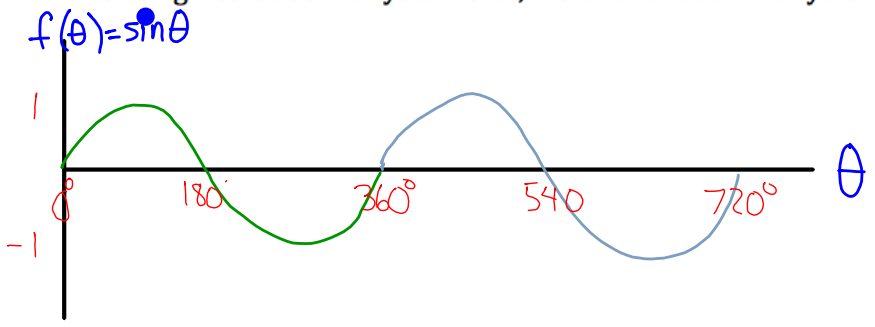
https://www.desmos.com/calculator/ie7t023ltt

Pick Up the Warm Up

HW Tally

Warm Up 7.1.4 day 1

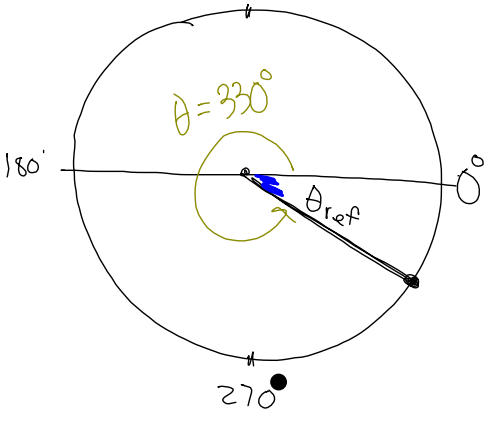
Without using a calculator or your notes, *sketch and label* two cycles of a sine curve



looking at your sketch list the first two θ – *axis* intercepts that are greater than 360° 540° 720°

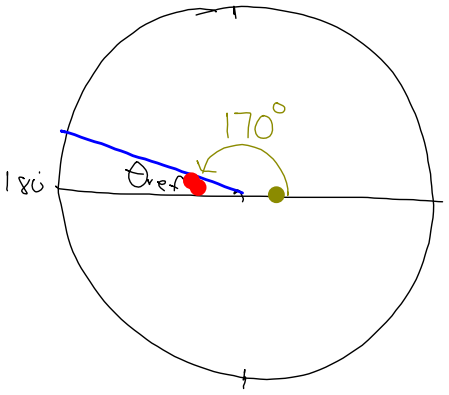
Determine the size of the *reference angles* associated with the following angles of rotation. Draw unit circles with a horizontal midlines to help. (a vertical axis might cause confusion so leave it off)

