Variables

Numerical

Numeric

Discrete (integer)
# of People
# of Cars → something you count

Continuous (real number)
Height   Weight   Temperature → something you measure

Variables

Numerical

Categorical

Numeric

Discrete (integer) 〈 # of People
# of Cars

Continuous (real number)

Height   Weight   Temperature
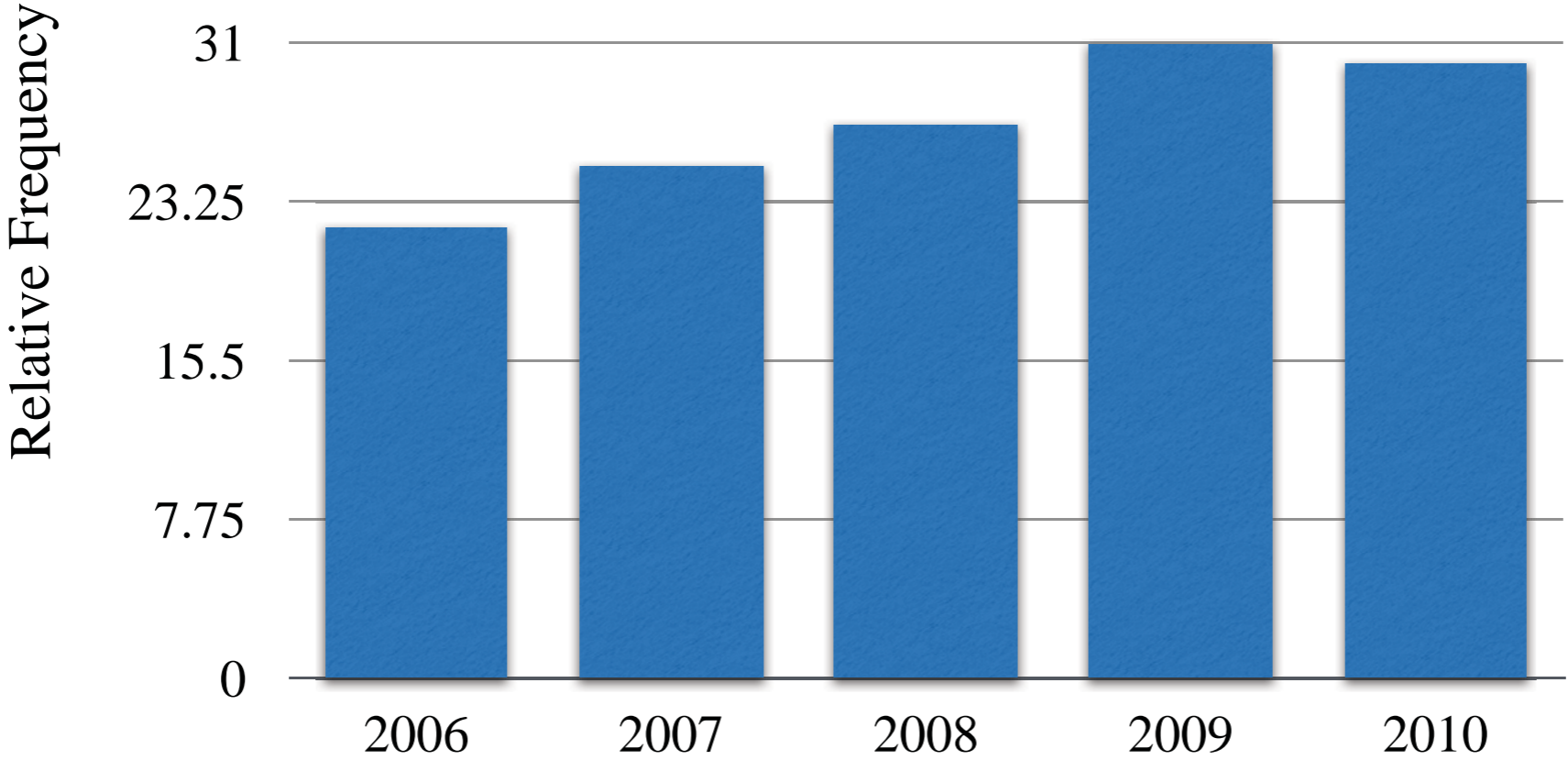
Nonnumeric

