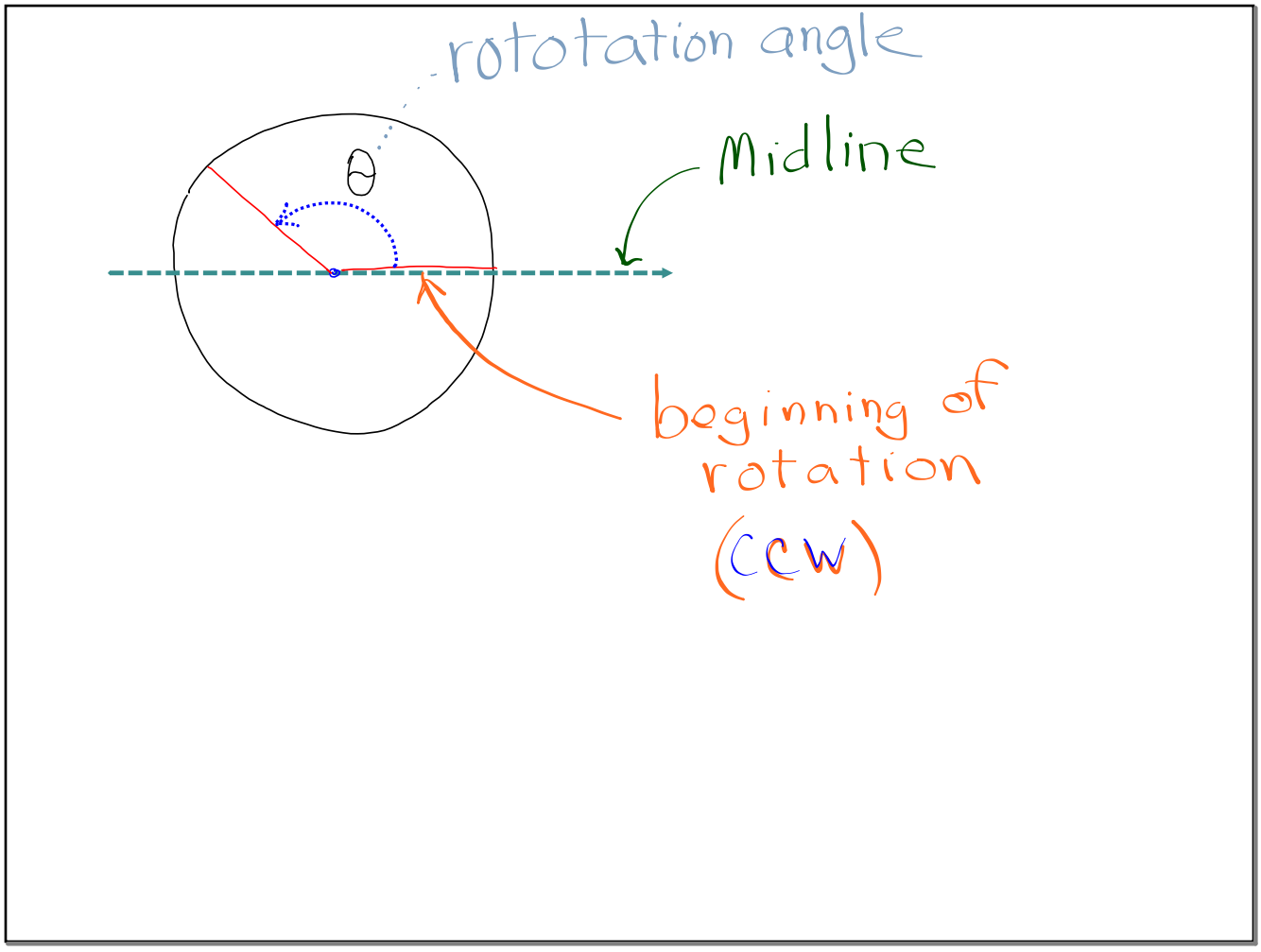
Α α	Β β	Γ γ	Δ δ	Ε ε	Ζ ζ	Η η	Θ θ
ἄλ.φα	βῆτα	γάμμα	δέλ.τα	ἔψιλ.όν	ζῆτα	ἦτα	θῆτα
alpha	beta	gamma	delta	epsilon	zeta	eta	theta
a	b	g	d	e	z	ē	th
[a/a:]	[b]	[g]	[d]	[e]	[zd/dz]	[ɛ:]	[t^h]