$\theta = 330°$ $\theta_{ref} = 30°$ $360° - 330° = 30°$



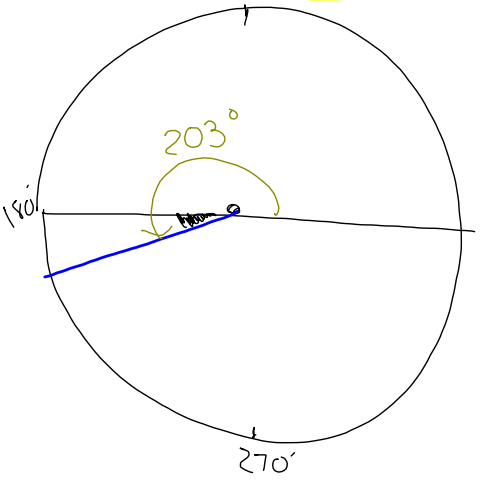
$\theta = 170°$

$\theta_{ref} =$ 10°



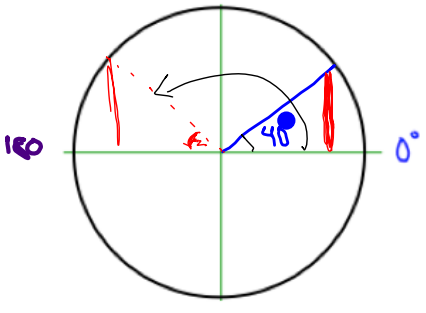
$\theta = 203°$

$\theta_{ref} =$ 23°

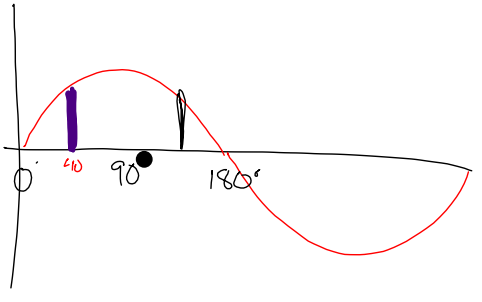


Name another rotation angle with the same vertical height as as 40°.

140°



via a Sine Graph



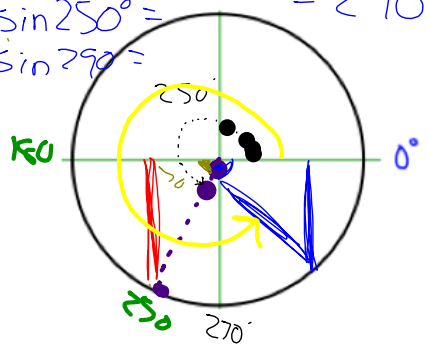
Name another rotation angle with the same **vertical height as** as 250°.

$\theta = 360 - 70°$

$= 290°$

$\sin 250° =$

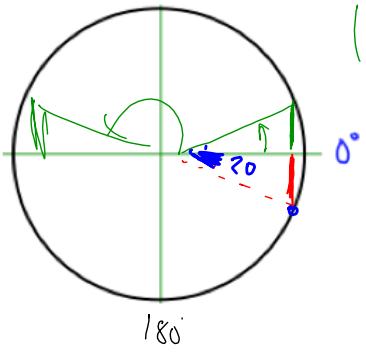
$\sin 290 =$



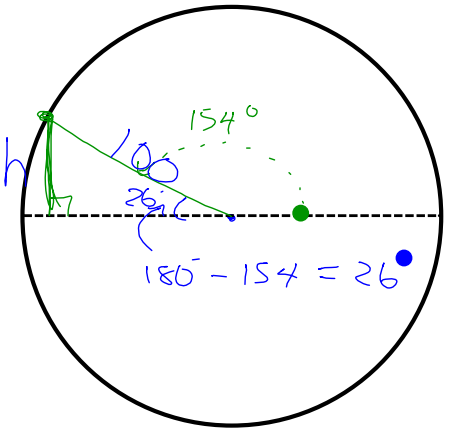
tricky -Name an another rotation angle whose **vertical height** is the opposite of the height from a rotation of 340°.

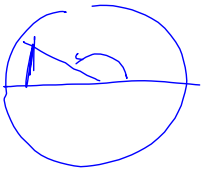
20°

160°



5. Suppose your best friend was stuck on the *Screamer* Ferris Wheel when it had rotated 154°. How high was the climb down to the ground level ?