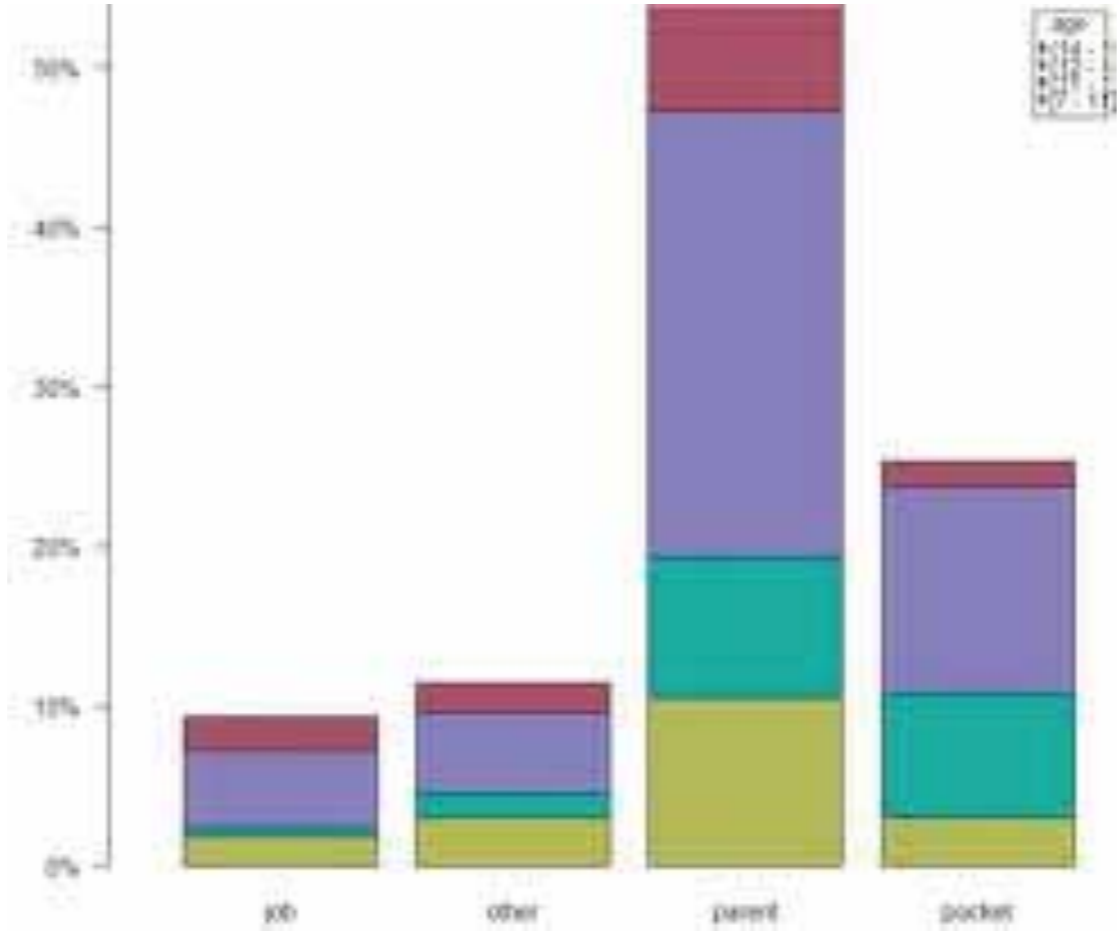Eye color
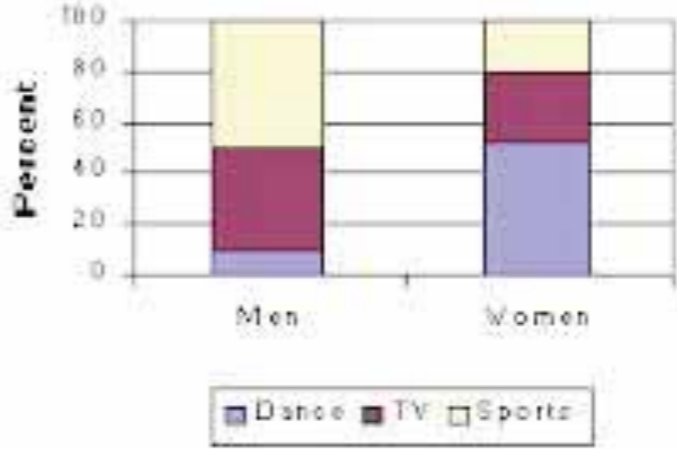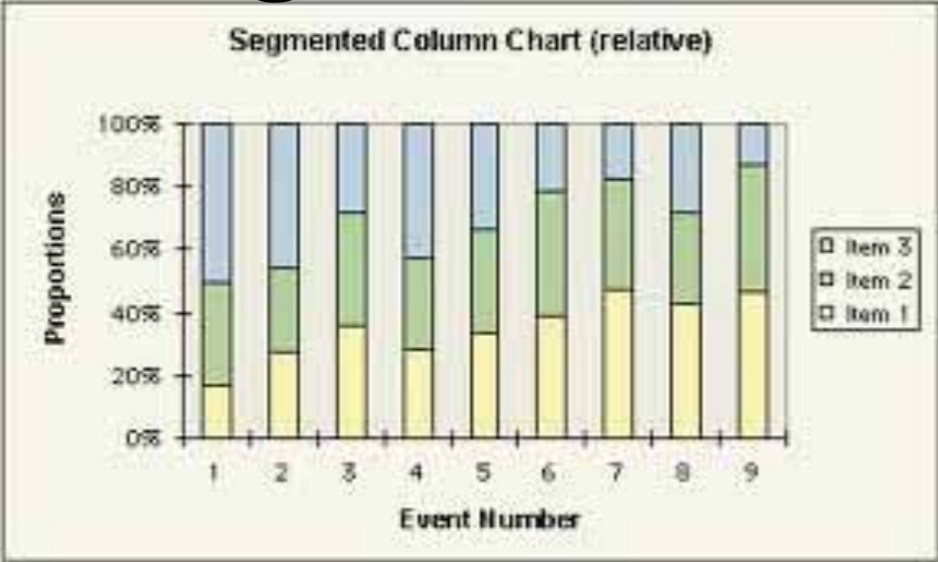
Product Brand

Grade Level

Gender

Bar Chart

Teen Pregnancy Rates

Spaces between each bar

Segmented Bar Chart

__Spaces between each bar__

Segmented Column Chart (relative)

Comparative Bar Chart
