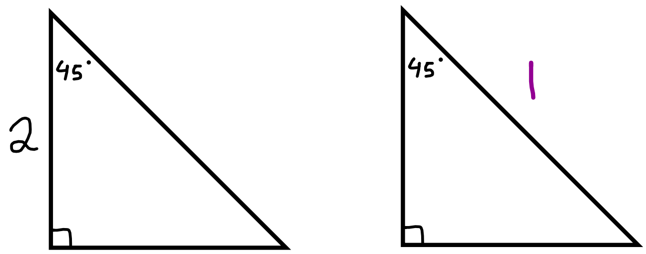
Warm Up

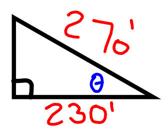
HW Questions

Add check marks as needed.

#1 Find all missing side lengths
(leave answers exact)

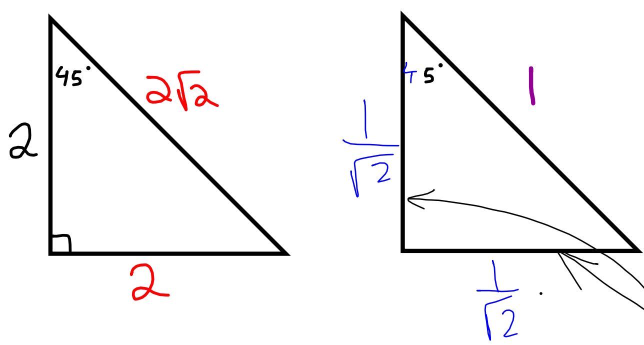


#2



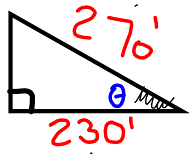
find θ

Answers



$$\frac{1}{\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}} = \boxed{\frac{\sqrt{2}}{2}}$$

#2



find θ

$$\boxed{\cos\theta = \frac{230}{270}}$$

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

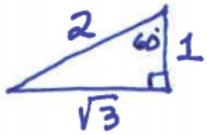
$$\theta = \cos^{-1}\left(\frac{230}{270}\right)$$

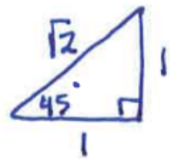
$$= 31.5^\circ$$

Questions on HW

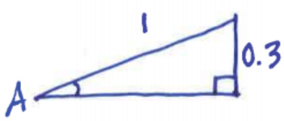
$\boxed{7-15}$

a.





$\boxed{7-16}$



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

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

7-18

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

(b) $\log(10^3) = n$

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

convert to log form

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

exp

$n=4$

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

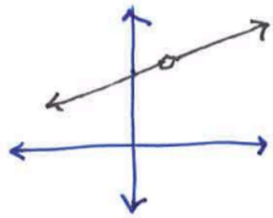
convert to log form

$m^{\log_m(n)} = n$

$\boxed{7-19}$

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 <u>hole</u> in the graph at $x=1$ (<u>not</u> an asymptote)