$\sin 26° = \frac{h}{100}$

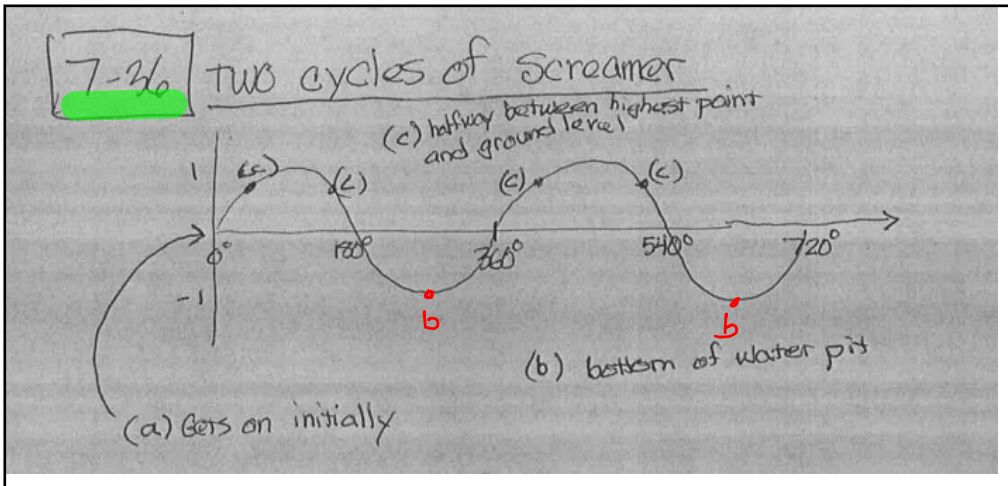
$h = 100 \cdot \sin(26)$

$\approx$ ~~23.8~~ 43.84 feet

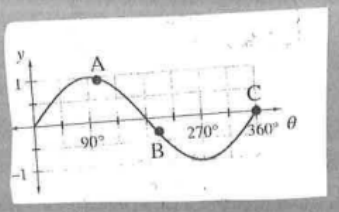
Q

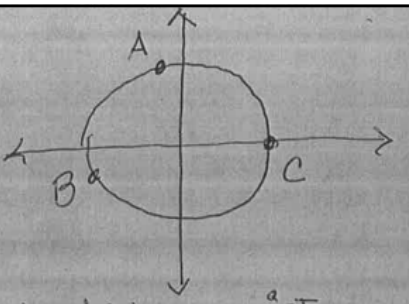
on HW

7-36 Two cycles of Screamer



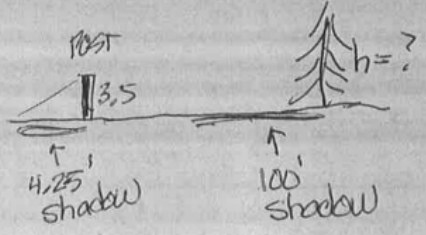
7-37





(a) The rider is just past the highest point.
(b) Just below ground
(c) Back to the starting point.

7-38



proportional thinking

$$\frac{3.5}{4.25} = \frac{h}{100}$$

cross multiply

$$h(4.25) = 100(3.5)$$

$$h = \frac{100(3.5)}{4.25} \approx 82.4 \text{ feet}$$

7-40 $y = 3x^2 + 6x + 1$

y-int: set $x=0$

$y = 1$

$(0, 1)$

x-int (set $y=0$)

$3x^2 + 6x + 1 = 0$

can't be factored so use Quadratic formula

$a=3 \quad b=6 \quad c=1$

$$x = \frac{-(6) \pm \sqrt{(6)^2 - 4(3)(1)}}{2(3)}$$

$$x = \frac{-6 \pm \sqrt{24}}{6} = \frac{-6 \pm 2\sqrt{6}}{6}$$

$$\frac{2\left[-3 \pm \sqrt{6}\right]}{6} = \frac{-3 \pm \sqrt{6}}{3}$$

$$\left(\frac{-3 \pm \sqrt{6}}{3}, 0\right)$$

7-41 From the graph you can see that the Vertex is at $(-1, -2)$ with a y-intercept of $(0, 1)$

