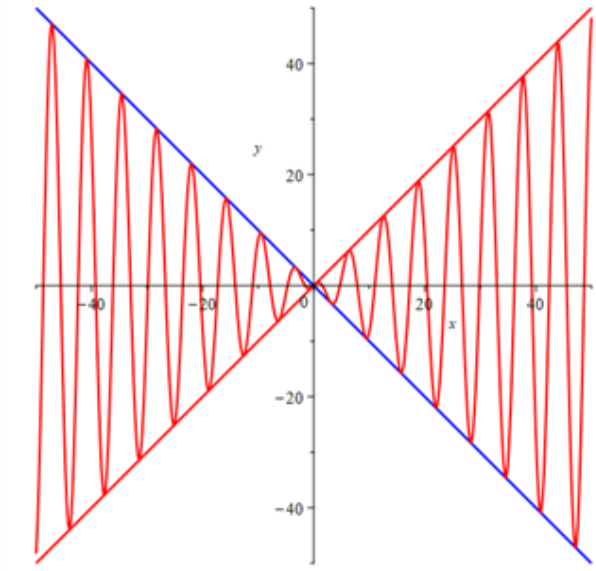
Resources for Writing Project #1 are all the old written tests and the test videos for Test 1 that are squirreled away on harryzaims.com.

Link to Test 1 video and notes in the Chapter 1 Videos:

https://harryzaims.com/122/videos/chapter-01/test-1/

§1.6 #29 $x\cos(x)$: "x" is dampening cos curve near $x=0$.



Coterminal with $\frac{237\pi}{6}$ between -2π & 2π

(1) Divide by 2π & work w/ remainder.

(2) Convert to degrees

$evalf\left(\frac{\frac{237\cdot Pi}{6}}{(2\cdot Pi)}\right)$ how many revolutions?

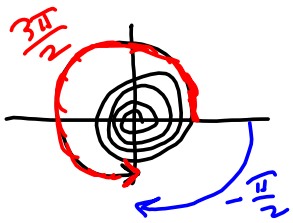
19.75000000 19.75

$19\cdot 2\cdot Pi$

$38\,\pi$

$\frac{237\cdot Pi}{6} - 38\cdot Pi$

$\frac{3\pi}{2}$ This is radians for that .75 revolutions remainder.



$-\frac{\pi}{2}, \frac{3\pi}{2}$

$-90^\circ, 270^\circ$

(2) $\frac{237\pi}{6} \cdot \frac{180^\circ}{\pi} =$

$\frac{237\cdot Pi}{6}\cdot\frac{180}{Pi}$ Convert to degrees

7110

$\frac{7110}{360}$

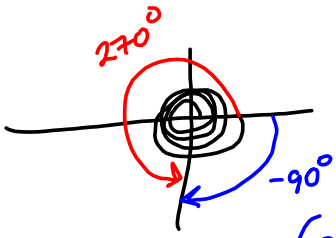
$\frac{79}{4}$

$evalf(\%)$ so 19.75 revolutions

19.75000000

$.75\cdot 360$

270.00° = .75 revolution



$-90^\circ, 270^\circ$

$-\frac{\pi}{2}, \frac{3\pi}{2}$

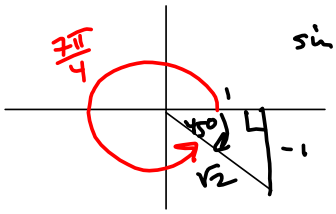
$(270^\circ)\left(\frac{\pi}{180^\circ}\right) = \frac{3\pi}{2}$!

Domains and Ranges of Inverse Functions &

$\cos^{-1}$, TAN^{-1}, SIN^{-1} Keys

$[0,\pi]$ $(-\frac{\pi}{2},\frac{\pi}{2})$ $[-\frac{\pi}{2},\frac{\pi}{2}]$ are their ranges.