Ι ι	Κ κ	Λ λ	Μ μ	Ν ν	Ξ ξ	Ο ο	Π π
ἰῶτα	κάππα	λ.άμβδα	μῦ	νῦ	ξεῖ	ὄμικρόν	πεῖ
iota	kappa	lambda	mu	nu	xi	omikron	pi
i	k	l	m	n	ks/x	o	p
[i/i:]	[k]	[l]	[m]	[n]	[ks]	[o]	[p]

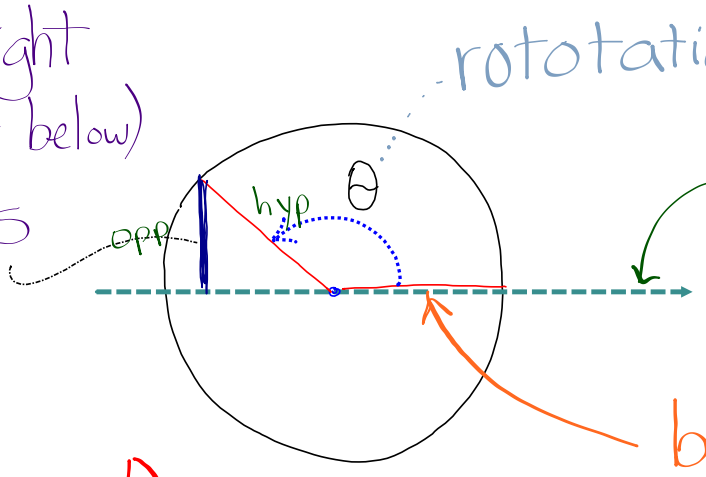
Ρ ρ	Σ σ/ς	Τ τ	Υ υ	Φ φ	Χ χ	Ψ ψ	Ω ω
ῥῶ	σῖγμα	ταῦ	ὖψιλ.όν	φεῖ	χεῖ	ψεῖ	ὦμέγα
rho	sigma	tau	upsilon	phi	chi	psi	omega
r/rh	s	t	u/y	ph	kh/ch	ps	ō
[r]	[s/z]	[t]	[y/y:]	[p^h]	[k^h]	[ps]	[ɔ:]


Midline
r=1


Midline
r = 1
0°
beginning of rotation
(ccw)

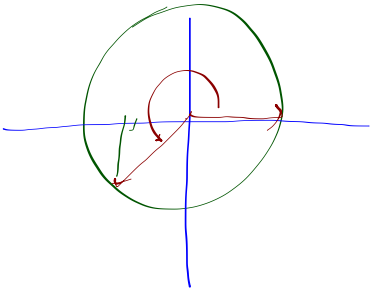

rotation angle
θ
Midline
beginning of rotation
(ccw)

The height above(or below) the axis is



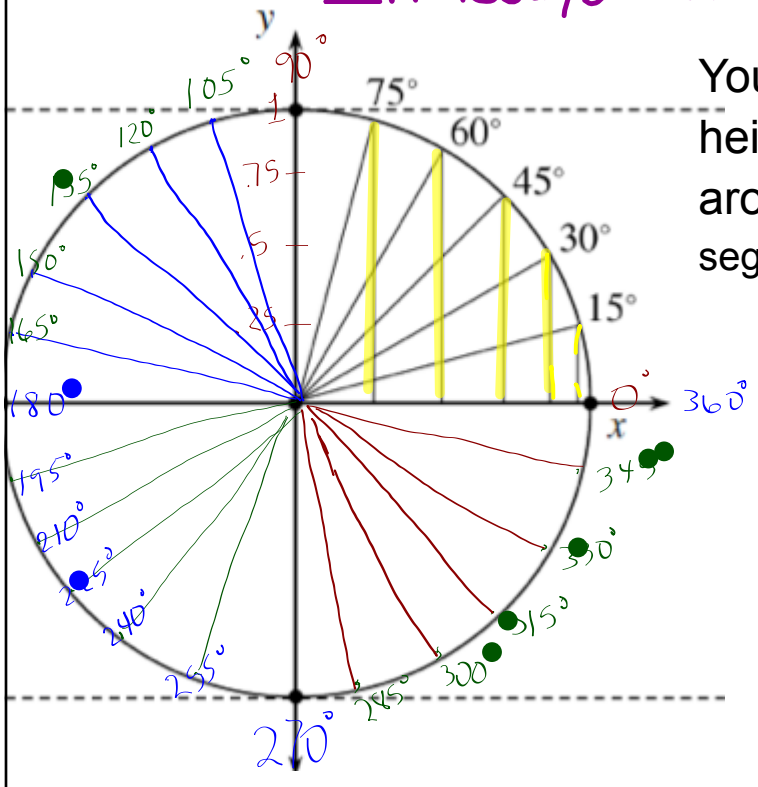
$f(\theta) = \sin\theta$

$\sin\theta = \frac{opp}{hyp}$



Need
Resource Sheet

In todays activity:



You will be **meas**uring the heights of **vertical segments** around **a** circle. Those segments represent heights

for example...