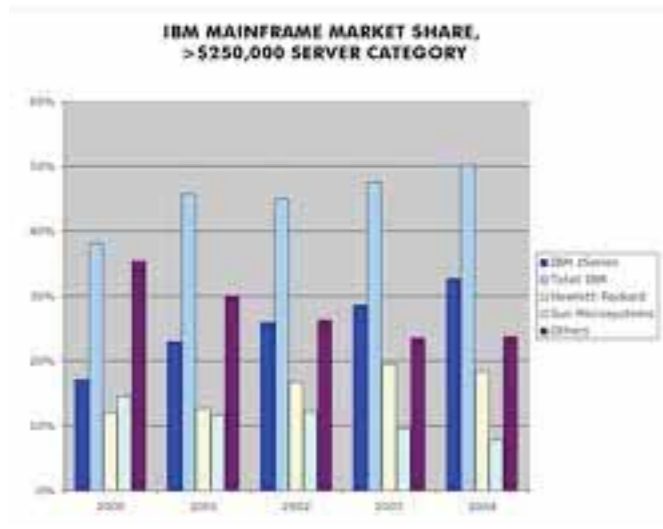

IBM MAINFRAME MARKET SHARE,
>$250,000 SERVER CATEGORY

Figure 8.8: Proportion of the population with tertiary education, 2001.

Spaces between each bar

Pie Chart

Pie Preferences

Cherry 23%

Pumpkin 30%

Pecan 8%

Cocunut Cream 3%

Apple 36%
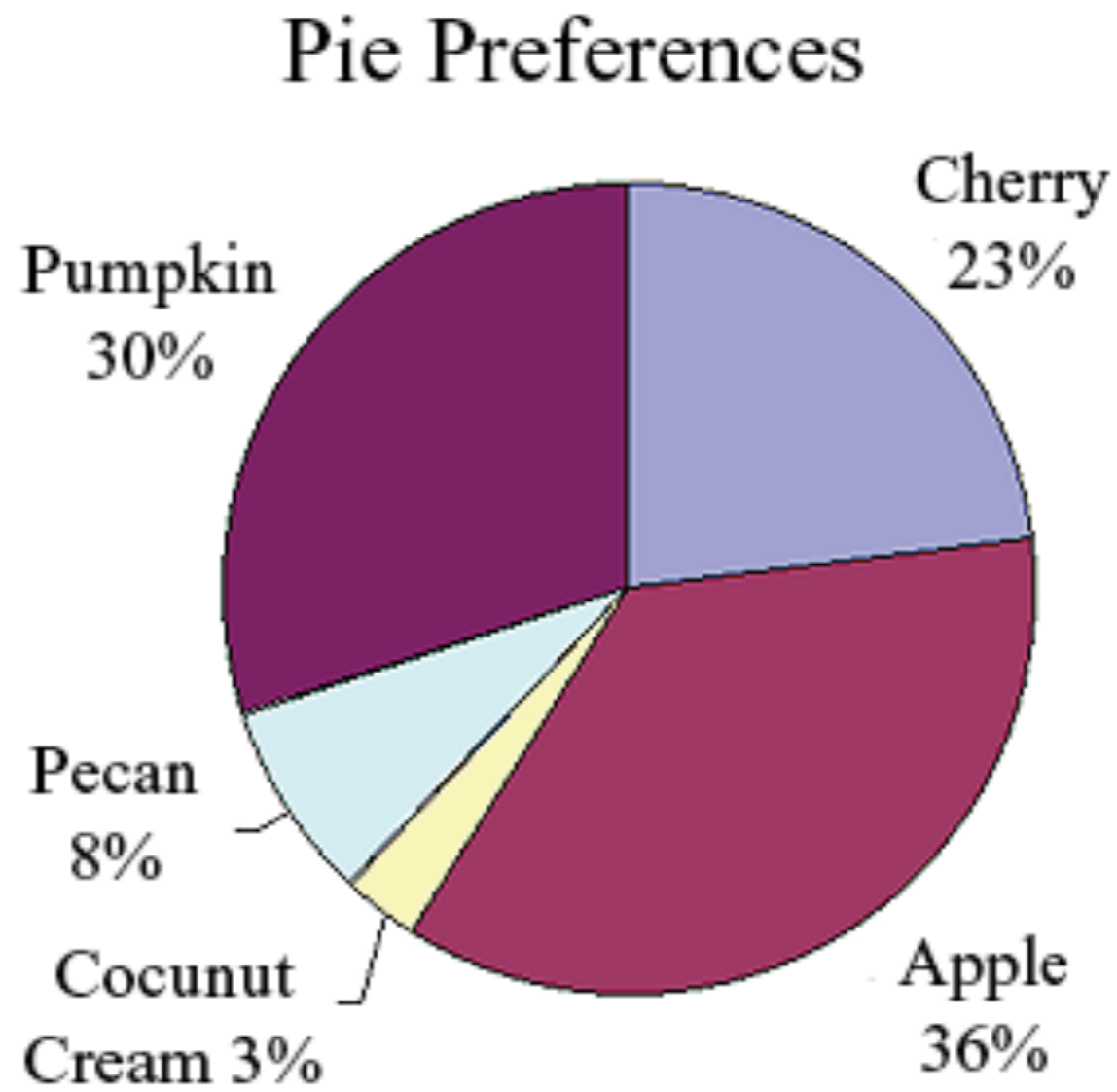
Frequency vs. Relative Frequency

