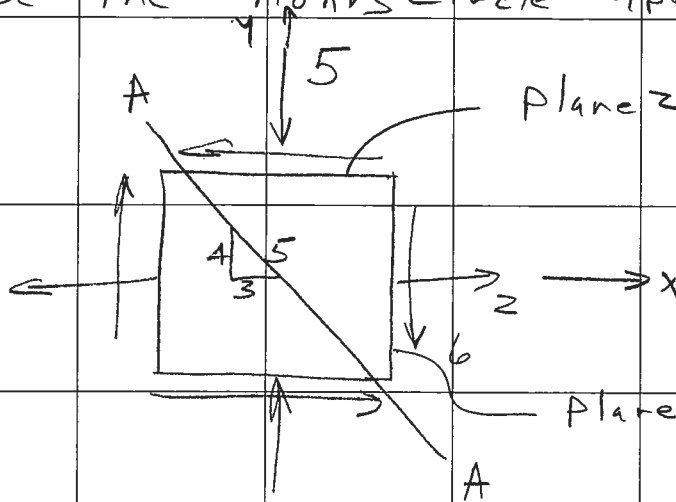


Determine the normal and shearing stresses acting on plane A-A of the point shown.

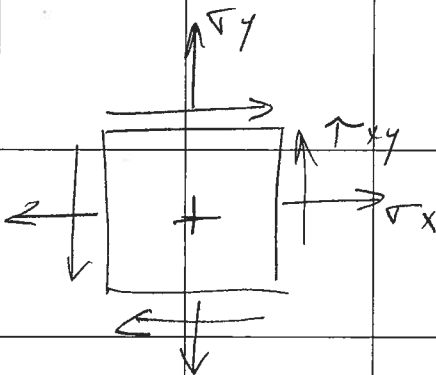
Use the Mohr's Circle approach



This is negative because it would rotate element CCW

This is plus for the Mohr's circle because it would rotate the element clockwise

Determine the proper signs of  $\sigma_x$ ,  $\sigma_y$ , and  $\tau_{xy}$



$$\sigma_x = 2$$

$$\sigma_y = -5$$

$$\tau_{xy} = -6$$

Determine the center of the circle

$$(1) \quad \sigma_{\text{center}} = \frac{\sigma_x + \sigma_y}{2}$$

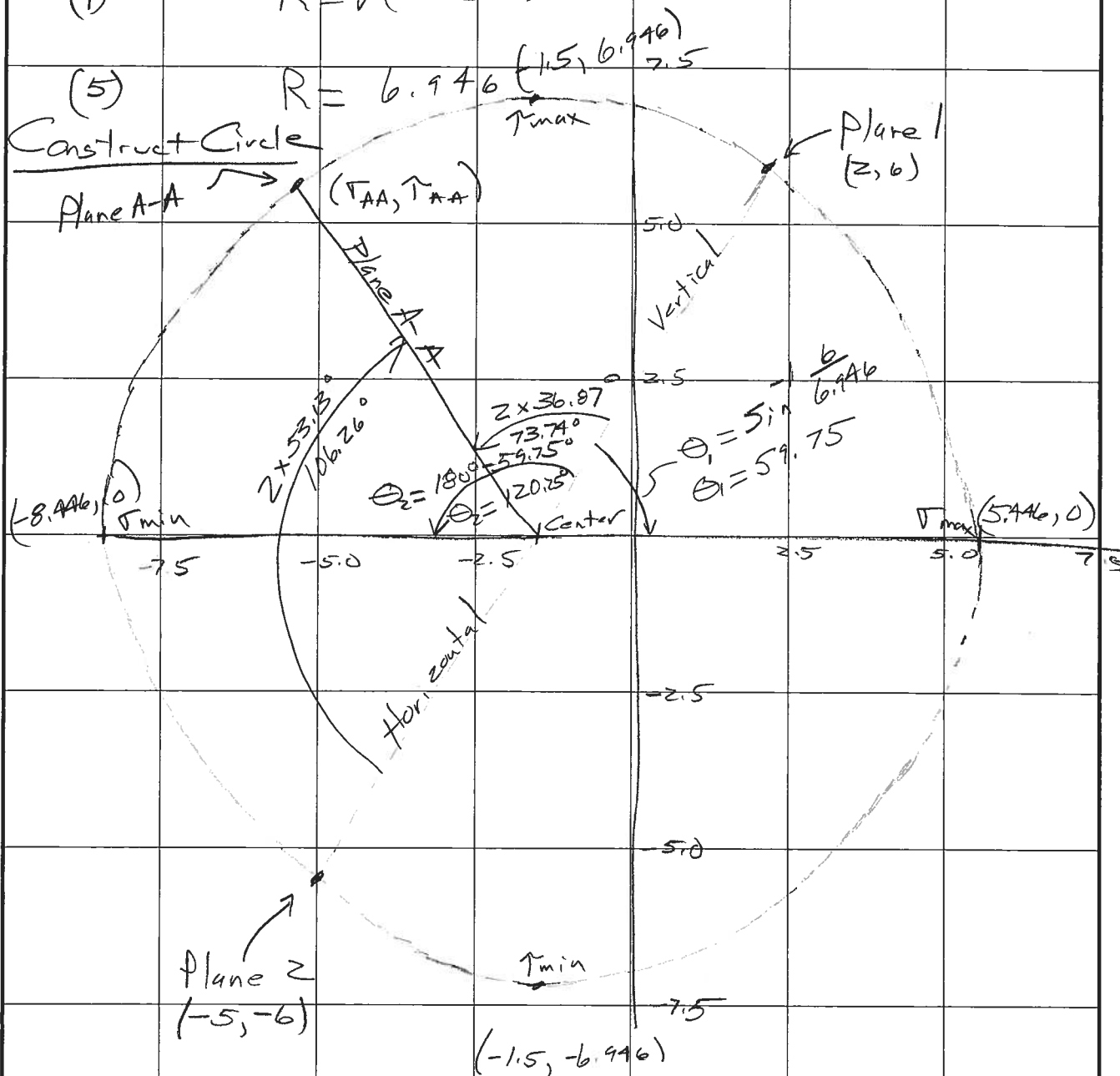
$$(2) \quad \sigma_{\text{center}} = \frac{2 + (-5)}{2} = -1.5$$

