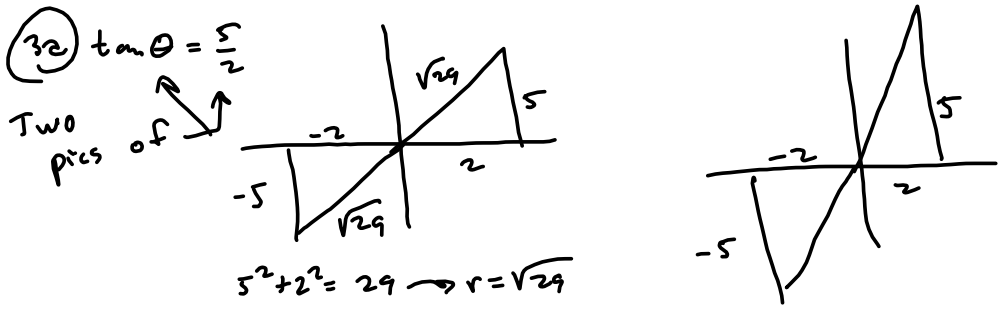
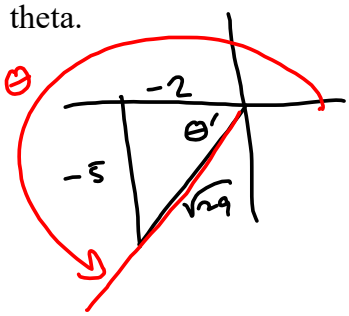
One like the Writing Project #3.



b. Assume the terminal side lies in the 3rd quadrant. Find the other 5 trig functions of theta.



$\sin\theta = \frac{-5}{\sqrt{29}} = \frac{-5\sqrt{29}}{29} = \sin\theta$

$\cos\theta = -\frac{2}{\sqrt{29}} = \frac{-2\sqrt{29}}{29} = \cos\theta$

$\tan\theta = \frac{5}{2}$

$\csc\theta = -\frac{\sqrt{29}}{5}$

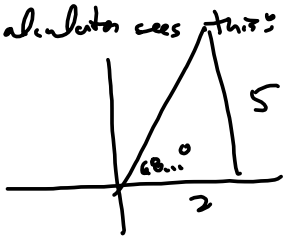
$\sec\theta = -\frac{\sqrt{29}}{2}$

$\cot\theta = \frac{2}{5}$

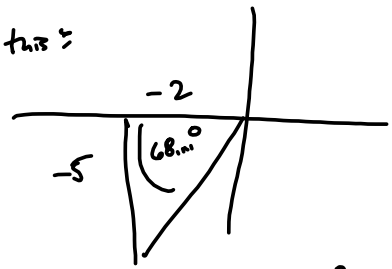
c. Same situation, find theta in degrees and radians, to 3 decimal places.

$\tan^{-1}\left(\frac{5}{2}\right) = \arctan\left(\frac{5}{2}\right) = 68.\ldots^\circ$

Calculator sees this:



We have this:




```
tan⁻¹(5/2)
      68.19859051
Ans+180
      248.1985905
Ans*π/180
      4.33188260
```

So we want $180^\circ + 68.\ldots^\circ = 248.\ldots^\circ$

$(248.\ldots^\circ)\left(\frac{\pi}{180^\circ}\right) = 4.33\ldots$

So, $\theta \approx 248.199^\circ$ OR $4.332 \approx \theta$

d. All solns of $\tan\theta = \frac{5}{2}$

$\theta \in \{x + 360^\circ n \mid x = 68.199^\circ, 248.199^\circ, n \in \mathbb{Z}\}$

($\mathbb{Z} = \{\ldots, -3, -2, -1, 0, 1, 2, 3, \ldots\} = \{x \mid x \text{ is an integer}\}$
= the set of integers)

Radians Answer:

$\theta \in \{x + 2\pi n \mid x = 4.332, 1.190, n \in \mathbb{Z}\}$

```
     248.1985905
Ans*π/180
     4.33188260
tan⁻¹(5/2)
     68.19859051
Ans*π/180
     1.19028995
```

That's one way.