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

$f(.9) = 5.9$

$f(1.1) = 6.1$ No asymptote

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

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

$\boxed{7-20}$

a) Exponential is appropriate for population growth or decay

b) $y = ab^x + c \leftarrow 60000$

#years after 2000

$(0, 72000) \quad (2, 70379)$

$y = ab^x + 60000 \qquad y = ab^x + 6000$

#years after 2000

$(0, 72000)$ $(2, 70379)$

$y = ab^x + 60000$

$y = ab^x + 6000$

$72000 = ab^0 + 60000$

$12000 = ab^0$

$12000 = a$

$70379 = ab^2 + 60000$

$70379 = 12000(b)^2 + 60000$

$10379 = 12000 \cdot b^2$

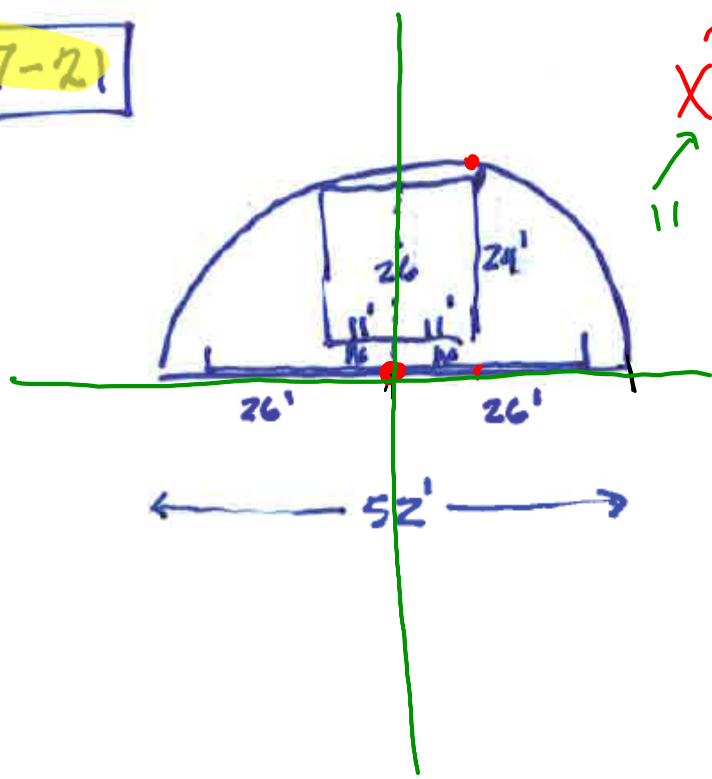
$\frac{10379}{12000} = b^2$

$.93 = b$

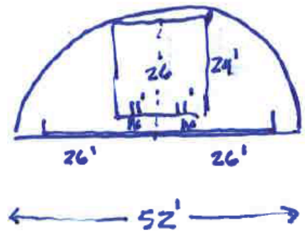
$$\boxed{y = 12000(.93)^x + 60000}$$

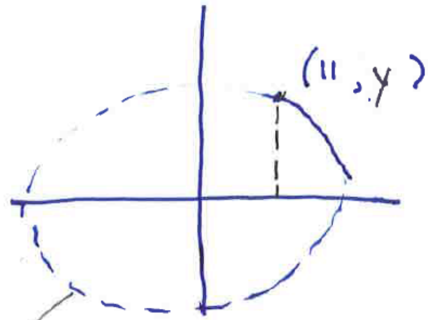
$\boxed{7-21}$

$x^2 + y^2 = 26^2$



7-21





circle

$x^2+y^2=26^2$

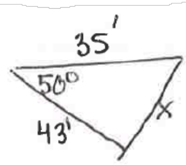
what is y when $x=11$?

$11^2+y^2=26^2$

$y^2=26^2-11^2$

$y=23.6$

7-22



NOT A RIGHT Triangle so Soh Cah Toa is NOT Useable

Given info is SAS so Law of Cosines works

(a)

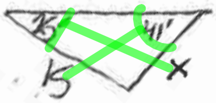
$c^2=a^2+b^2-2ab\cos C$

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

$x^2=1139.209\ldots$

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

(b)



LAW OF SINES

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

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

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

$\boxed{7\text{-}23}$

$x + y + z = 40$

$y = (x - 5)$

$x = 2z$

substitute to get

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

substitute $x = 2z$ to get

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

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

$5z = 45$

$\underline{\underline{z = 9}}$

$x = 2(9)$

Random HW Quality Check

- Turn in the assignment that was due yesterday.