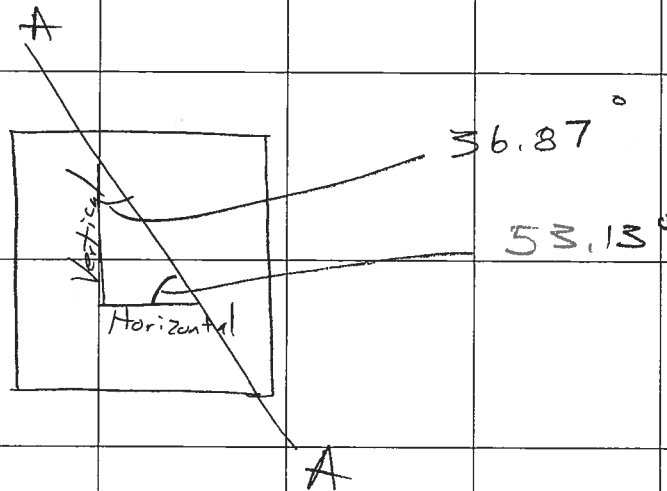
$$(3) \quad R = \sqrt{\left(\frac{\sigma_x - \sigma_y}{2}\right)^2 + \tau_{xy}^2}$$

$$(4) \quad R = \sqrt{\left(\frac{2-1.5}{2}\right)^2 + (-6)^2}$$

(5)  $R = 6.946$  (1.5, 6.946) 7.5  
 $\tau_{max}$

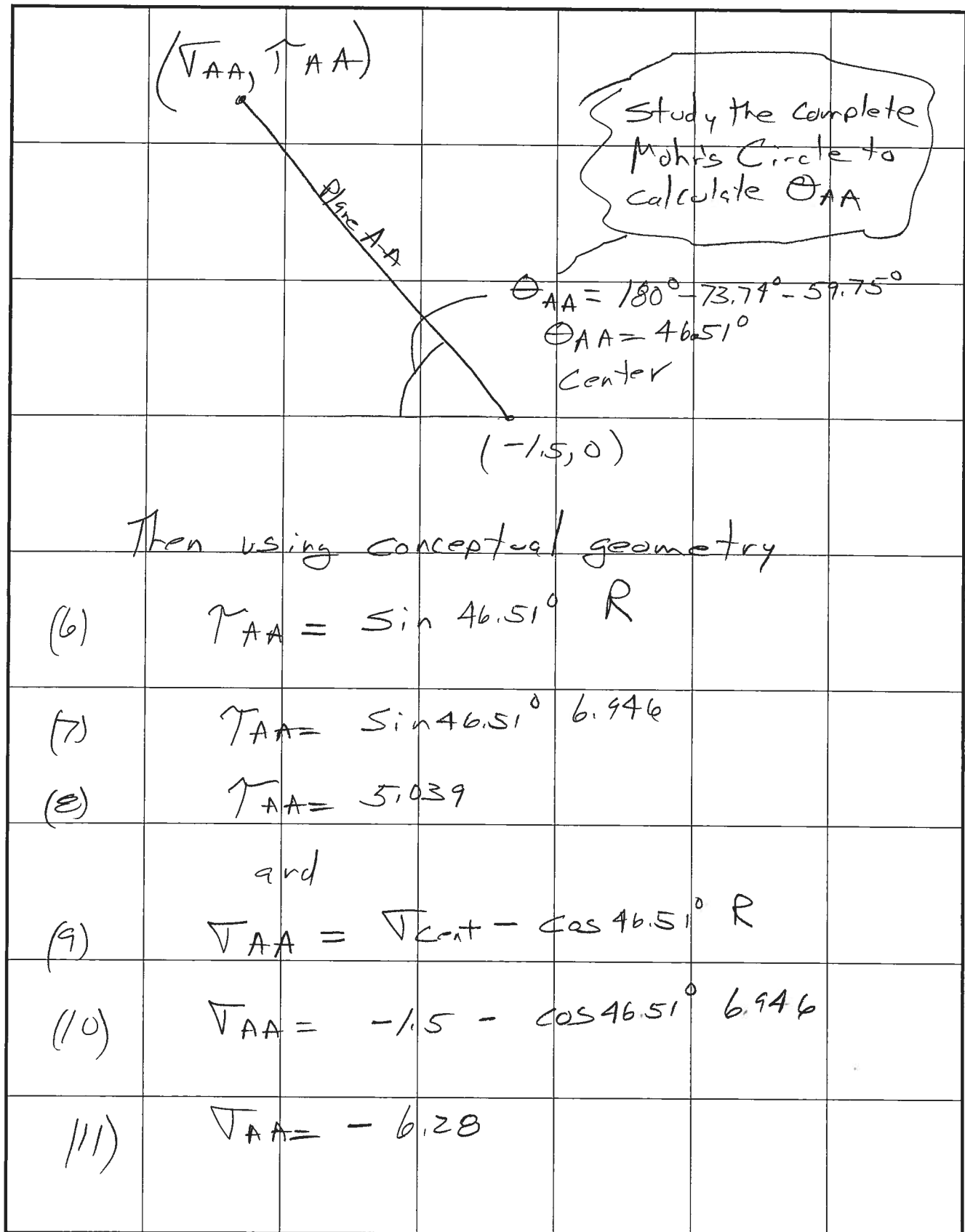
Plane A-A



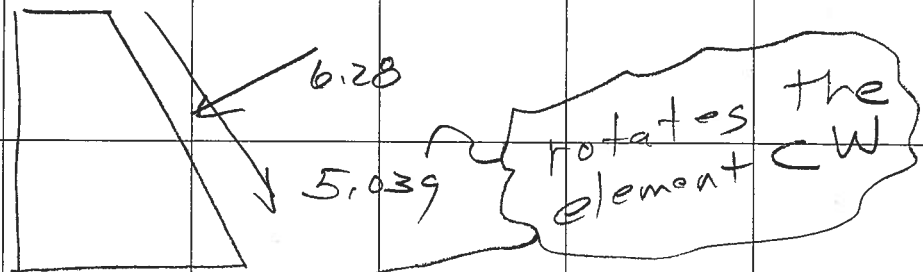


To locate plane A-A on the block you can rotate  $36.87^\circ$  CCW from the vertical plane or  $53.13^\circ$  CW from the horizontal plane. So on the circle you rotate  $2 \times 36.87^\circ$  CCW from plane 1 (vertical plane) or you rotate  $2 \times 53.13^\circ$  CW from plane 2 (horizontal plane). The location of plane A-A is shown on the circle.

Then the magnitudes  $\sigma_{A-A}$  and  $\tau_{A-A}$  are determined using simple geometry



Finally, we show the results on a properly oriented sketch



or