whole #   %

Suppose we are looking at the history grades of students in 10th grade and have the classes corresponding to letter grades: A, B, C, D, F.

- 7 students with an F (50-59)
- 9 students with a D (60-69)
- 18 students with a C (70-79)
- 12 students with a B (80-89)
- 4 students with an A (90-99)

- $0.14 = 14\%$ students with an F
- $0.18 = 18\%$ students with a D
- $0.36 = 36\%$ students with a C
- $0.24 = 24\%$ students with a B
- $0.08 = 8\%$ students with an A

Make a frequency and relative frequency table from the history test grade data

Graph the results below

% Range	Frequency	Relative Frequency
50-59	7	0.14
60-69	9	0.18
70-79	18	0.36
80-89	12	0.24
90-100	4	0.08
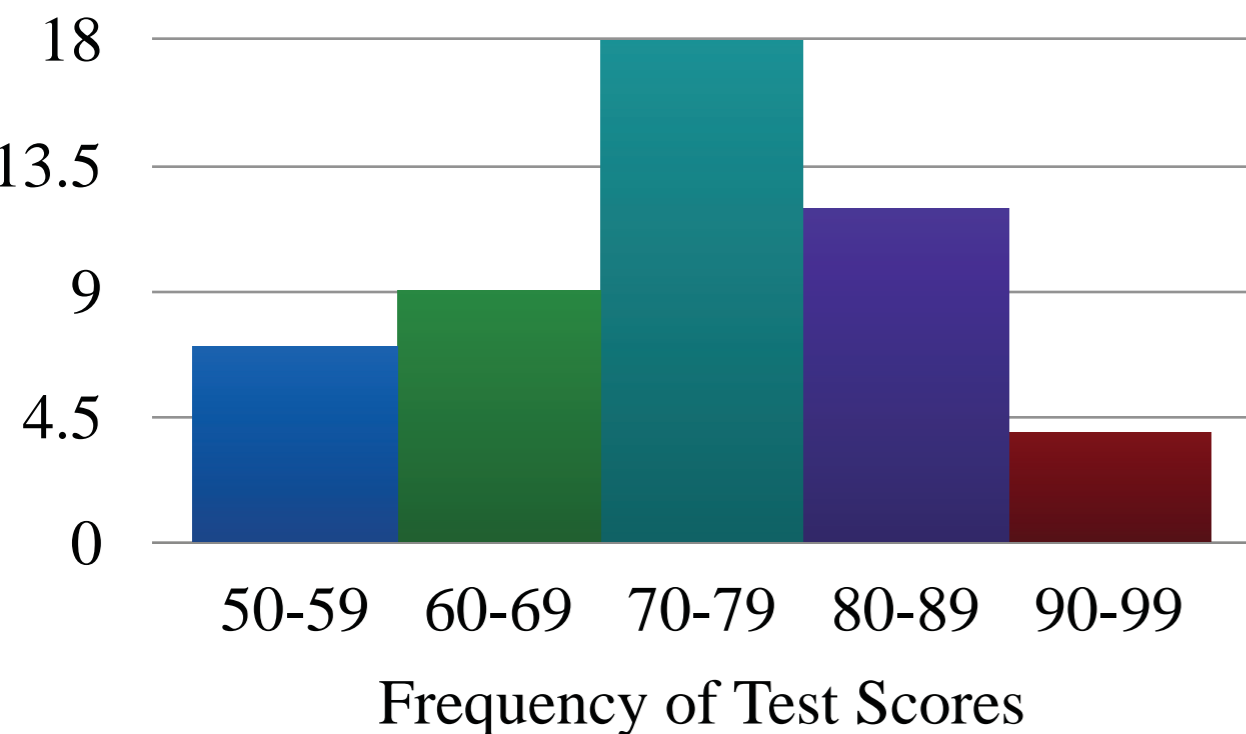
Notice how the relative frequencies (just like %) always add up to 1