Thus $y = a(x+1)^2 - 2$

to find "a" use y-int $(0, 1)$

$1 = a(0+1)^2 - 2$

$1 = a - 2$

$a = 3$

$y = 3(x+1)^2 - 2$

7-44

Forty total pennants → $w + c + p = 40$

Five fewer from Washington than California → $w = c - 5$

twice as many Calif. pennants than in Pennsylvania → $c = 2p$

$p = \frac{c}{2}$

$w = c - 5$

$w + c + p = 40$

$0.5 + c + \frac{c}{2} = 40$

multiply by 2

$2c - 10 + 2c + c = 80$

$5c - 10 = 80$

$5c = 90$

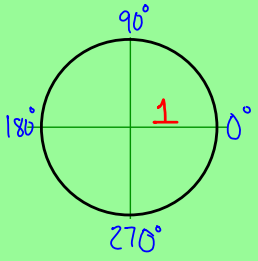
$c = 18$

$w = 18 - 5 = 13$

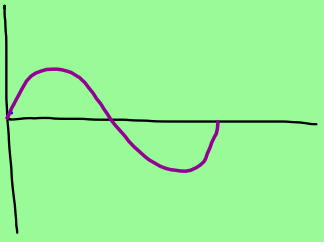
$p = \frac{18}{2} = 9$

18 from California
13 from Washington
9 from Pennsylvania

We've been working with UNIT CIRCLES

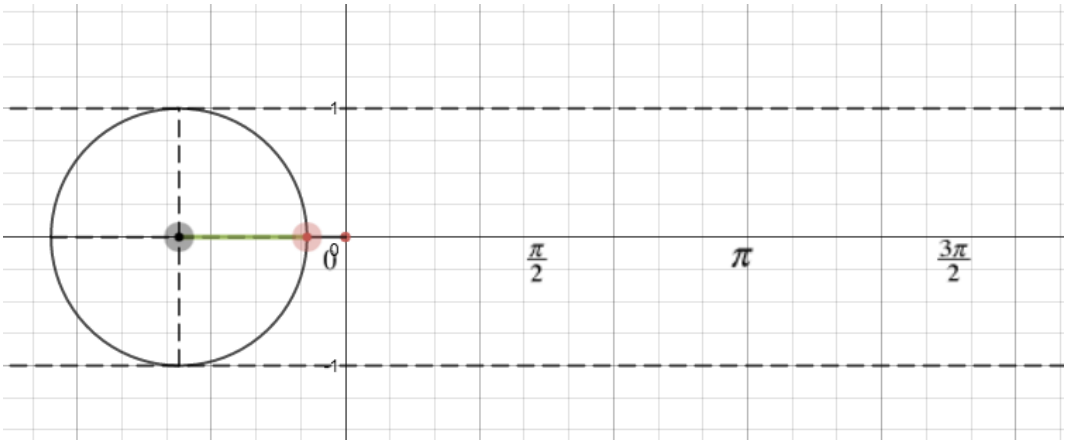


and the connection to the SINE FUNCTION

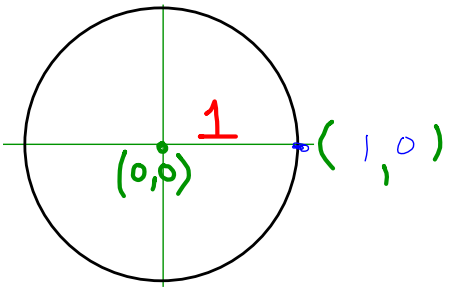


The assignment due today is the last one that you will show on the blue Recording Sheet.

The blue recording sheet, with all assignments, will be due tomorrow.



https://www.desmos.com/calculator/ie7t023ltt



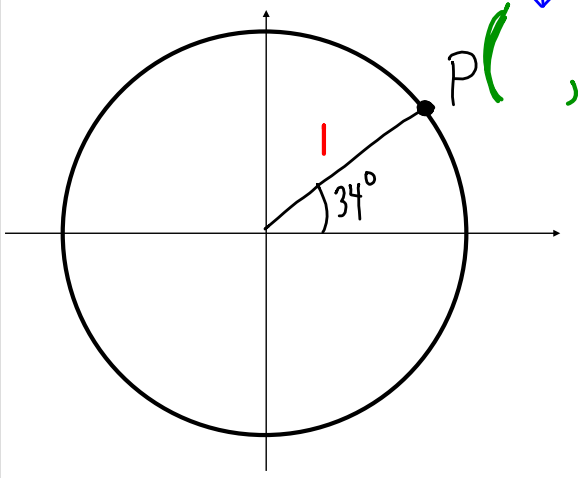
TODAY Cosine gets involved

Aim: Generate the Unit Circle Definition of Sine and Cosine

WORK ON Core Problem 7 - 45 and 46 in your notes p. 327

Find the coordinates accurate to 2 decimal places.

