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The traditional economic approach to revenue-maximizing auction design posits a known prior distribution over what bidders are willing to pay, and then solves for the auction that maximizes the seller's expected revenue with respect to this distribution. But where does this distribution come from? One obvious answer is from data, in the form of previous bids by comparable bidders in auctions for comparable items. The goal of this short course is to develop theory to help reason about questions such as: (i) for much data is necessary and sufficient to identify a near-optimal auction? (ii) what is the optimal way to use data? (iii) are there fundamental trade-offs between auction complexity and auction optimality?