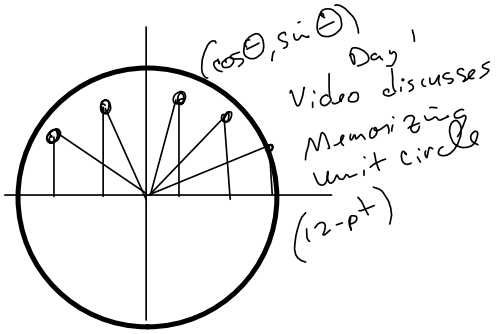
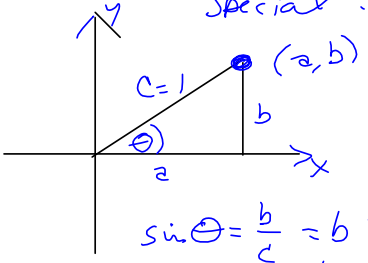
Trigonometry

Some nicer-looking notes than my improv on Monday. That fall '18 notes section looks nice.

https://harryzaims.com/122/122-fall-18/notes/chapter-1/180823.pdf

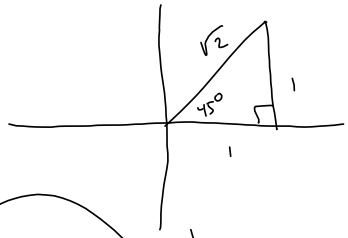


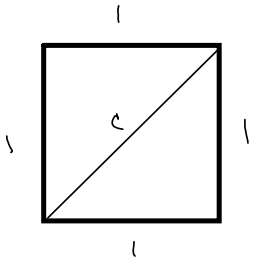
Day 1
Video discusses
Memorizing
unit circle
(12-pt)



Special!

$\sin\theta = \frac{b}{c} = b =$ y-coordinate of the point on the unit circle corresponding to θ.





$1^2 + 1^2 = 2 = c^2 \Rightarrow$

$\sqrt{c^2} = \sqrt{2}$

$|c| = \sqrt{2}$

$c = \pm\sqrt{2}$

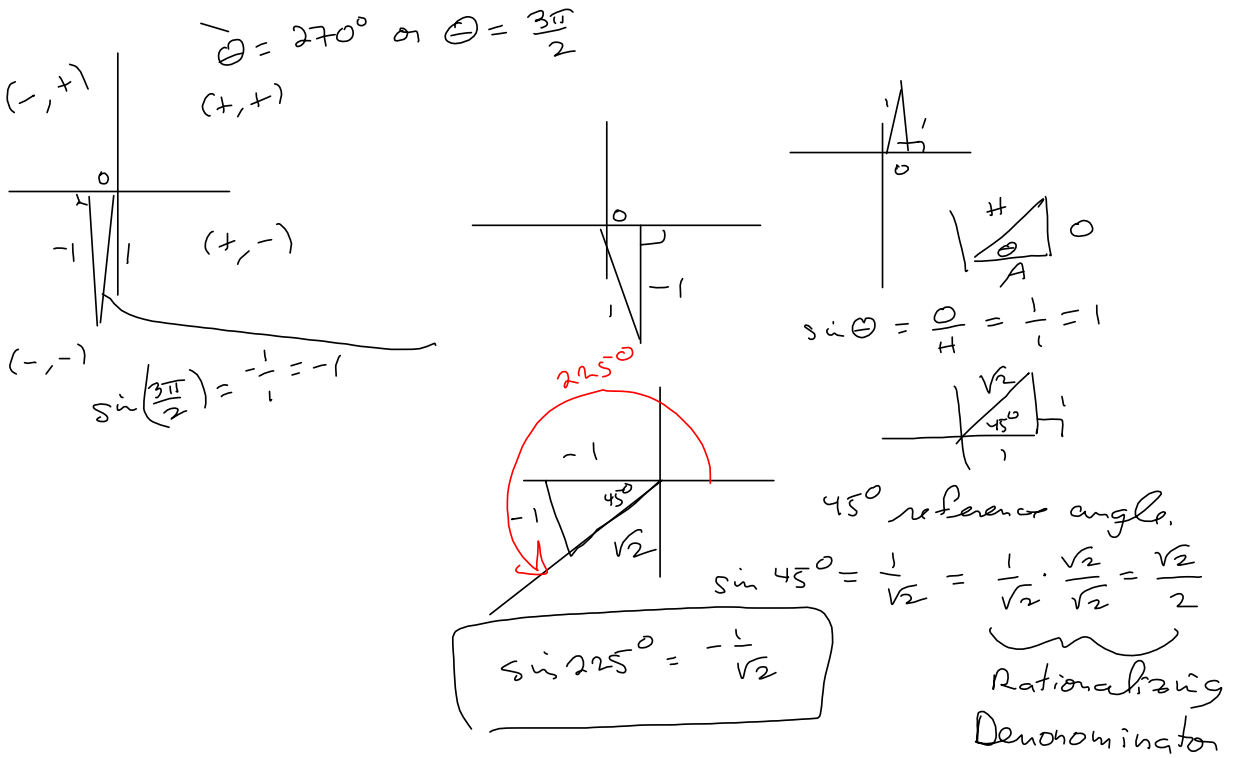
By convention, the hypotenuse (long side) is always positive.