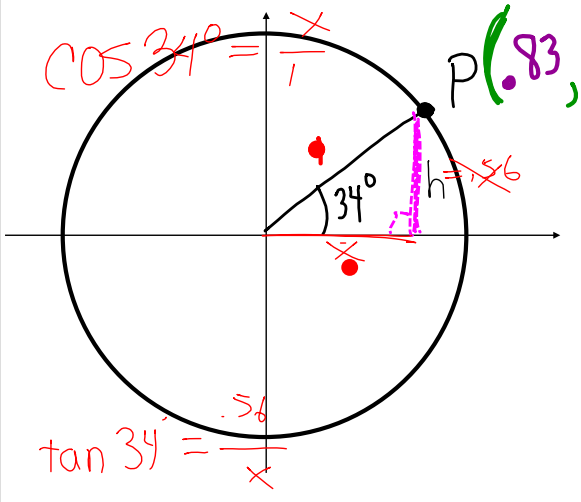
Unit Circle



How can you find ?

Is there more than one way?

ANSWER 7-45

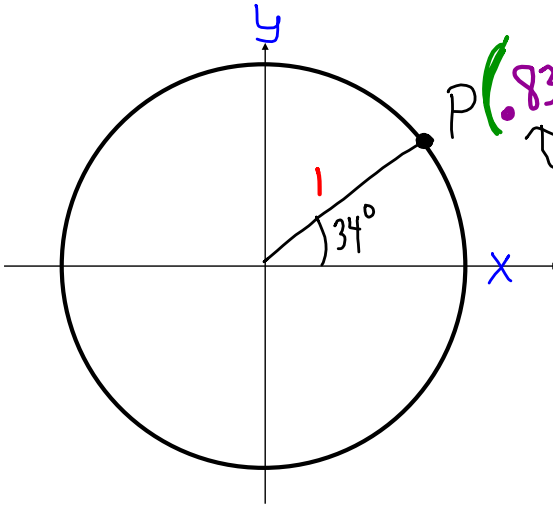


$\sin 34^\circ = \frac{h}{1}$

$h = .56$

$\tan 34^\circ = \frac{.56}{x}$

Volunteer to explain how they got their answer ?



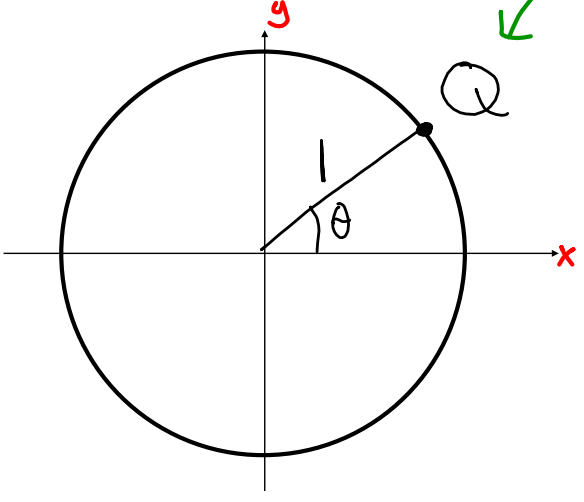
Vertical distace from x-axis

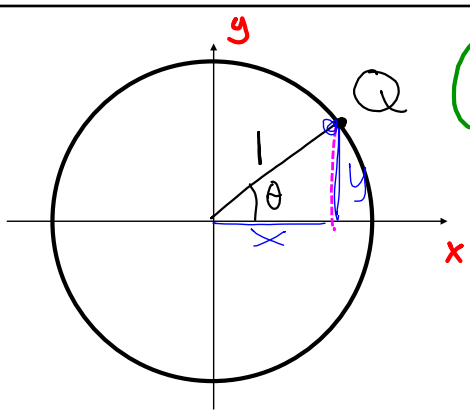
P(.83, .56)

horizontal distace from the center

Generalize.....

looking for its coordinates





$(\cos\theta, \sin\theta)$

$\frac{\sin\theta}{\tan\theta} = \frac{\frac{\sin\theta}{1}}{\frac{\sin\theta}{\cos\theta}}$

