Statistics 1

Statistics is the science of dealing with *data*.

- Data Analysis
  - Gathering, displaying, and summarizing data

- Probability
  - The laws of chance

- Statistical inference
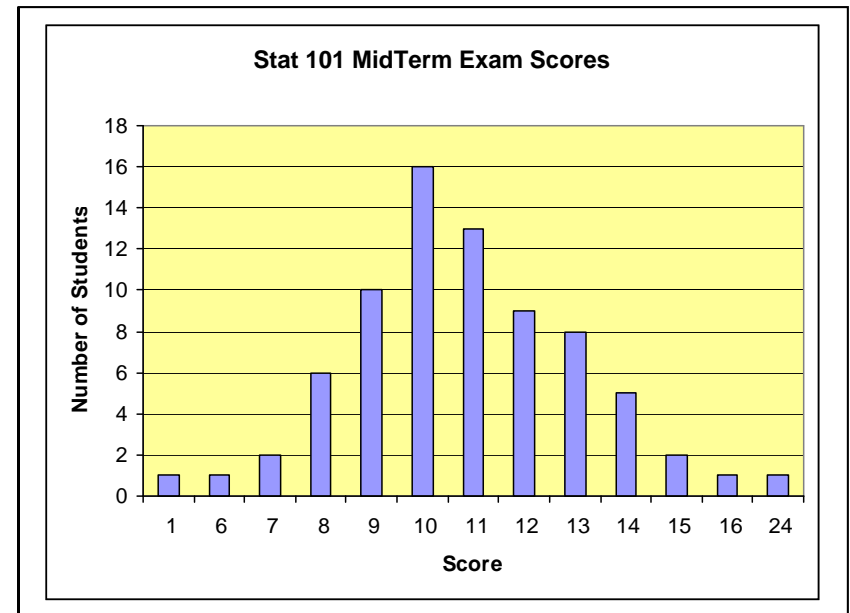 - Drawing conclusions from data using probability

Displaying Data

- Data set
- Frequency table
- Bar graph

Summarizing Data

- Measures of *central tendency*
  - Average (mean)
  - Median
  - Quartiles
- Obtained from
  - List
  - Frequency table
  - Bar graph

Score	Frequency
1	1
6	1
7	2
8	6
9	10

Stat 101 MidTerm Exam Scores

Example

Professor Blackbeard's Stat 101 class of 75 students made the following scores on his MidTerm Exam.

(insert Table 14.1, Tannenbaum, 6th ed., page 478)

Frequency Table

A frequency table is a start at organizing the data from Prof. Blackbeard's class.

Scores with a frequency of 0 are omitted from the table.

Prof. Blackbeard's Stat 101 MidTerm Exam Scores								
Score	1	6	7	8	9	10	11	**Total**
Frequency	1	1	2	6	10	16	13	
Score	12	13	14	15	16	24		
Frequency	9	8	5	2	1	1		**75**

Bar Graph

A frequency table can easily be turned into a bar graph. Each bar represents a score on the test, and the height of the bar represents the number of students making that score.

