Shaw and colleagues* have reported on $\text{A}_1\text{B}_{11042}$ (and other biomarkers) for the detection of mild Alzheimer's disease (AD). Data describing the results of this test in a sample of 56 autopsy-confirmed people with AD and 52 cognitively normal (NC) people are reported in the figure on the next page. The authors constructed an ROC curve for $\text{A}_1\text{B}_{11042}$ and identified a cutpoint that yielded the greatest diagnostic test accuracy.

Whether or not you agree with the authors' methods, use the information in the figure to:

Q1. Divide the $\text{A}_1\text{B}_{11042}$ data into 3 strata ($<130$, $\geq130$ to $<185$, and $\geq185$), create the necessary $\text{A}_1\text{B}_{11042}$ 2x2 tables, and plot the ROC curve that summarizes this multiple outcome test. The 2 cut-offs are represented by the vertical solid lines in the figure.

Q2. If you are making a treatment decision for an older person for whom the pre-test probability of AD is 0.1 and $C_{FP}=.8C_{FN}$ (i.e., the ratio of the cost of false positive to false negative mistakes is .8) which cut-off would you use for a positive test?

Q3. If the pre-test probability was 0.225 and the cost ratio was unchanged, which cut-off would you use?

Please show your work and report results to 3 decimals.

Plot of cerebrospinal fluid (CSF) tau concentration versus CSF amyloid-B 1 to 42 peptide (AB\textsubscript{1-42}) concentration for 56 autopsy-confirmed (AD) cases (solid circles) and 52 elderly cognitively normal (NC) subjects (open circles). Vertical lines added at AB\textsubscript{1-42}=130 and AB\textsubscript{1-42}=185. NOTE: In addition to the 5 visible partially overlapping open circles with AB\textsubscript{1-42}>200, consider one additional open circle in this region to represent 2 cases.