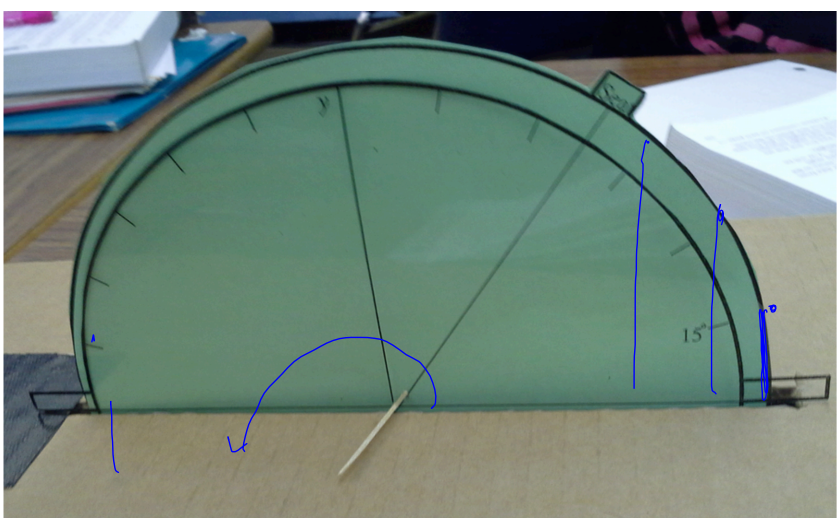
  7....... 4-6, 9-11

- Just your HW paper, no score necessary yet.

Have one person from your group:

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

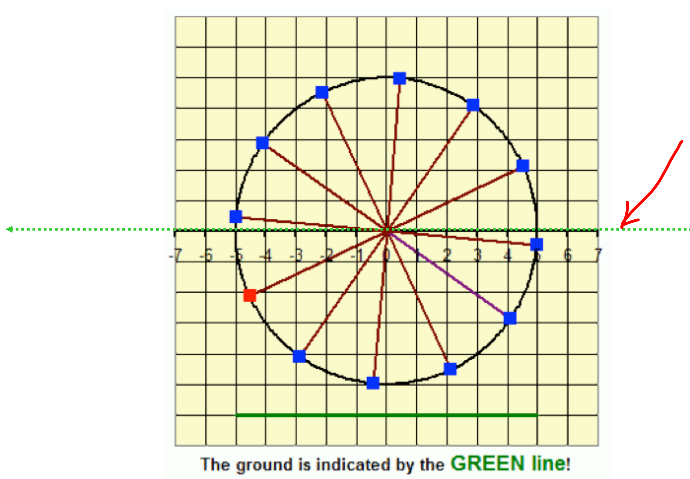
Then explain what we did to anyone who was absent ! If absent, you do <u>not</u> have to make up this particular activity, but you do need to understand it!



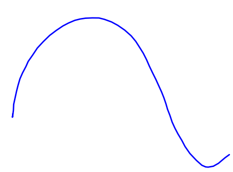
Summary and Ramifications from the Ferris Wheel Activity

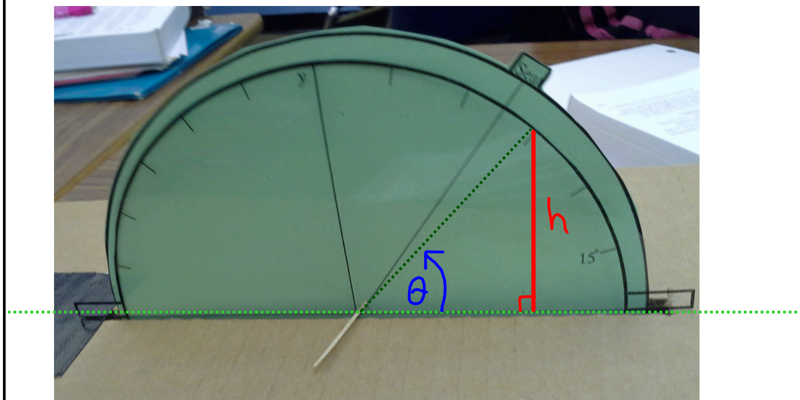
We created a new parent function called the:

The Sine Function



Ground level is the "midline"



