

## Qual Topics for Math 281ABC

### Math 281A

- Models and Parameters
- Sufficiency
- Exponential Families
- Minimum Contrast Estimators (M-estimators)
- Maximum Likelihood
- Consistency of M-estimators, Consistency of MLE
- Asymptotic Normality of M-estimators and MLE
- Efficiency
- Delta Method

### Math 281B

- Hypotheses Tests, Type I and II errors,  $p$ -value, Critical Region, Power Function
- Uniformly Most Powerful Tests
- Unbiased Tests
- Confidence Intervals, Confidence Sets
- Likelihood Ratio Tests
- Chi-square Tests

### Math 281C

- Kernel Regression Estimation: choices of kernels, bias-variance trade-off, bandwidth selection
- Kernel Density Estimation: Nadaraya-Watson kernel estimator, bandwidth selection, splines and orthogonal functions