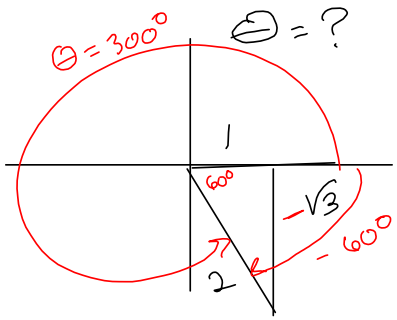
$\sqrt{4^2} = \sqrt{16} = 4$

$\sqrt{(-4)^2} = 4 = -(-4)$!

So $\sqrt{x^2} = |x|$

$|x| = \begin{cases} x & \text{if } x \geq 0 \\ -x & \text{if } x < 0 \end{cases}$

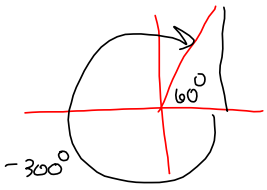

θ = 270° or θ = 3π/2
(−, +)
(+, +)
(+, −)
(−, −)
sin(3π/2) = −1/1 = −1
225°
45°
√2
sin 225° = −1/√2
sin θ = O/H = 1/1 = 1
45° reference angle.
sin 45° = 1/√2 = 1/√2 · √2/√2 = √2/2
Rationalizing Denominator



60° ref. angle in Q IV

II | I
III | IV

300° & -60° are coterminal



$\sin\theta = -\frac{\sqrt{3}}{2}$ $\quad \csc\theta = -\frac{2}{\sqrt{3}}$

$\cos\theta = \frac{1}{2}$ $\quad \sec\theta = \frac{2}{1}$

$\tan\theta = \frac{-\sqrt{3}}{1}$ $\quad \cot\theta = -\frac{1}{\sqrt{3}}$

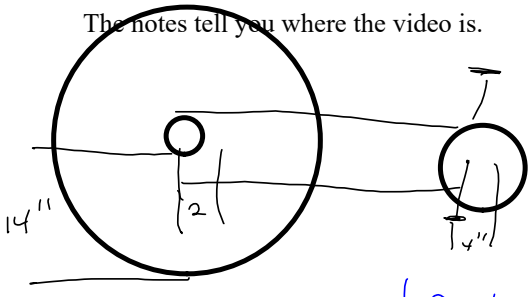
Webassign.net:

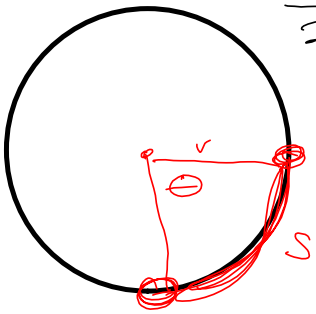
aims 9259 1636

Access code w/ new book.
Buy direct from site

#24 S1.1 is #25 in my notes.

The notes tell you where the video is.





$\frac{4}{2}$ = 2 times faster on rear sprocket!

Arc Length & Radians.

Circumference of circle?

$s = 2\pi r = r(2\pi)$ → Radian measure of going all the way around the circle.

$360^\circ = 2\pi$ radians.

Arc length for going $\frac{1}{2}$ way around the circle?

$\frac{1}{2}(2\pi)r = \pi r$ ← radius, radian angle

$s = r\theta$ = arc length for radius r & angle θ

$s = r\theta$

$\frac{\text{Distance}}{\text{Unit time}} = \text{speed}$ #24 is speed question involving arc length.

Want speed.

$s = r\theta$ = Distance Pedaling at $2 \frac{\text{revs}}{\text{sec}}$

$\frac{s}{\text{time}} = \frac{r\theta}{\text{time}}$

$\left(\frac{2 \text{ FRONT REVS}}{\text{sec}}\right)\left(\frac{2\pi}{1 \text{ REV}}\right)\left(\frac{1 \text{ REV FRONT}}{2 \text{ REV Rear}}\right)$

HOLD OFF. Will Make video for this.

$\left(\frac{2 \text{ Revs front}}{1 \text{ sec}}\right)\left(\frac{2 \text{ revs rear}}{1 \text{ rev front}}\right)\left(\frac{2\pi}{1 \text{ rev rear}}\right)\left(\begin{array}{c}14 \text{ inch} \\ \text{radius} \\ \text{rear}\end{array}\right)\left(\frac{1 \text{ ft}}{12 \text{ in}}\right)$

$\frac{\theta}{\text{sec}}$ r

$= \frac{28}{\cancel{56}\pi} \frac{\cancel{\text{ft}}}{\cancel{\text{sec}}} = \frac{28\pi}{3} \frac{\text{ft}}{\text{s}}$

$\left(\frac{28\pi}{3}\right)\frac{\text{ft}}{\text{s}}\left(\frac{60 \text{ mph}}{88 \text{ ft/sec}}\right) = \ldots \frac{\text{mi}}{\text{hr}}$

$\left(\frac{28\pi}{3}\frac{\text{ft}}{\text{s}}\right)\left(\frac{\text{mi}}{5280 \text{ ft}}\right)\left(\frac{3600 \text{ sec}}{1 \text{ hr}}\right) = \ldots \frac{\text{mi}}{\text{hr}}$