$\arcsin\left(\sin\left(\frac{7\pi}{4}\right)\right) = \theta$



$\sin\left(\frac{7\pi}{4}\right) = -\frac{1}{\sqrt{2}} = -\frac{\sqrt{2}}{2}$ &

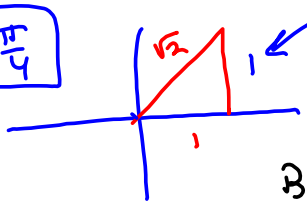
$\arcsin\left(-\frac{1}{\sqrt{2}}\right) = -\frac{\pi}{4} = \theta$

Calculator in degrees mode would say -45° here.

$\arccos\left(\sin\left(\frac{7\pi}{4}\right)\right) = \arccos\left(\frac{1}{\sqrt{2}}\right)$ Not $\sqrt{2}$, dummy

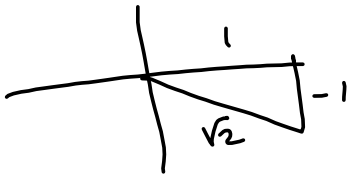
$= 45^\circ$ OR $\frac{\pi}{4}$

even though there are 2 solutions in $[0,2\pi]$ of $\cos\theta = \frac{1}{\sqrt{2}}$

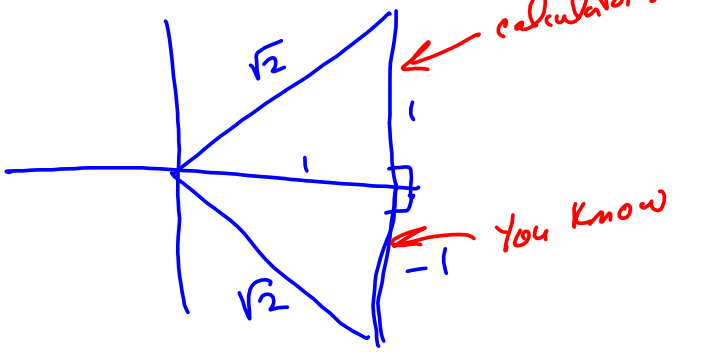


is all the calculator sees!

But You can see this, too:



$\cos\theta = \frac{1}{\sqrt{2}}$



3. Answer the questions about the equation $\tan(\theta)=\frac{-2}{3}$.

a. (5 points) Sketch two triangles that satisfy $\tan(\theta)=\frac{-2}{3}$.

b. (5 pts) Assume the terminal side of the angle θ lies in the 2nd quadrant. Find the other five trigonometric functions of θ.

c. (5 pts) Again, assuming θ's terminal side lies in Q II, and $0 \le \theta < 2\pi$, find θ, in radians *and* degrees, rounded to 3 decimal places.

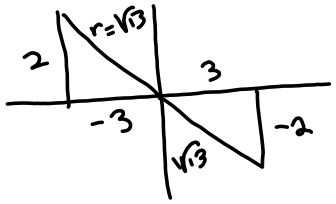
d. (5 pts) Give *all* solutions to the equation $\tan(\theta)=-\frac{2}{3}$, in degrees *and* radians, rounded to three (3) decimal places.

(a) $\tan\theta = -\frac{2}{3}$

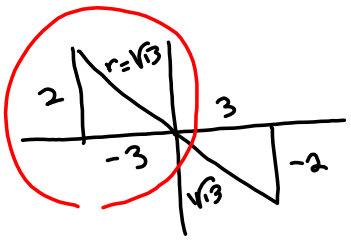
Pythagorus:

$2^2 + 3^2 = 13$

$\rightsquigarrow r = \sqrt{13}$



(b)



$\sin\theta = \frac{2}{\sqrt{13}} = \frac{2\sqrt{13}}{13} = \sin\theta$

$\cos\theta = \frac{-3}{\sqrt{13}} = \frac{-3\sqrt{13}}{13} = \cos\theta$

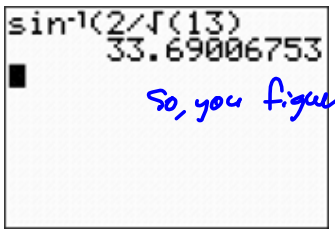
$\tan\theta = -\frac{2}{3}$

$\csc\theta = \frac{\sqrt{13}}{2}$

$\sec\theta = -\frac{\sqrt{13}}{3}$

$\cot\theta = -\frac{3}{2}$

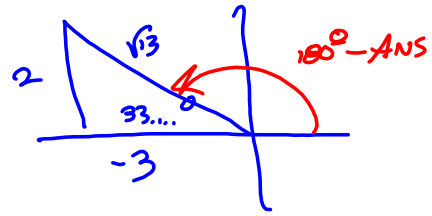
(c)