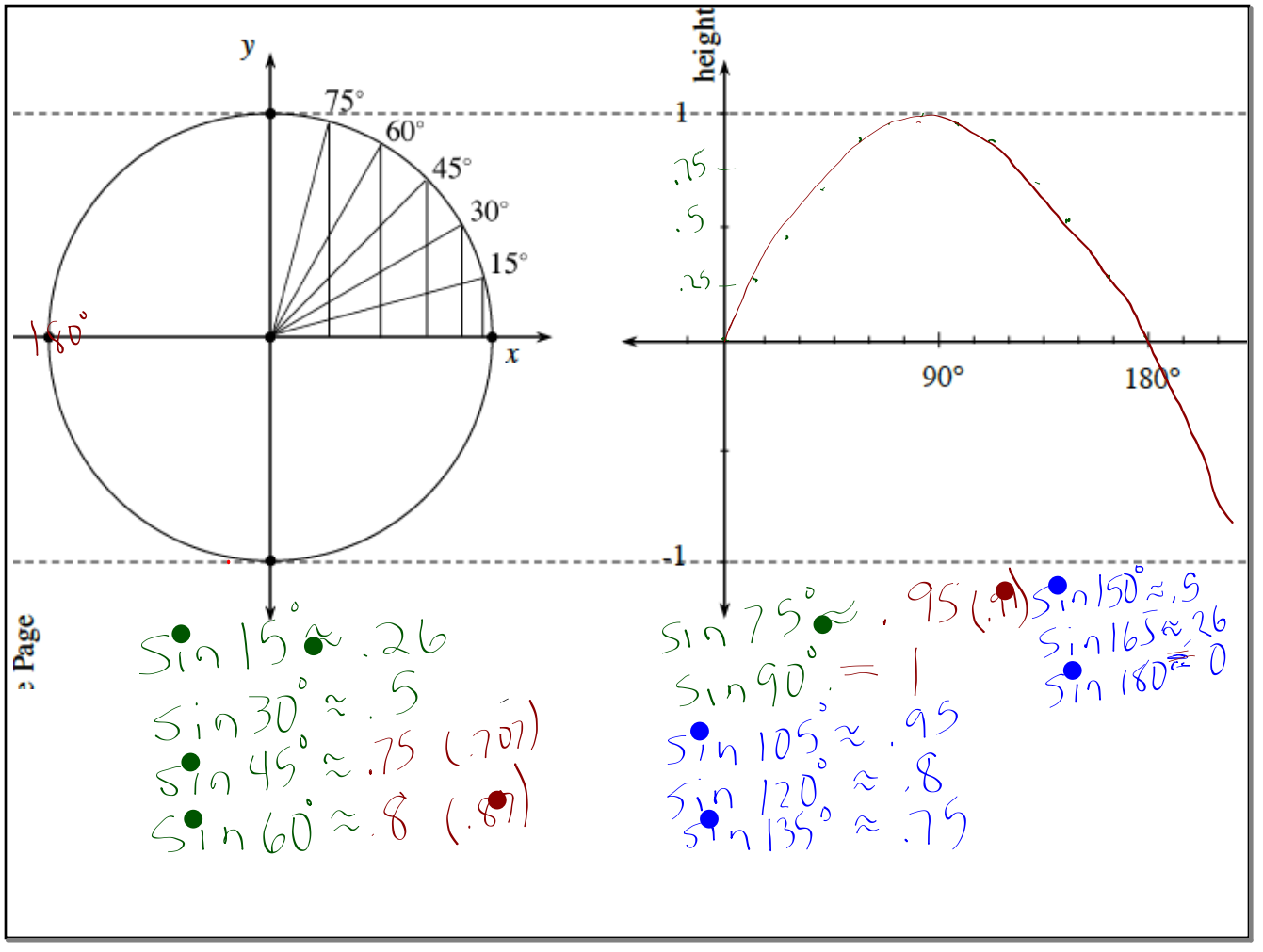
$h(15°) = \sin 15°$

$\approx .26$

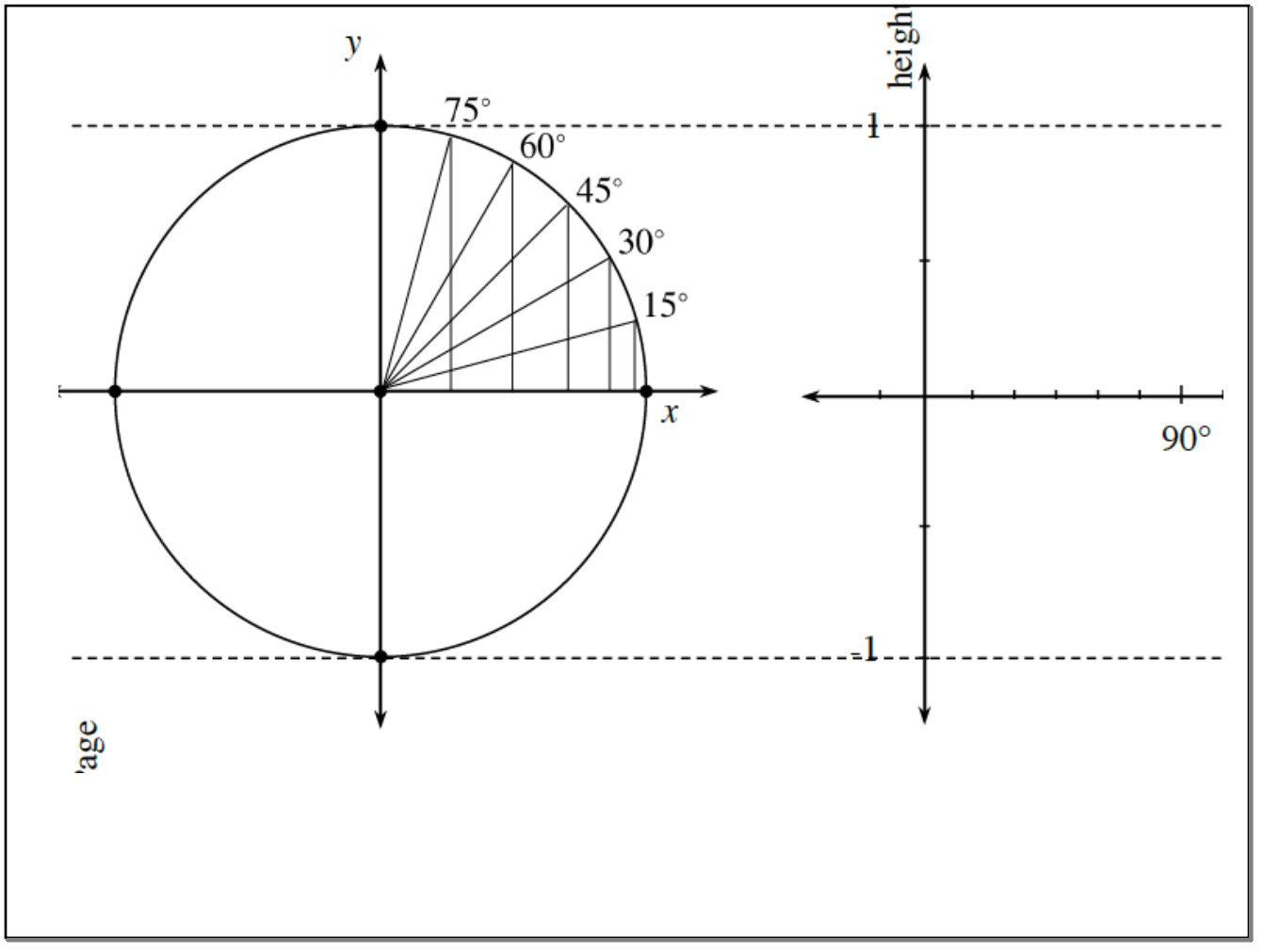
$h(30°) = \sin 30°$

$\approx .05$

May 01, 2019


y
75°
60°
45°
30°
15°
180°
x
height
1
.75
.5
.25
-1
90°
180°
Page
sin 15° ≈ .26
sin 30° ≈ .5
sin 45° ≈ .75 (.707)
sin 60° ≈ .8 (.87)
sin 75° ≈ .95 (.97)
sin 90° = 1
sin 105° ≈ .95
sin 120° ≈ .8
sin 135° ≈ .75
sin 150° ≈ .5
sin 165° ≈ .26
sin 180° ≈ 0