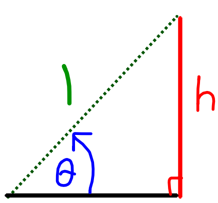


The Sine function is the connection between the heights above (and below) the midline AND the angle of rotation (θ)

the Greek letter θ

theta

The connection happens because at every point along the circle (well almost each point), you can make a right triangle with the height and the angle θ



$$\sin\theta = \frac{\text{opposite}}{\text{hypotenuse}} = \frac{h}{1}$$

so $h = \sin\theta$

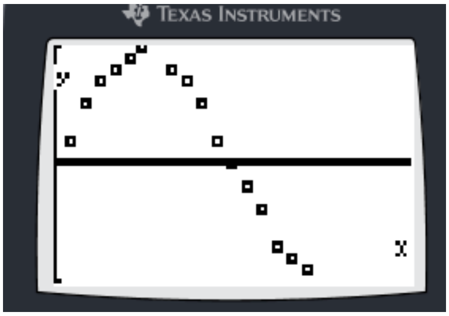
no matter the size of the angle

as a function of θ

$$h(\theta) = \sin\theta$$

1. We collected periodic data (heights around the circle)

2. We plotted those heights against the various angles of rotation.



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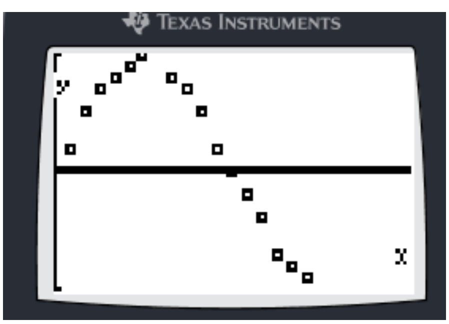
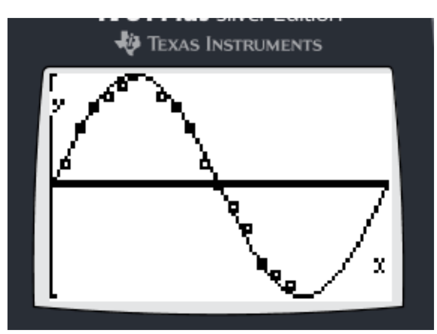




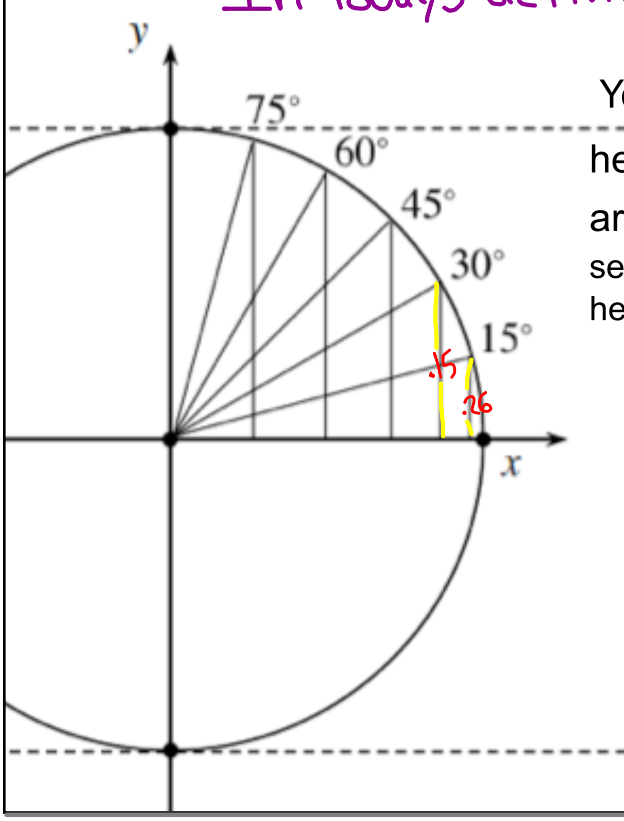
We then graphed the function $h(\theta) = \sin\theta$

and it fit pretty well.

Aim
TODAY

To deepen the connection between the heights of points around a circle (with a radius $=1$) and the angle of rotation.

In todays activity :



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

for example....