Another way:

$A = \{68.199^\circ + 360^\circ n \mid n \in \mathbb{Z}\}$,

$B = \{248.199^\circ + 360^\circ n \mid n \in \mathbb{Z}$

$\theta \in A \cup B$

ANOTHER way, that's cleverer

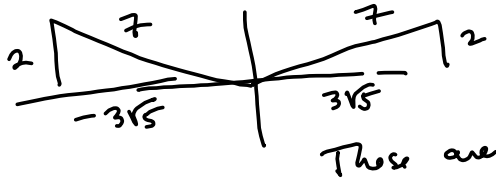
Note that the solns are 180° apart, so

$\theta \in \{68.199^\circ + 180^\circ n \mid n \in \mathbb{Z}\}$

or $\theta \in \{1.190 + \pi n \mid n \in \mathbb{Z}\}$

tangent questions are like this

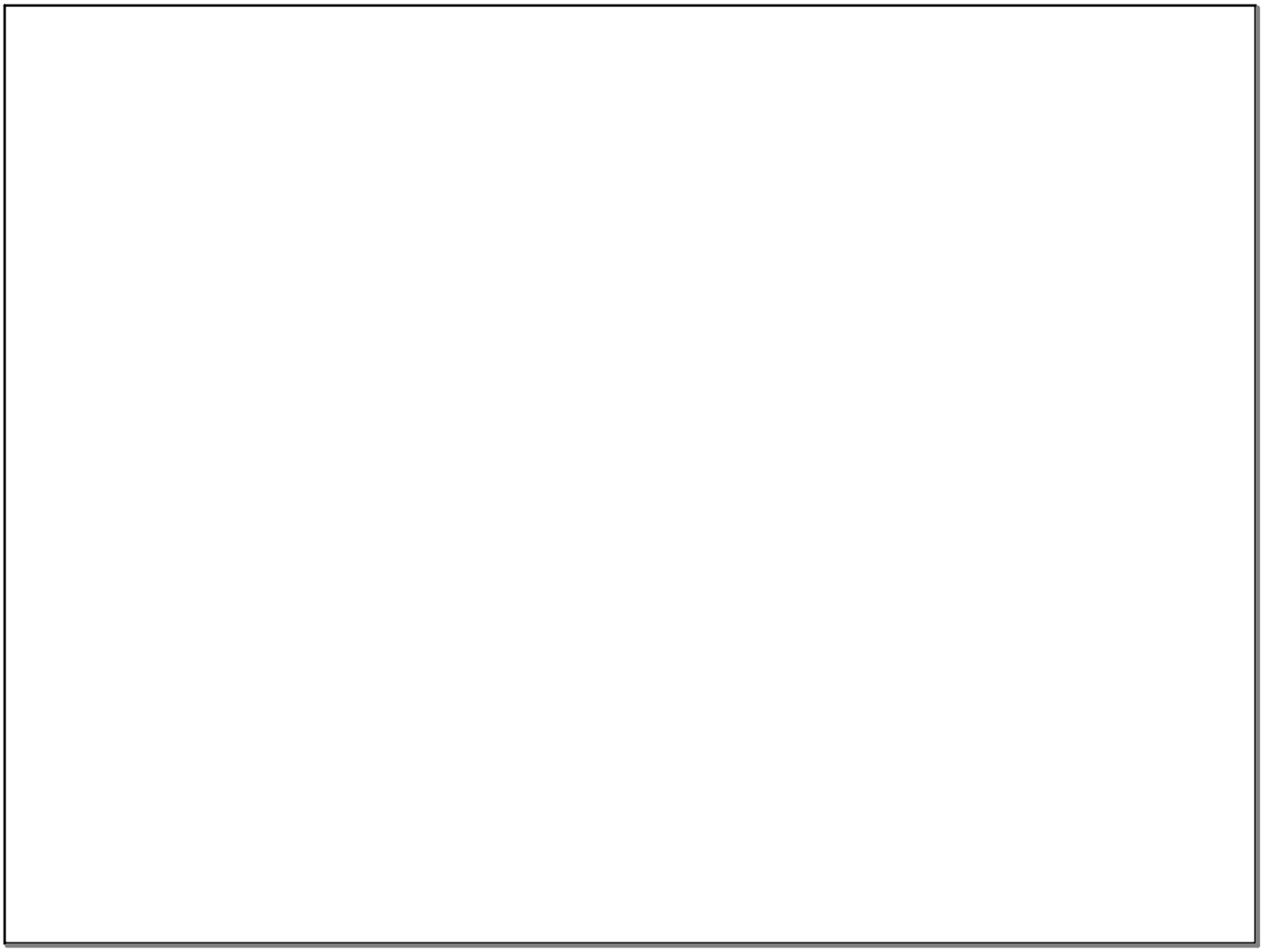
$\sin\theta = \frac{2}{7}$ isn't.