Histograms

Frequency of Test Scores

Relative Frequency of Test Scores
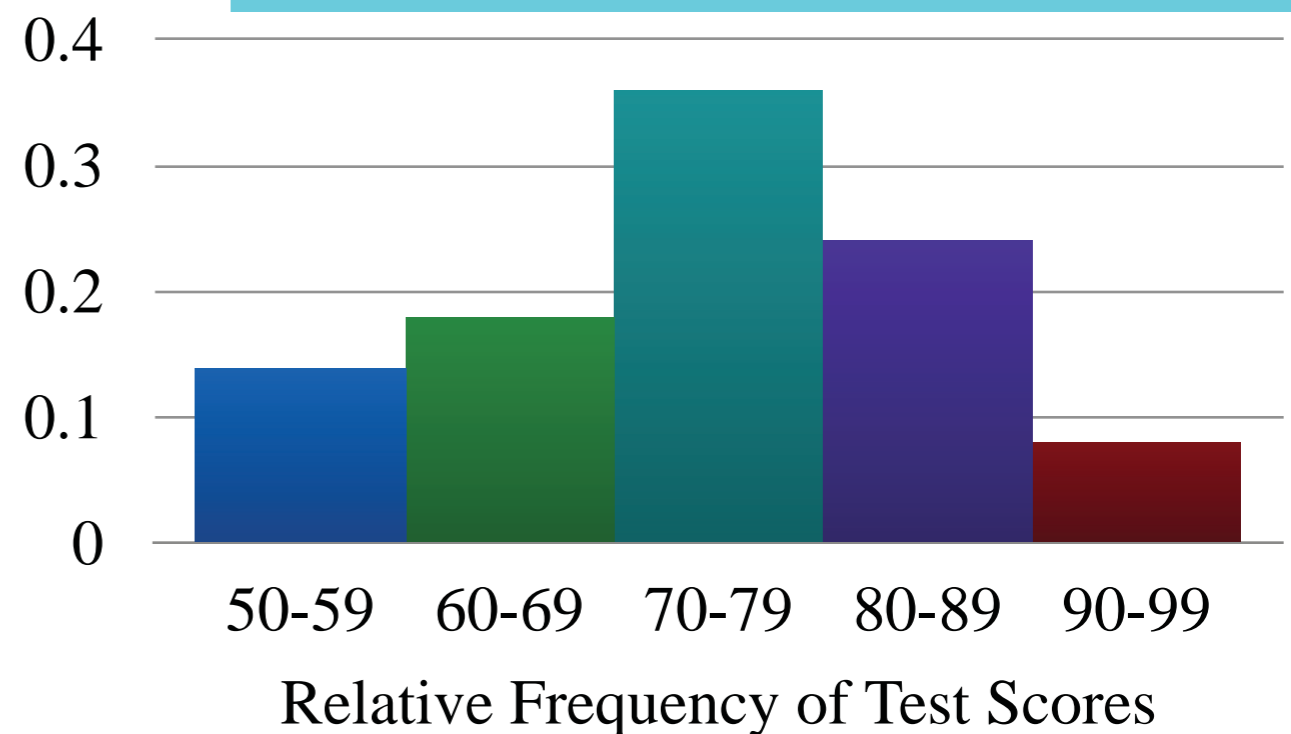
So to sum up

Frequency   vs.   Relative Frequency

whole #   %

Discrete — # of People   # of Cars

Continuous — Height   Weight   Temperature

Segmented Bar Chart   ***Spaces between each bar***

Comparative Bar Chart   ***Spaces between each bar***

Pie Chart

- Frequency

- Relative Frequency

- Cumulative Frequency

- Cumulative Relative Frequency
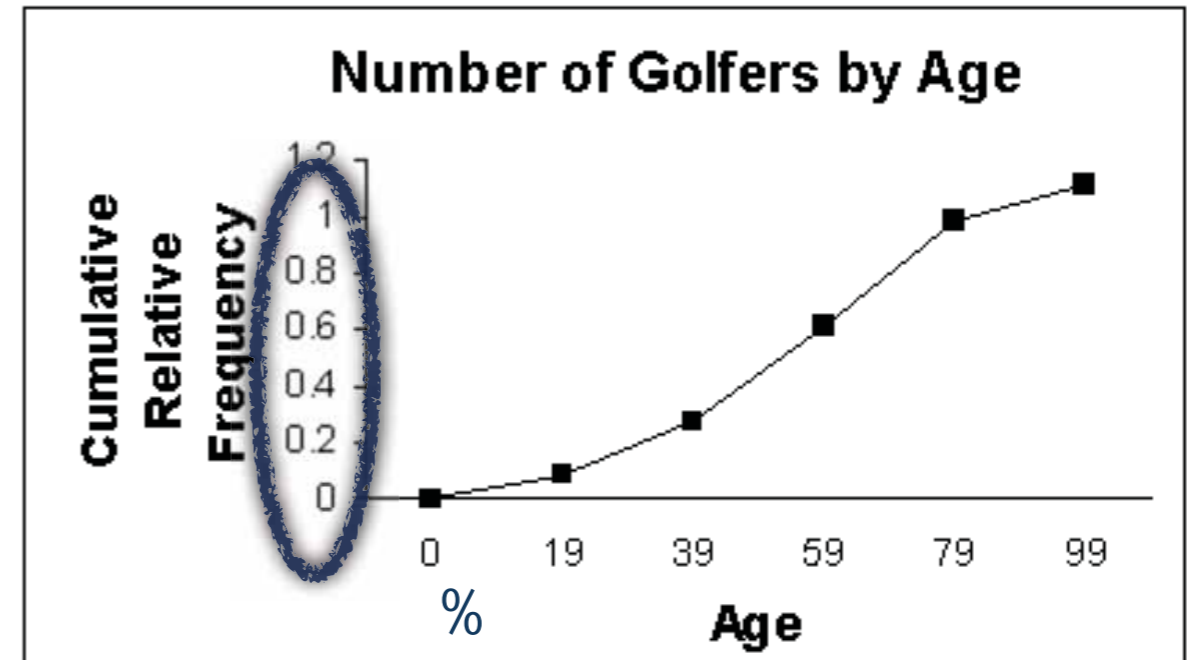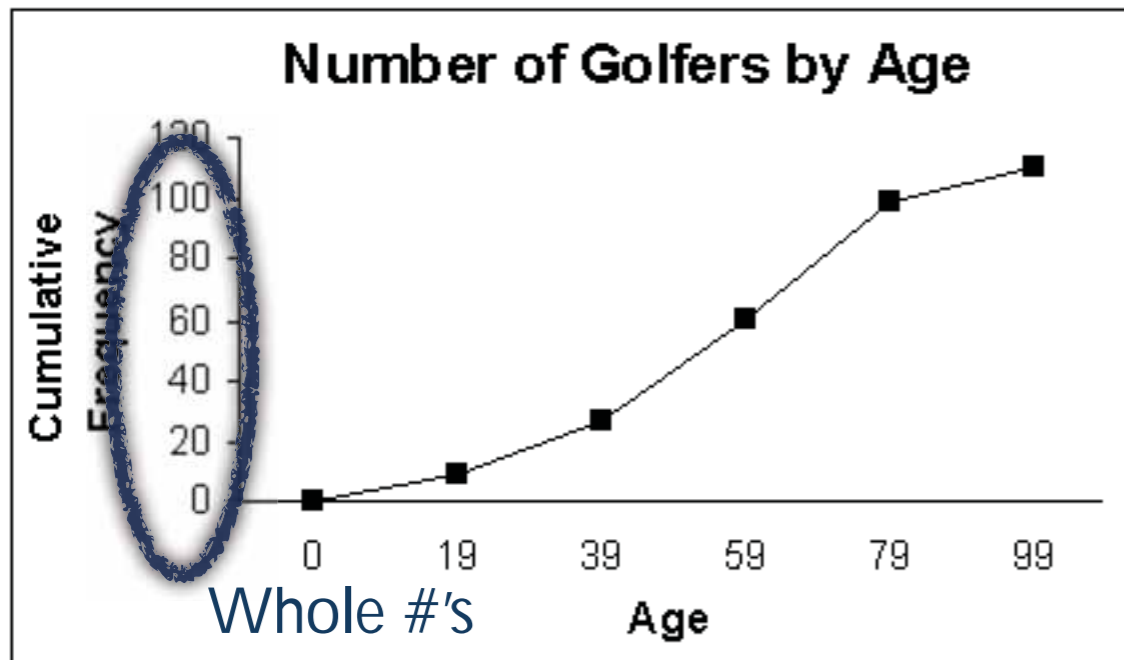
Actual Counts