Stat 101 MidTerm Exam Scores
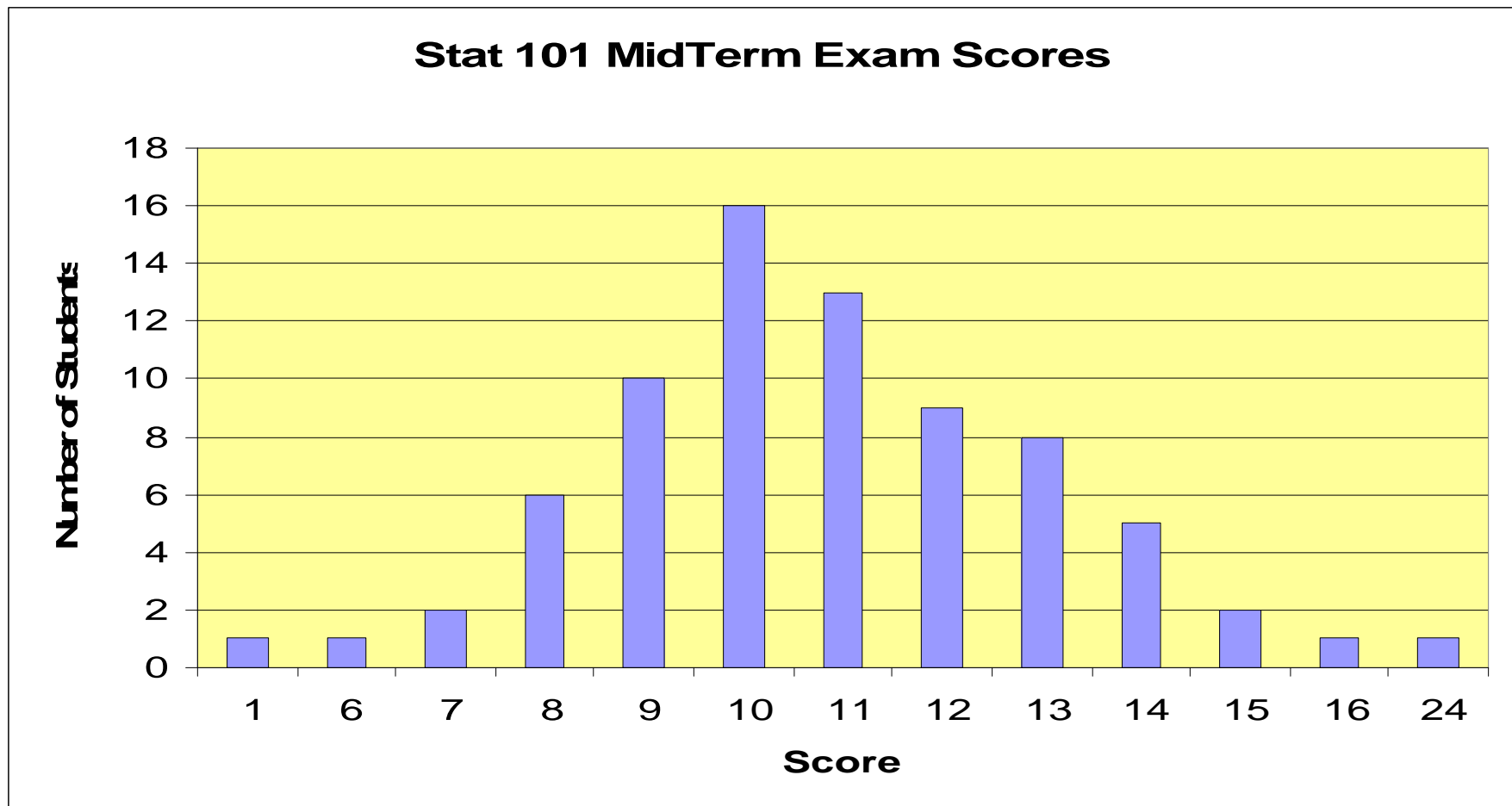
Variables

In statistics a **variable** is any attribute that varies with the members of a population.

Variables may be

- Quantitative
    - Discrete
    - Continuous

- Qualitative

Examples

1. Blackbeard's Stat 101 class MidTerm Exam scores.
2. Stat 101 final grade (ABCDF).
3. Height of students in this class.
4. Time it takes students in this class to complete Test 3.
5. Starting salary of UAB graduates.

Class Intervals

Qualitative data, such as letter grades, are divided into ***classes or categries***.

Quantitative data can be divided into intervals called ***class intervals***, but often in many ways.

The key in displaying data in a bar graph is to choose the "best" class intervals. Here is one possibility for the MA 110 Test 3 grades.

MA 110 Test 3 (Pink) Grades						
Score Interval	0-19	20-39	40-59	60-79	80-99	Total
Frequency	2	10	27	50	51	140

The corresponding bar graph follows. What do you think of it?