$h(15°) = \sin 15°$

$\approx .26$

$h(30°) = \sin 30°$

≈ 0.5

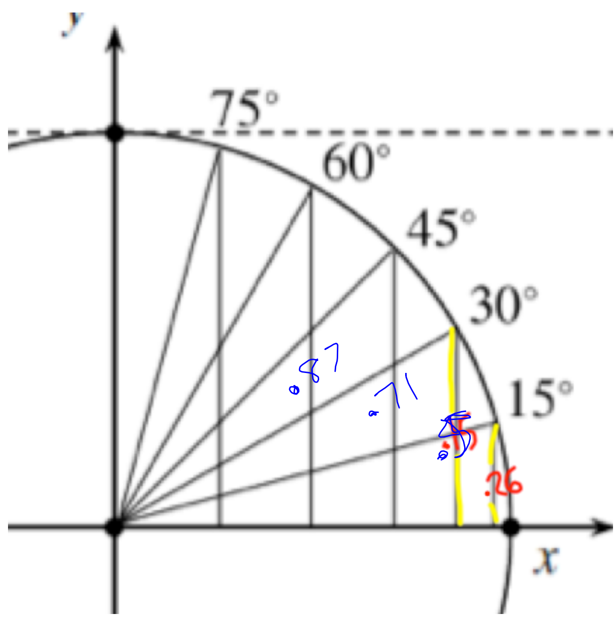
Each pair needs a Resource Sheet 7.1.2

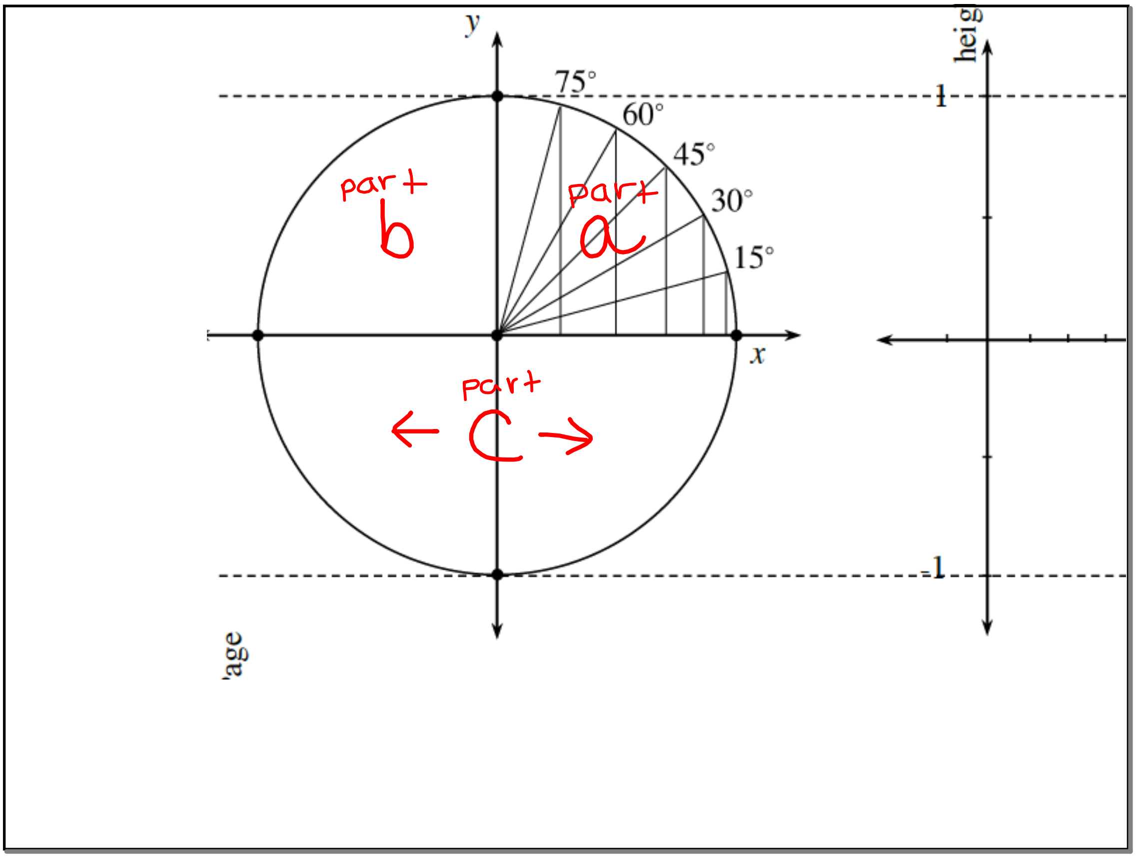