Percentages or Decimals

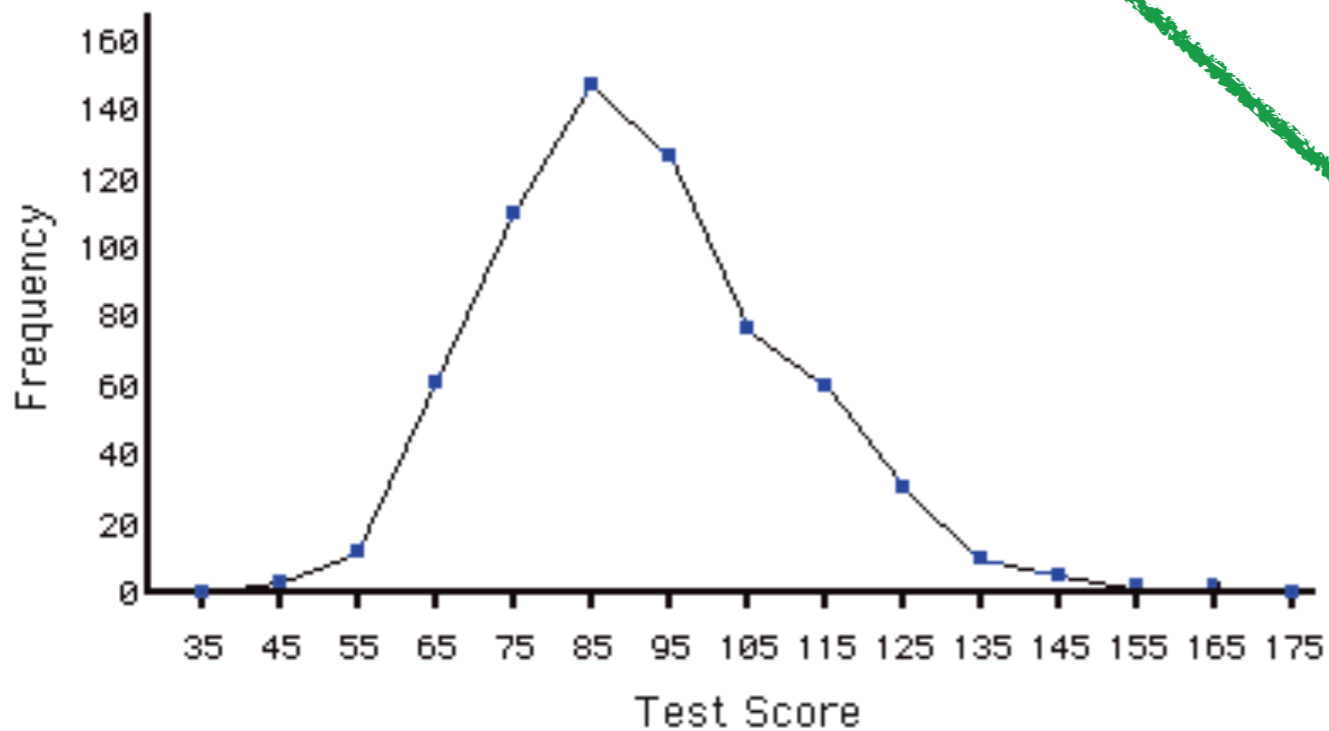| Length	Frequency	Cumulative Frequency
21-24	3	3
25-28	7	10 (= 3 + 7)
29-32	12	22 (= 3 + 7 + 12)
33-36	6	28 (= 3 + 7 + 12 + 6)
37-40	4	32 (= 3 + 7 + 12 + 6 + 4)

Lengths of 32 collected Baby Brown Snakes
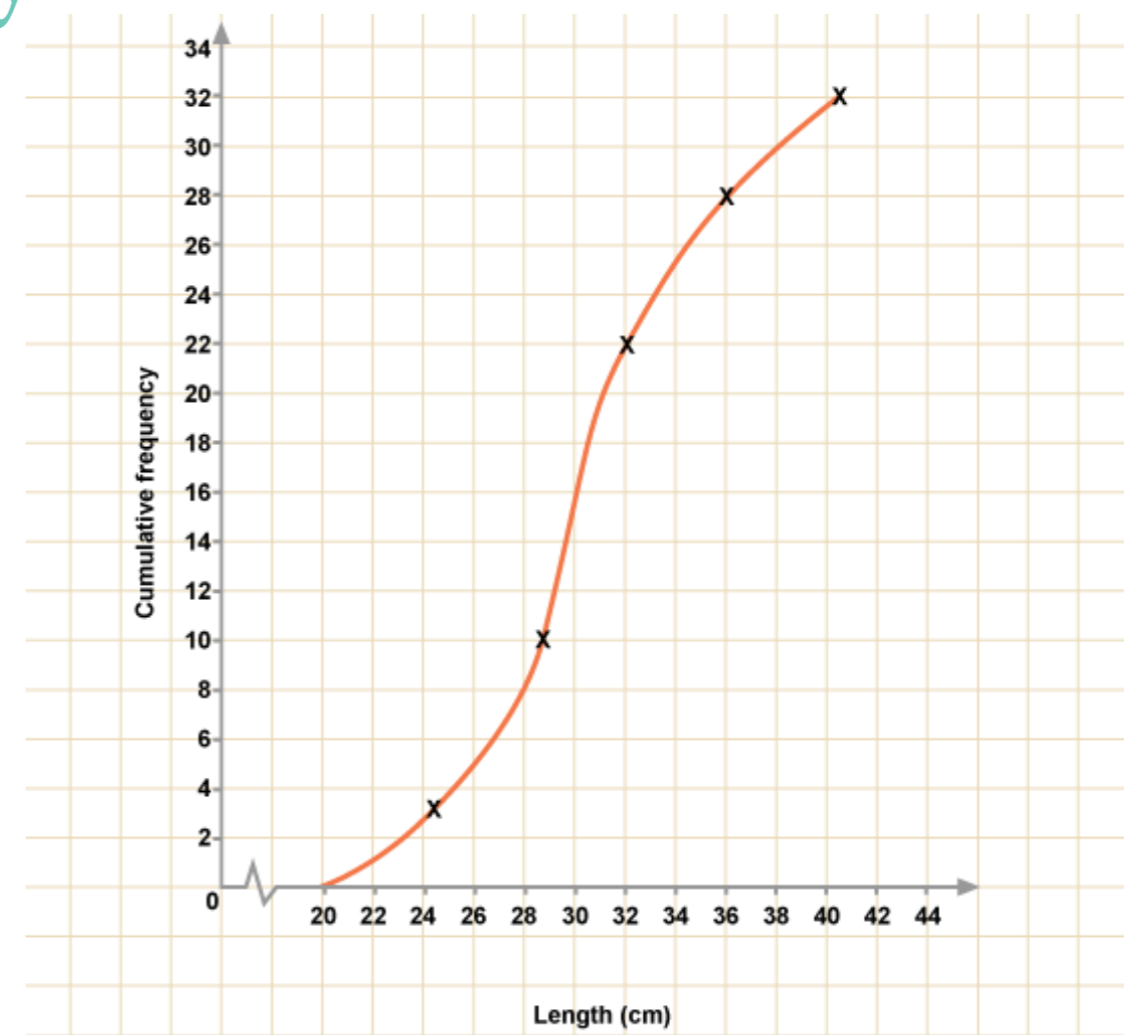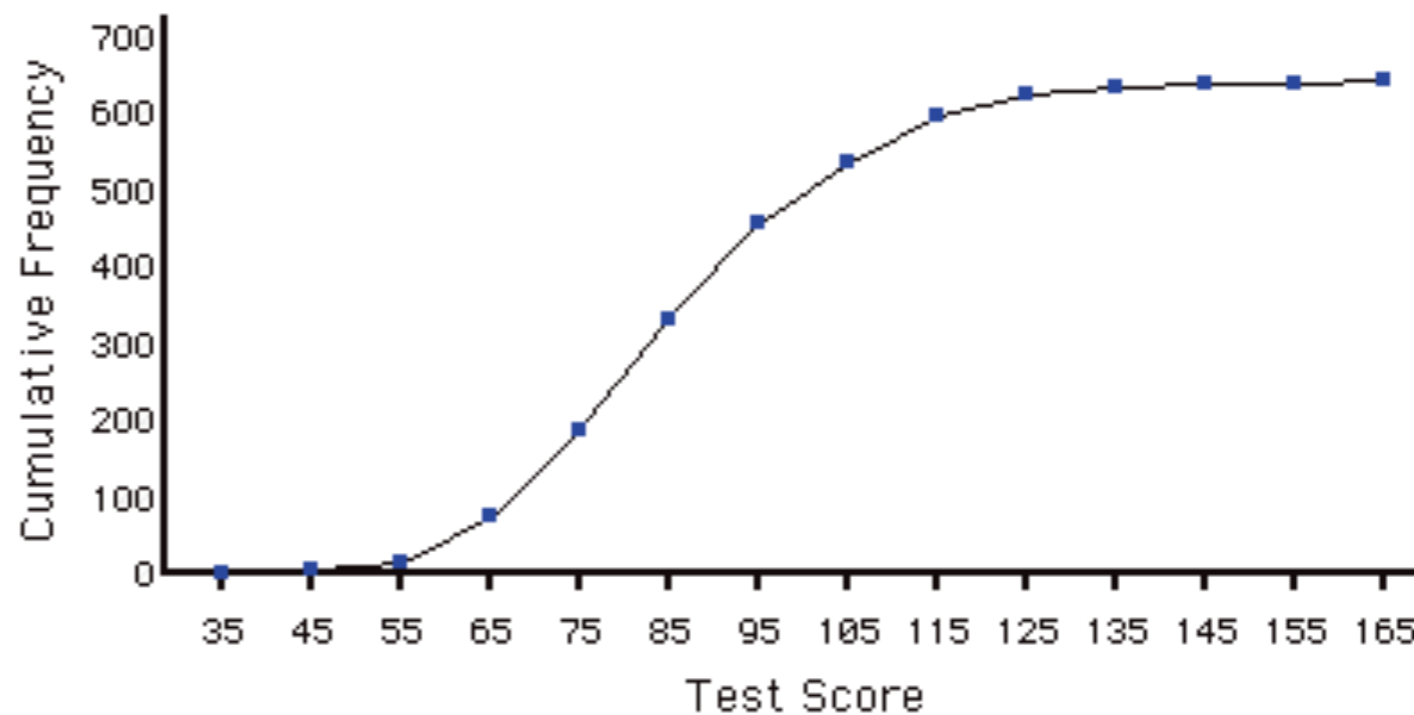
Cumulative FREQUENCY