Bar graph with 20 point class intervals
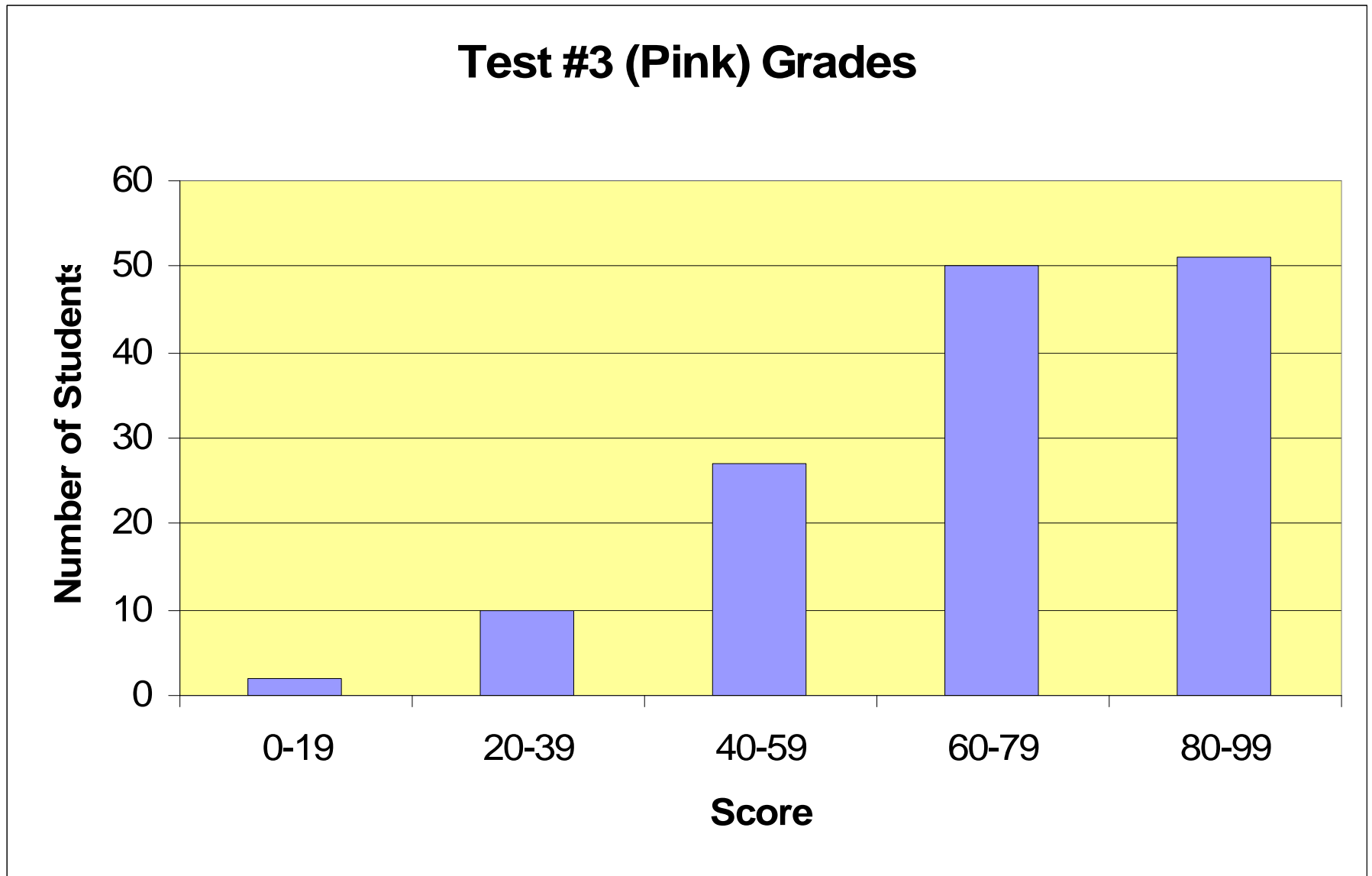
Test #3 (Pink) Grades

Choosing Class Intervals

The key in displaying data in a bar graph is to choose the "best" class intervals. Below is a frequency table for class intervals of length 10 rather than 20 for the MA 110 Test 3 grades.

MA 110 Test 3 (Pink) Grades											
Score Interval	0-9	10-19	20-29	30-39	40-49	50-59	60-69	70-79	80-89	90-99	Total
Frequency	0	2	2	8	10	17	16	34	39	12	140

Compare the resulting bar graph, below, to the first one with 20 point class intervals.

What are the benefits of choosing smaller class intervals?

Do you think it would be even better with 5 point intervals? 1 point?