⇒ 7-14 abc

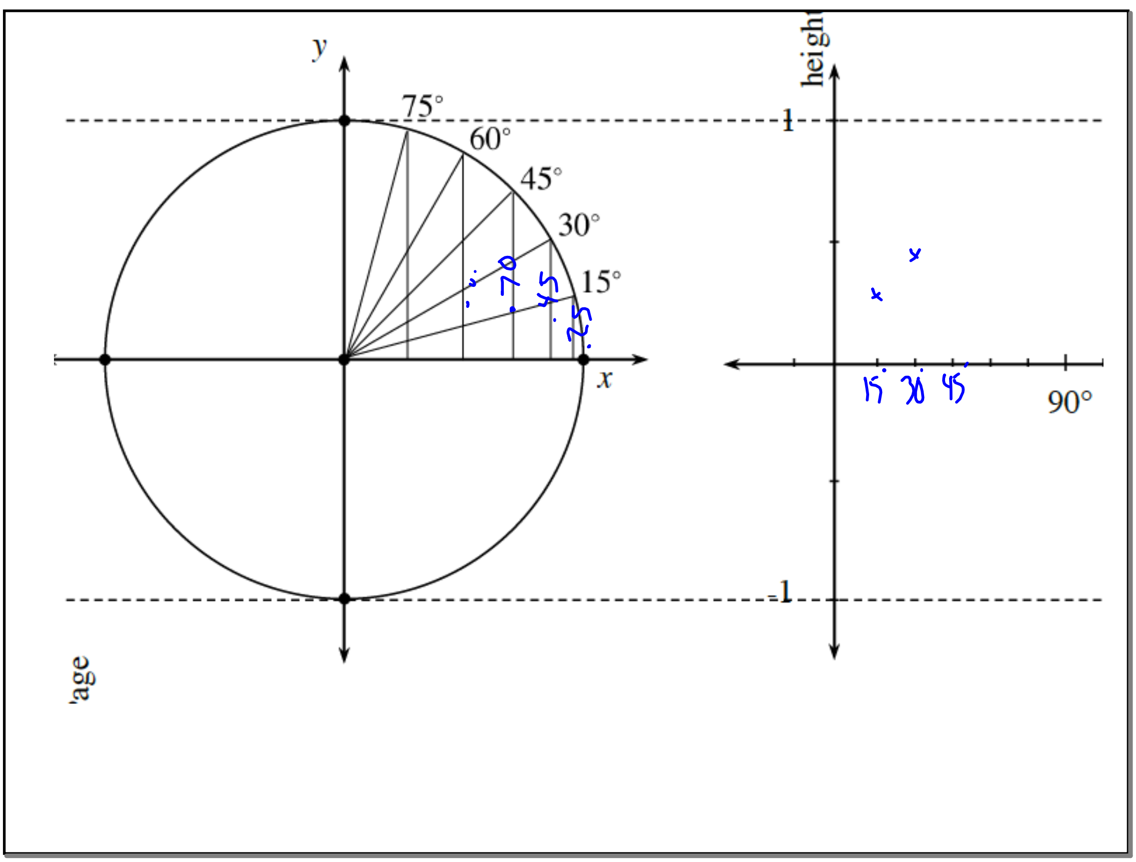
need a straight edge to make triangles

Try to finish in 30 minutes

-Each person pair will turn in their own.