Cumulative **RELATIVE** FREQUENCY

Cumulative graphs ALWAYS increase!

FREQUENCY

Cumulative FREQUENCY
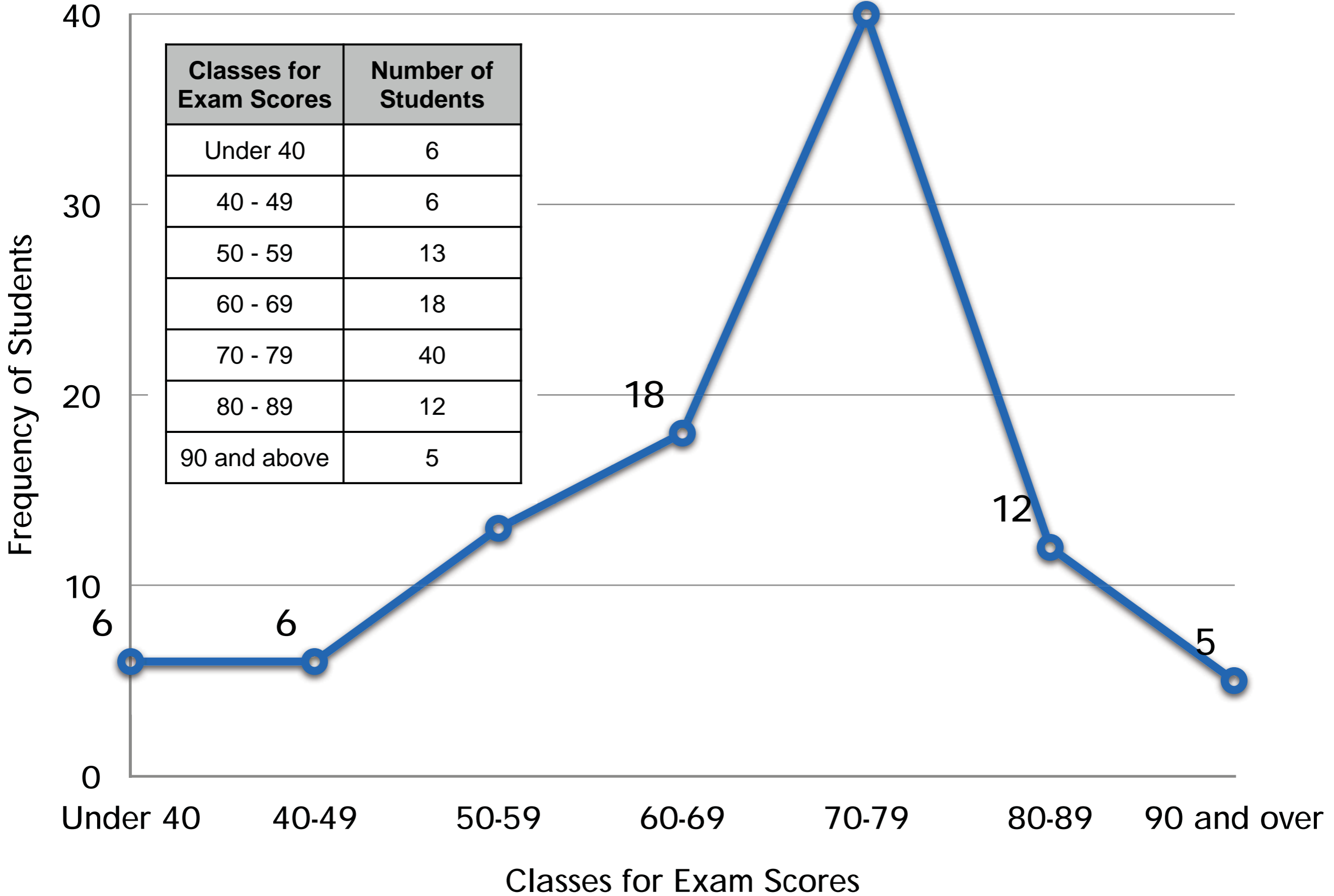
Ex 3

Frequency
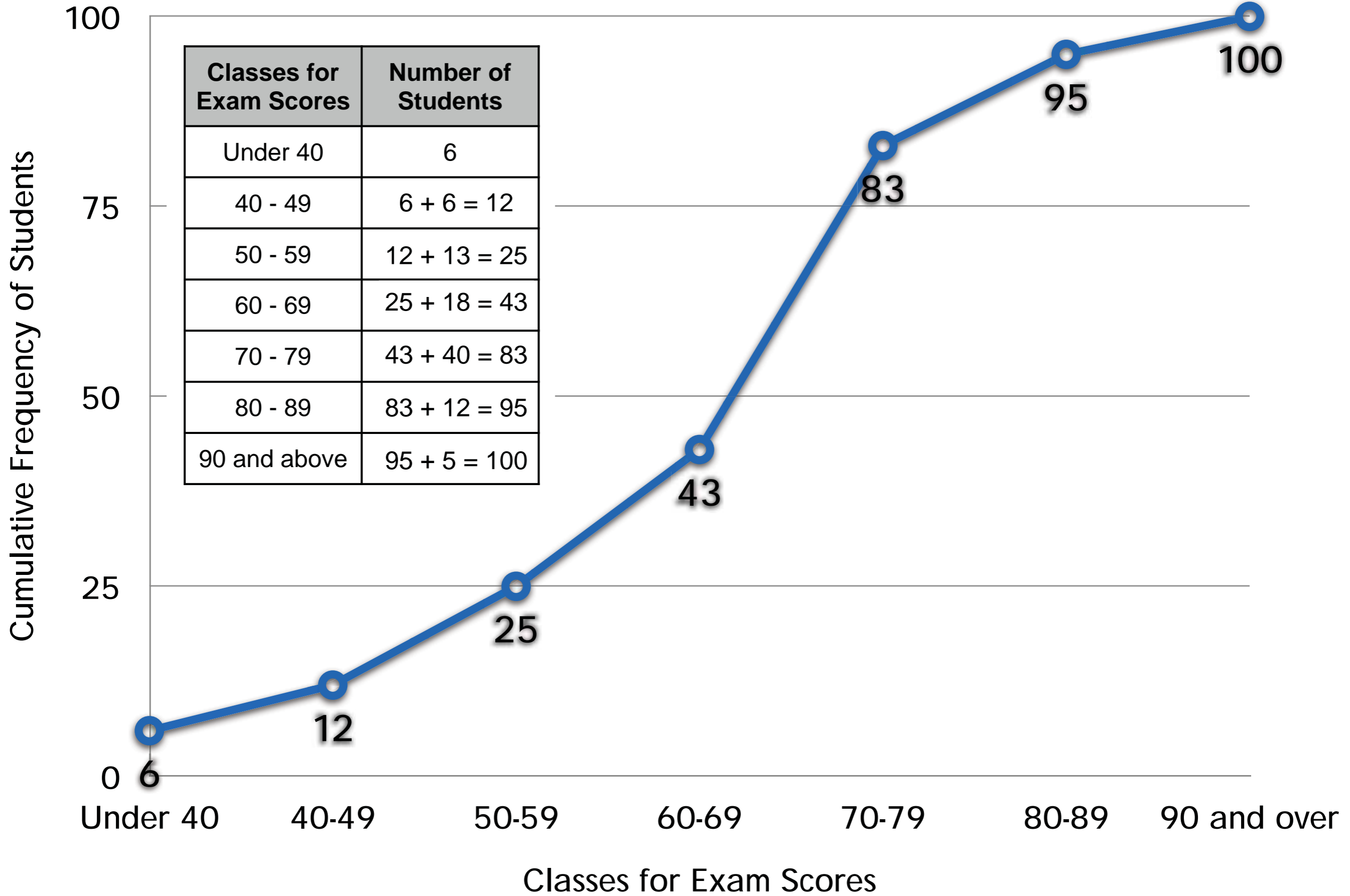
Classes for Exam Scores	Number of Students
Under 40	6
40 - 49	6
50 - 59	13
60 - 69	18
70 - 79	40
80 - 89	12
90 and above	5

Frequency of Students

Classes for Exam Scores

Ex 3   Cumulative Frequency

Cumulative Frequency of Students (y-axis): 0, 25, 50, 75, 100

Classes for Exam Scores	Number of Students
Under 40	6
40 - 49	6 + 6 = 12
50 - 59	12 + 13 = 25
60 - 69	25 + 18 = 43
70 - 79	43 + 40 = 83
80 - 89	83 + 12 = 95
90 and above	95 + 5 = 100

Data points on graph: 6, 12, 25, 43, 83, 95, 100

Classes for Exam Scores (x-axis): Under 40, 40-49, 50-59, 60-69, 70-79, 80-89, 90 and over
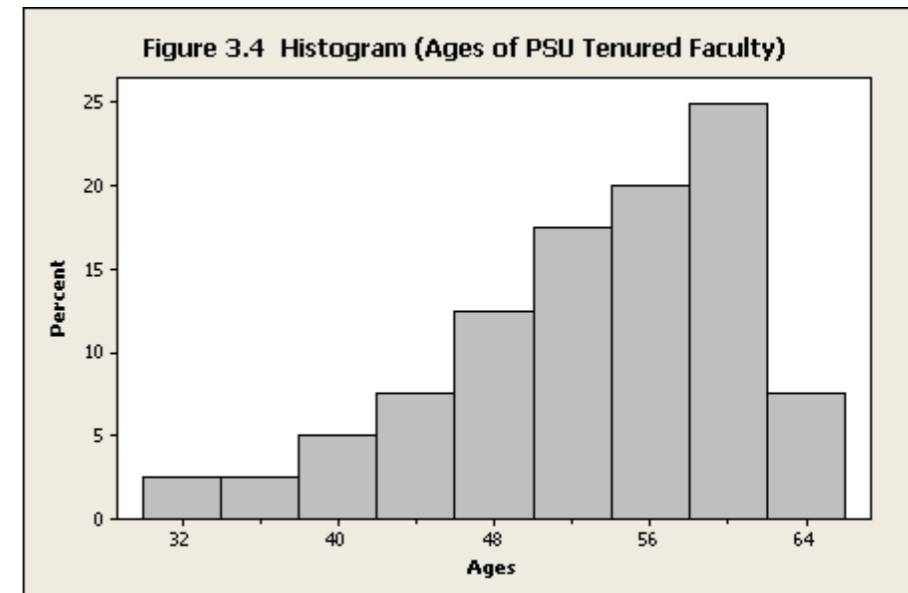
Histograms

- Similar to Bar Charts
- Use numerical data instead of categorical data
- No spaces between bars (unlike Bar Charts)
  - ✳ Spaces between bars only if there is a gap in the data