$\cos\theta = \frac{x}{1}$

$\sin\theta = \frac{y}{1}$

Possible Answers

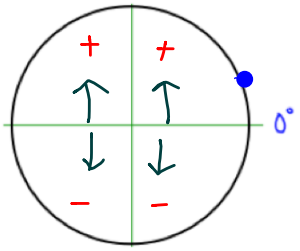
$(\cos\theta, \sin\theta)$

$(\sqrt{1-\sin\theta}, \sin\theta)$

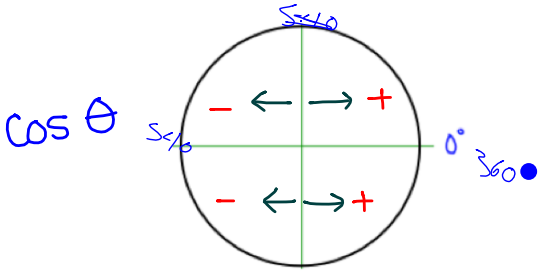
Summary

The **sine** is the **height** (vertical) distance from the **x-axis**)

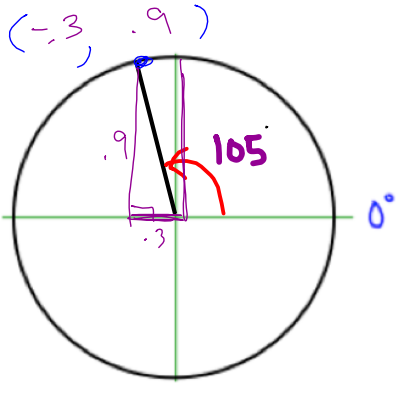
$\sin\theta$



The cosine tells you about the horizontal distance from the y-axis.



Estimate the coordinates of

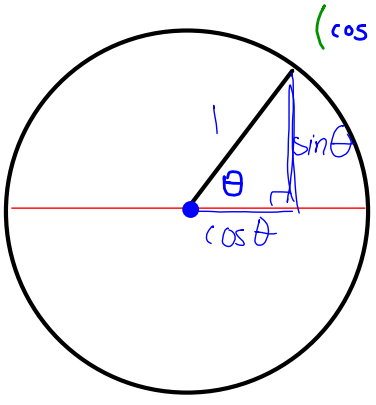


B. B.

The Pythagorean Identity

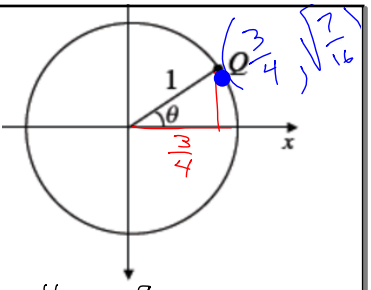
$(\cos\theta)^2 + (\sin\theta)^2 = 1^2$

$\cos^2\theta + \sin^2\theta = 1$



a. Find the exact coordinates of point Q by using the Pythagorean Theorem.

b. What is the value of $\sin\theta$. $= \sqrt{\frac{7}{16}}$



$\left(\frac{3}{4}\right)^2 + \sin^2(\theta) = 1$

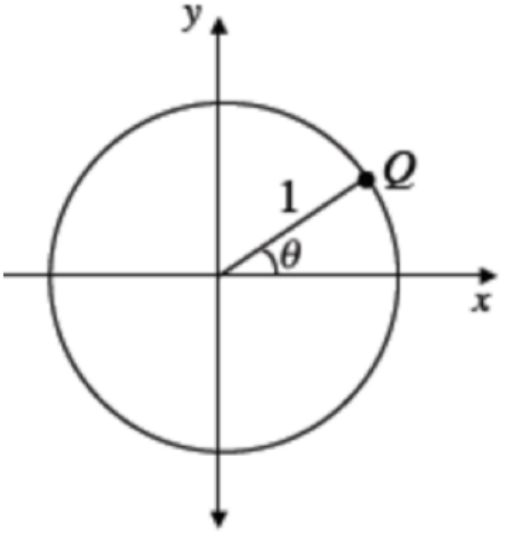
$\frac{9}{16} + \sin^2(\theta) = 1$

$\sin^2\theta = 1 - \frac{9}{16}$

$\sin^2(\theta) = \frac{16}{16} - \frac{9}{16}$

$\sin^2\theta = \frac{7}{16}$

$\sin() = \pm\sqrt{\frac{7}{16}}$



cosine of $\frac{3}{4}$

LCQ

Wednesday Assignment:

7....53-55, 58-60, 67

Mr.C ⟶ pdf