These aren't 180° apart.

3 | 45
3 | 15
5

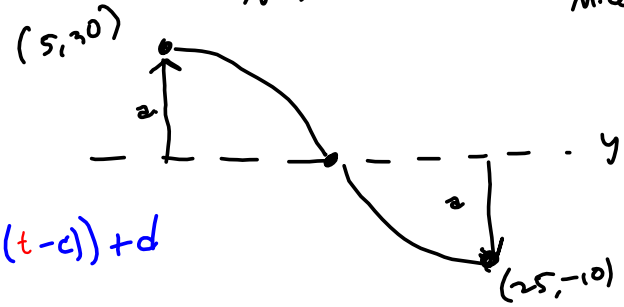
$\sqrt{45} = 3\sqrt{5}$



Write the cosine function that achieves a maximum of y = 30 cm at t = 5 hours and its minimum height of y = -10 cm at t = 25 hours.

We have $(t_1, y_1) = (5, 30)$ start

$(t_2, y_2) = (25, -10)$



midline: $y = d = \frac{30 + (-10)}{2} = \frac{20}{2} = 10 = d$

$a\cos(b(t-c)) + d$

$f(t) = a\cos(b(t-5)) + 10$ (start, mid)

$a = \frac{\text{high-low}}{2} = \frac{30-(-0)}{2}$

$= \frac{40}{2} = 20 = a$

$20\cos(b(t-5)) + 10$

Cosine Period is 2π

Our function has period 20 No. 40!

Want $bt = 2\pi$ when $t = 20$ No. 40!

No. 40! $20b = 2\pi$

$b = \frac{2\pi}{20} = \frac{2\pi}{40} = \frac{\pi}{20}$ No. 40!

$\frac{1}{2}$-period is $20 \Rightarrow \frac{\pi}{20} = b$

So $f(t) = 20\cos\left(\frac{\pi}{20}(t-5)\right) + 10$

b big:

b small:

$\sin(\omega t)$ the ω relates to frequency, which is the reciprocal of wavelength or period

Writing Project #1:

If you can't do white background on your PDF, then mail or hand-deliver your paper and pencil work to my office at the address given.

Find arc length corresponding to 300° & radius of 12 in.

Practice Test #14 (Round answer to 2 decimal places.)

s = arc length in inches

r = radius " "

θ = angle in radians

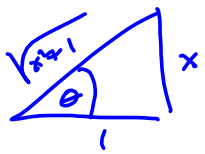
Then $s = r\theta = (12\text{in})(300^\circ)\left(\frac{\pi}{180}\right)$ ← θ in

$= \frac{2}{30}300\pi = 2 \cdot 10\pi = 20\pi$ in

$\Rightarrow s \approx 62.83$ in

```
      4.33188260
tan⁻¹(5/2)
      68.19859051
Ans*π/180
      1.19028995
20π
      62.83185307
```

$\sin(\arctan(x)) = \sin(\theta)$



$\sqrt{x^2+1} = r$ by Pythagorus!

So, $\sin(\theta) = \frac{x}{\sqrt{x^2+1}}$