Bar graph with 10 point class intervals

Test 3 (Pink) Grades
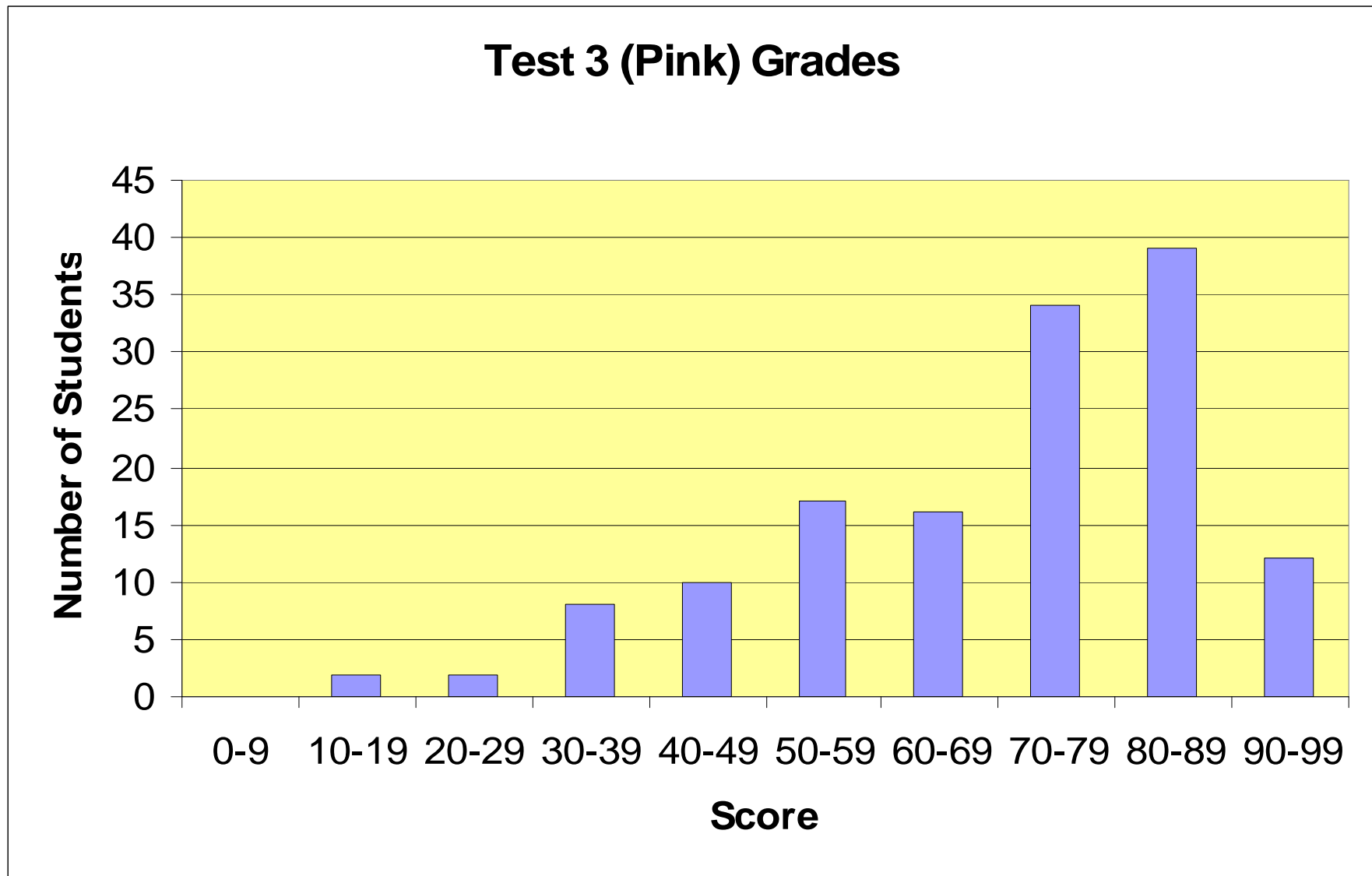
Unequal Class Intervals

Sometimes there are good reasons to use unequal class intervals. Prof. Blackbeard thought so in assigning letter grades to his Stat 101 class.

Stat 101 MidTerm Grades