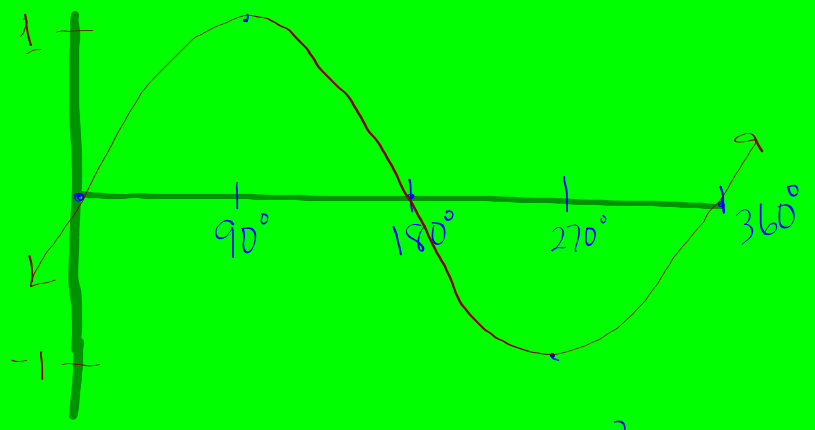
May 01, 2019

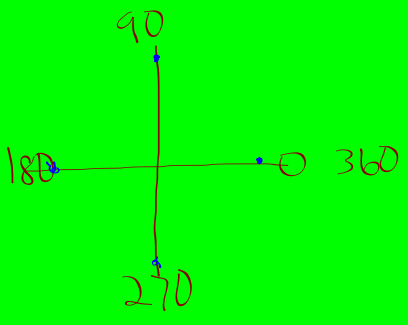


May 01, 2019

Domain and range of $y = \sin(\theta)$

for tonight only





D: $0^\circ \leq \theta \leq 360^\circ$

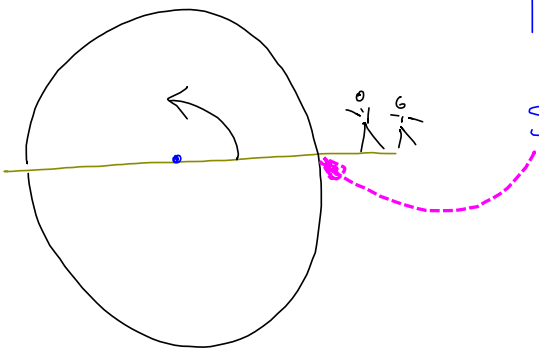
R: $-1 \leq f(\theta) \leq 1$

Definition $f(\theta) = \sin(\theta)$

$f(\theta)$ is the height above/below the midline as a function of the angle of rotation, θ.

(in a circle with radius = 1)

For the next several weeks you will be given problems that refer to the Screamer.



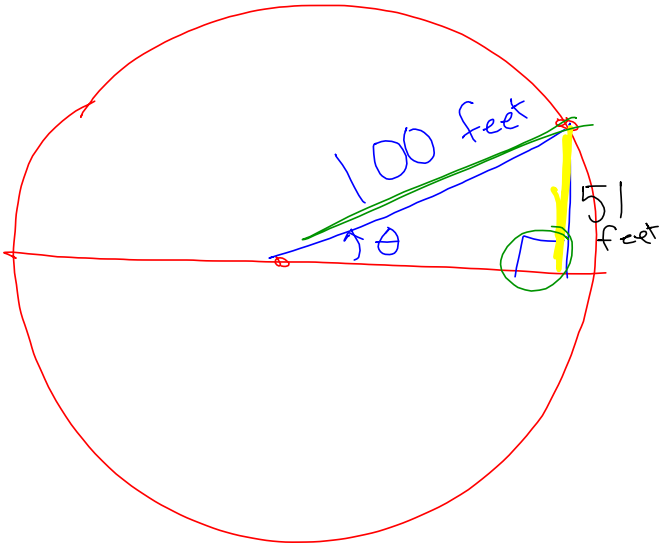
100 foot radius

Starting point at ground level

Screamer rotates counter - clock.

Notes

If the Screamer broke down when you were 51 feet above ground, what was the angle of rotation when that happened ?



$$\sin\theta = \frac{51}{100}$$

$$\theta = \sin^{-1}(.51)$$

$$\theta \approx 30.7^\circ$$

Assignment:

7....24-27,29-30,32