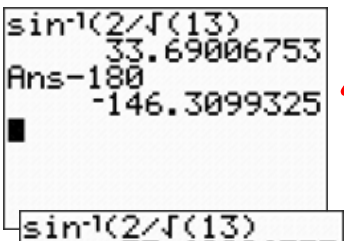


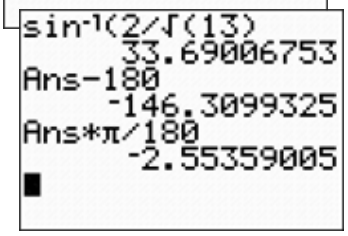
is in wrong quadrant.

So, you figure this:

We want this one:





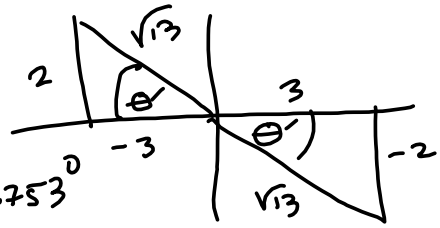


So, $\theta \approx 146.3099325^\circ \approx 2.55359005$

To 3 places:

$\theta \approx 146.310^\circ$ OR 2.554

(d) ALL Solutions



$\theta' \approx 33.690067753^\circ$

We got 146.3099325°

& $360^\circ - 33...^\circ \approx$

OR $2\pi - 2.55... \approx 3.72959526 \Rightarrow 213.6900675^\circ$

```
     -146.3099325
Ans*π/180
     -2.55359005
Ans+2π
      3.72959526
Ans*180/π
      213.6900675
```

No. This should be 2π - The radians for $33...^\circ$, not 2π - QII result

Nope. Not quite!

BACK TO ORIGINAL Degrees Answer:

```
      3.72959526
Ans*180/π
      213.6900675
sin⁻¹(2/√(13)
      33.69006753
Ans-360
     -326.3099325
```

So the QIV triangle is $326...^\circ$

Put these two together:

$x \approx 33.690^\circ + 360^\circ n, \; n \in \mathbb{Z}$

or $x \approx 326.310^\circ n, \; n \in \mathbb{Z}$

Nice way of reporting it as a set:

$$x \in \{x + 360^\circ n \mid x = 33.690^\circ, 326.310^\circ, \; n \in \mathbb{Z}\}$$

Any symbol · same symbol

For radians, do $\frac{\pi}{180}$ this to unrounded degrees answer

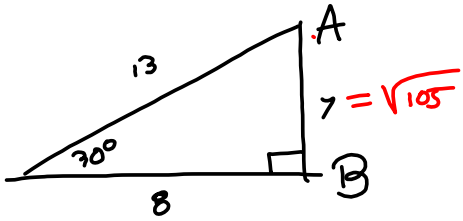
$$x \in \{y + 2\pi n \mid y = 2.554, 5.695, \; n \in \mathbb{Z}\}$$

$2\pi - 2.55 \approx 5.69518270$

```
      2.55359005
sin⁻¹(2/√(13)
      33.69006753
Ans-360
     -326.3099325
Ans*π/180
     -5.69518270
```

Solve

EXACT



$y = \sqrt{13^2 - 8^2}$ (Assume QI)

$= \sqrt{169 - 64} = \sqrt{105}$

$180^\circ - 30^\circ - 90^\circ$

$= 180 - 120 = 60^\circ$

$A = 60^\circ$

$B = 90^\circ$

$y = \sqrt{105}$

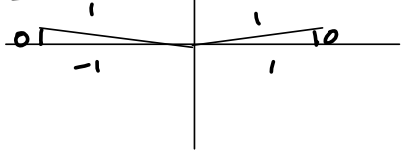
$3 \mid 105$

$5 \mid 35$

7

$\sin(x) = 0$

$\Rightarrow x \in \{0, \pi\}$



Done with degenerate triangle sketch.