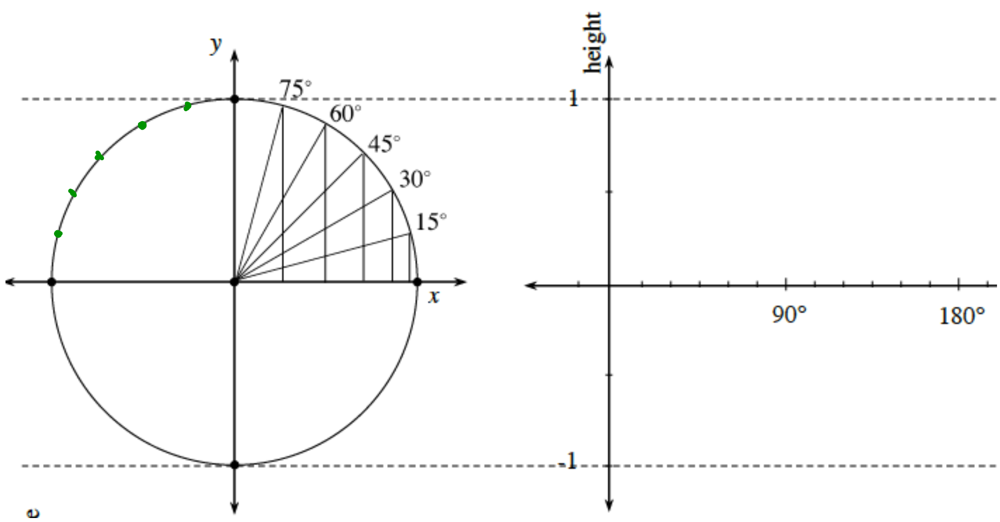

y
75°
60°
45°
30°
15°
x
1
-1
heig
'age
part b
part a
part C

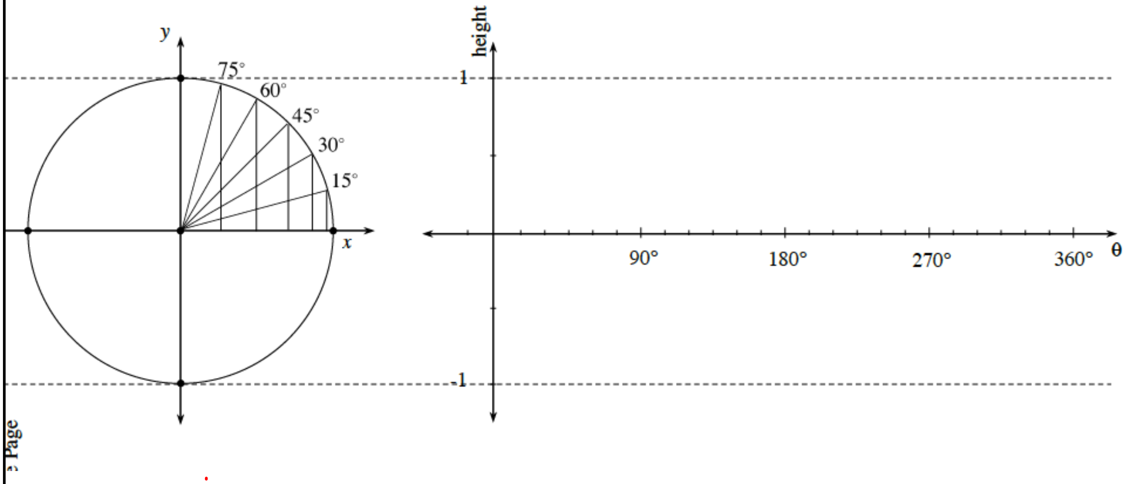

y
75°
60°
45°
30°
15°
x
1
-1
heigh
'age
.70
.45
.25
15°
30°
45°
90°

Before you turn in your paper, title it

The Sine Function $y=\sin(\theta)$

Then check last night's HW with the solutions




y
x
75°
60°
45°
30°
15°
height
1
-1
90°
180°
270°
360°
θ

Assignment: 7....24-30, 32

pdf