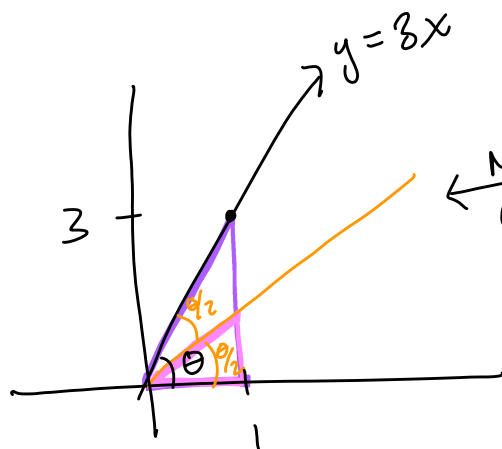
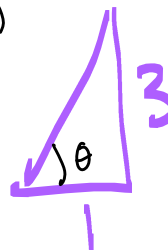
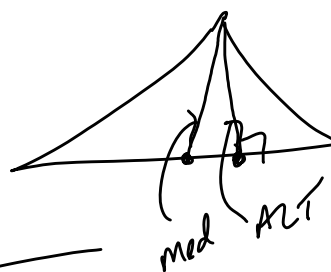


TRIG PROBLEM SOLNS

14.



NEITHER
(in general.)

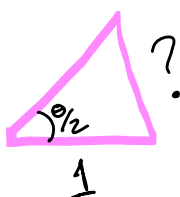


$$\tan \theta = 3$$

$$\theta = 71.565^\circ$$

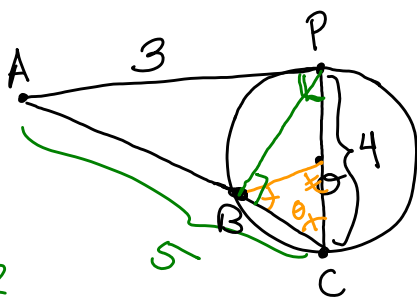
$$\frac{\theta}{2} = 35.7825^\circ$$

$$\tan \frac{\theta}{2} = \frac{?}{1}$$



0.7207 SLOPE

15.



$$\tan \theta = \frac{3}{4}$$

$$\theta \approx 36.87$$

$$\angle \approx 106.$$

+ LAW OF SINES.

CALCULATE SIDE
BC = 3.2

$$\frac{4}{5} = \frac{2}{4}$$

$$3.2 = \frac{16}{5} = ?$$

STRUCTURED RESPONSE

① THE SEGMENT DEFINED BY
 $(2, 4)$ & $(8, -1)$ HAS MIDPOINT $\left(\frac{2+8}{2}, \frac{4-1}{2}\right) =$
 $= (5, \frac{3}{2})$. WE TEST TO SEE IF THIS

MIDPOINT IS ON THE LINE $y = 3x - 6$. SINCE
 $3 \cdot 5 - 6 = 9 \neq \frac{3}{2}$, THE MIDPOINT IS NOT ON THE
LINE & SO $y = 3x - 6$ IS NOT A BISECTOR OF
THE SEGMENT.

② THM $\cot x + \tan x = \csc x \sec x$.

PROOF

$$\cot x + \tan x = \frac{\cos x}{\sin x} + \frac{\sin x}{\cos x} =$$

$$= \frac{\cos^2 x + \sin^2 x}{\sin x \cos x}, \text{ BY PYTH THM}$$

THIS IS EQUAL TO

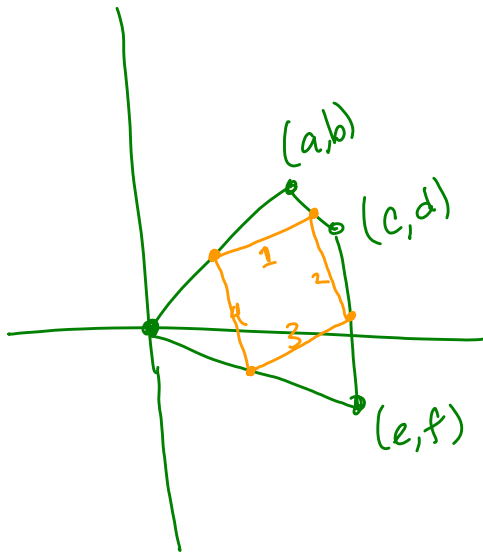
$$\frac{1}{\sin x \cos x} = \frac{1}{\sin x} \cdot \frac{1}{\cos x}$$

$$= \csc x \cdot \sec x.$$

THUS $\cot x + \tan x = \csc x \sec x$.

3. THM THE LINES ADJOINING MIDPOINTS OF ADJ. SIDES OF ANY QUADRILATERAL FORM A PARALLELOGRAM.

Pl.



ASSUME ONE VERTEX AT ORIGIN, AND THAT THE OTHERS ARE (a,b) , (c,d) , (e,f) .

WE'LL FIND THE MIDPOINTS AND SHOW THAT OPPOSITES OF THE FIGURE DEFINED BY THOSE POINTS HAVE THE SAME SLOPE, AND SO THE FIGURE IS A PARALLELOGRAM.

SIDE 1 IS DEFINED BY

$$\left(\frac{a+0}{2}, \frac{b+0}{2}\right) \text{ AND } \left(\frac{a+c}{2}, \frac{b+d}{2}\right)$$

$(a/2, b/2)$

SIDE 3 IS DEFINED BY

$$\left(\frac{e+0}{2}, \frac{f+0}{2}\right) \text{ AND } \left(\frac{c+e}{2}, \frac{d+f}{2}\right)$$

$(e/2, f/2)$

$$\text{SLOPE OF SIDE 1: } \left(\frac{b+d}{2} - \frac{b}{2}\right) / \left(\frac{a+c}{2} - \frac{a}{2}\right) = \frac{d/2}{c/2} = \frac{d}{c}$$

$$\text{SLOPE OF SIDE 3: } \left(\frac{d+f}{2} - \frac{f}{2}\right) / \left(\frac{c+e}{2} - \frac{e}{2}\right) = \frac{d}{c}.$$

SINCE THE SEGMENTS HAVE THE SAME SLOPE, THEY

ARE PARALLEL. A SIMILAR ARGUMENT WILL SHOW THAT SIDES 2 AND 4 ARE PARALLEL, AND SINCE OPPOSITE PAIRS OF SIDES ARE $\parallel$, THE FIGURE IS A PARALLELOGRAM. $\square$