

INSTRUCTIONS:

This quiz is open-book, open-note, and you may work with your classmates.

Please answer all questions on your individual papers and submit to me by the end of today's class period.

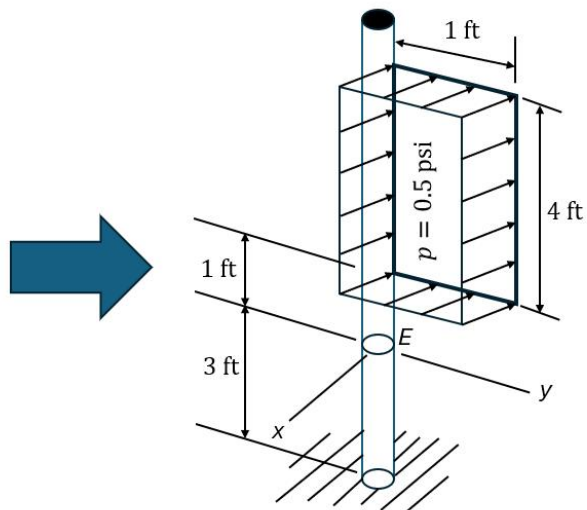
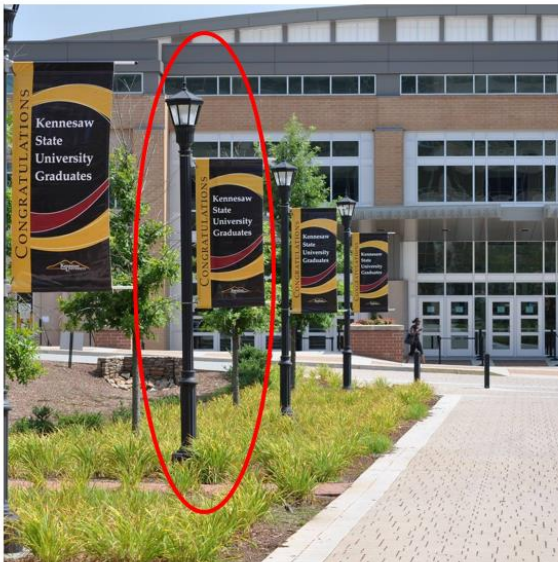
GIVEN:

We are asked to evaluate the design of the signs pictured for KSU. We have developed a mathematical model of the sign using our engineering judgement, as shown in the diagram.

The sign shown is subjected to a uniform wind load of 0.5 psi. The wind acts in the negative x -direction.

The sign is supported by a 4-inch diameter pole.

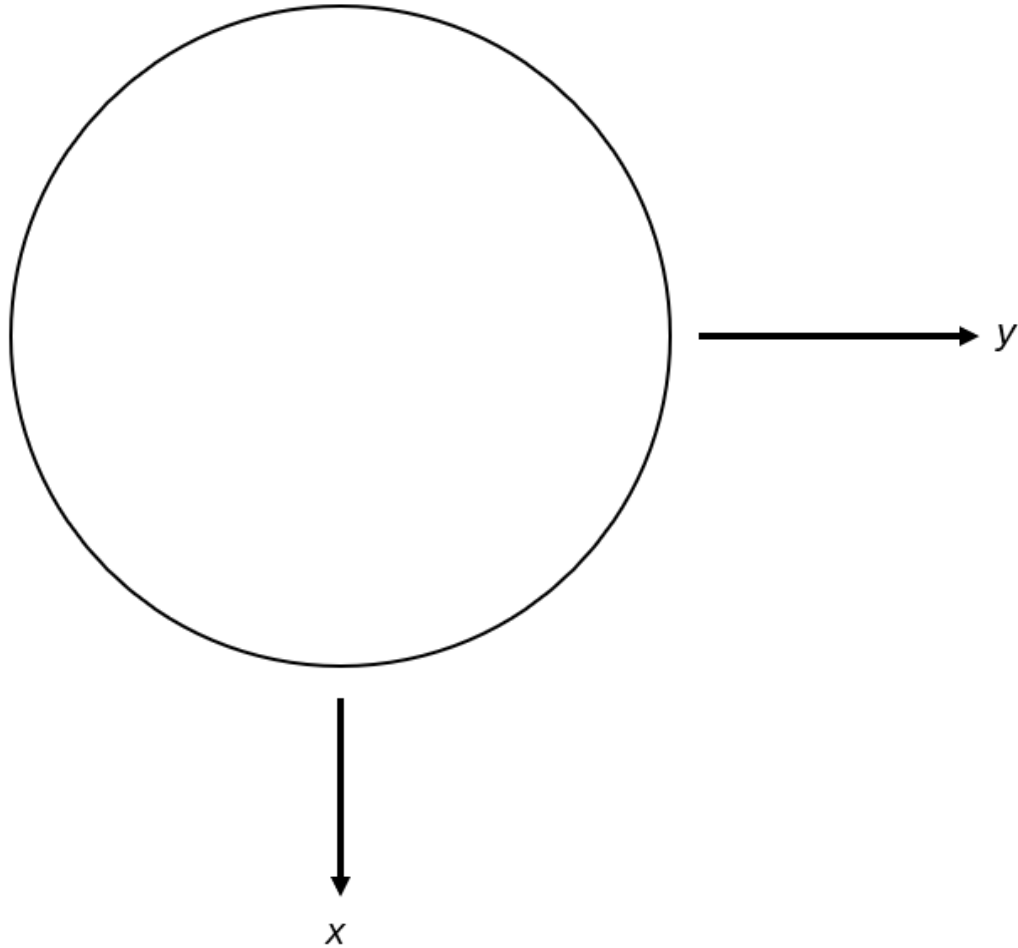
The weights of the sign and the pole are negligible compared to the wind load.

FIND:

- 1) (25 points) The internal loads acting in the pole are (select all that apply):
 - ☐ Axial
 - ☐ Torsion
 - ☐ Bending
 - ☐ Transverse shear
- 2) (25 points) Identify the location of the critical cross section of the pole.

- 3) (25 points) For the cross-section at the location labeled E , identify the critical element(s). Show the location(s) of the critical element(s) on the cross-section below.

Cross-section at E (top-down view)



- 4) (25 points) For each critical element identified above, calculate the numerical values of each stress acting and show the stress state on a stress element.

BONUS: (10 points) How would your answers to these 4 questions change if the weights of the sign and pole were not neglected? You do not need to perform any calculations, just briefly discuss.