Bi-Modal Distribution

Unitary Distribution

Negatively Skewed

- Positively Skewed

Figure 3.4 Histogram (Ages of PSU Tenured Faculty)

Departure Time

Mean : 10.53
Std. : 3.26

Midnight
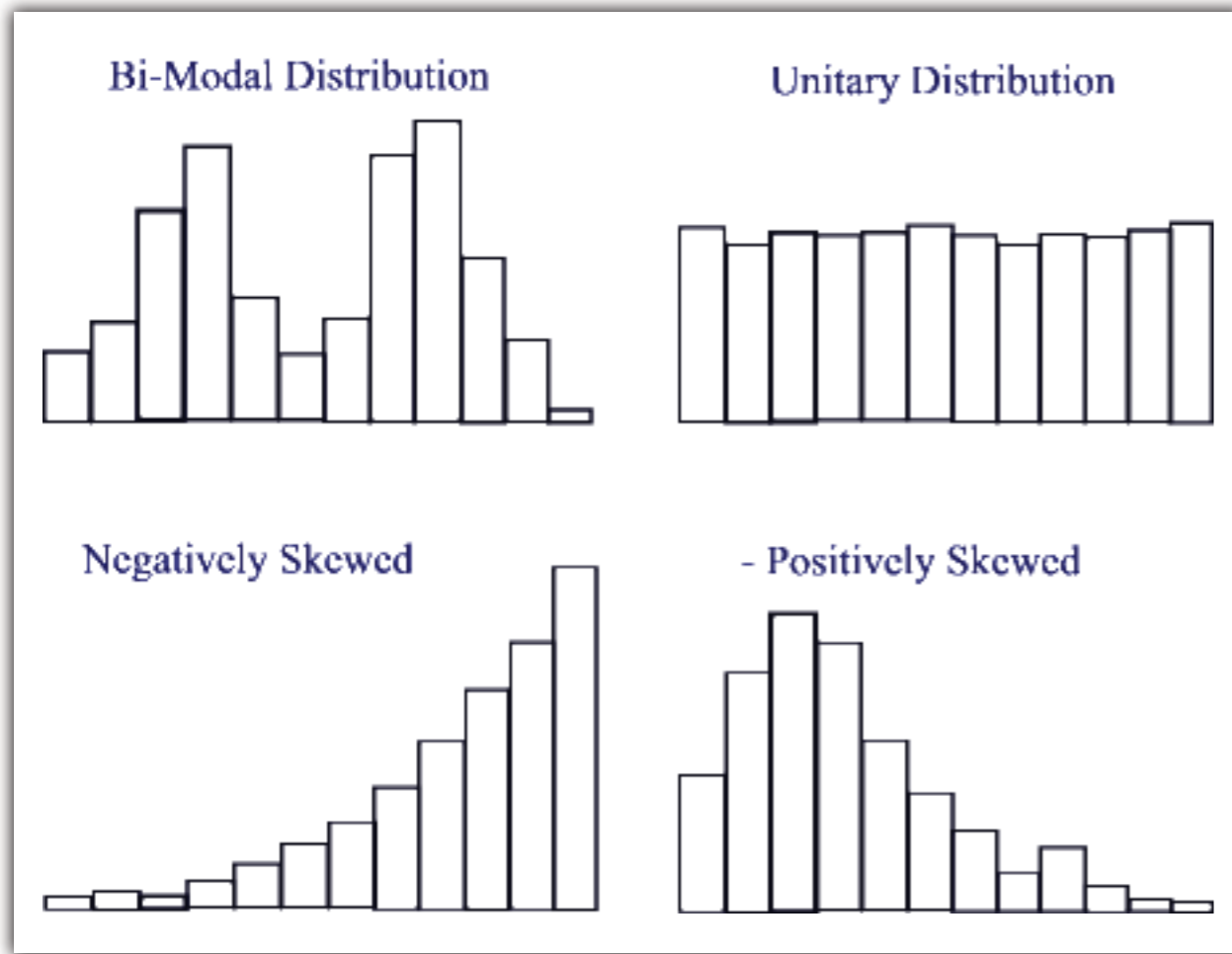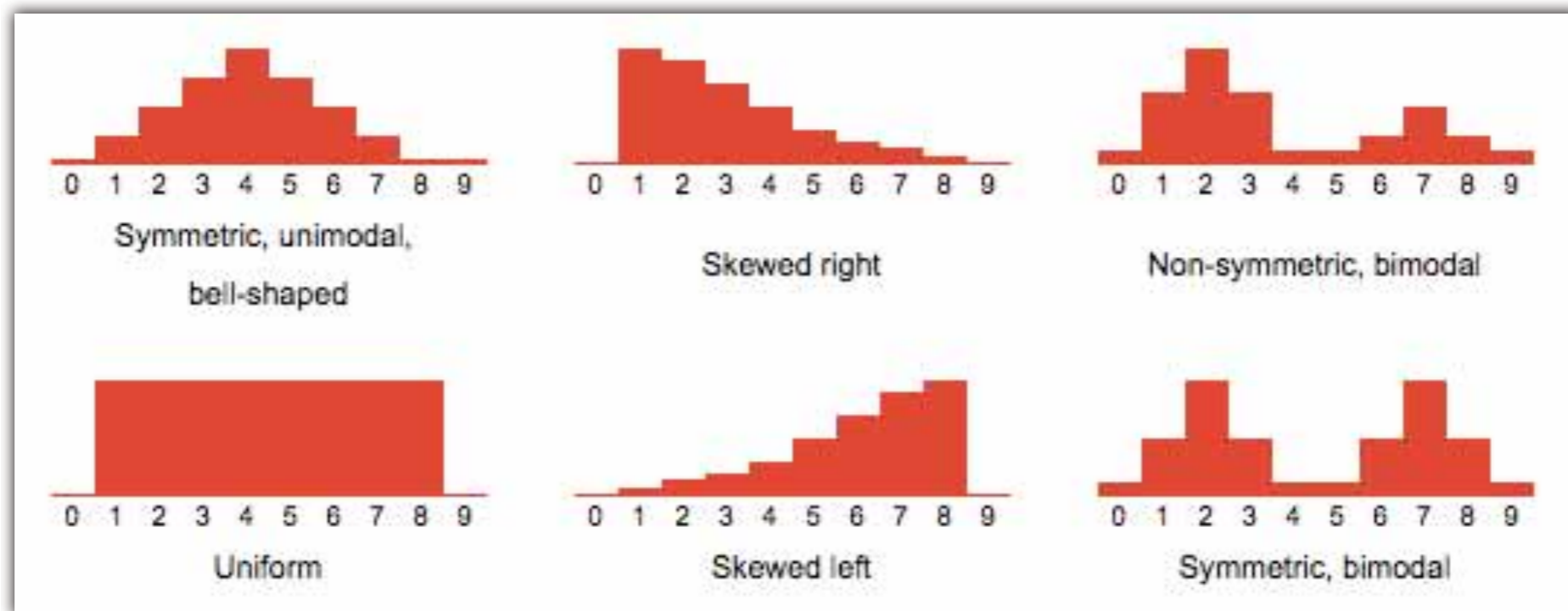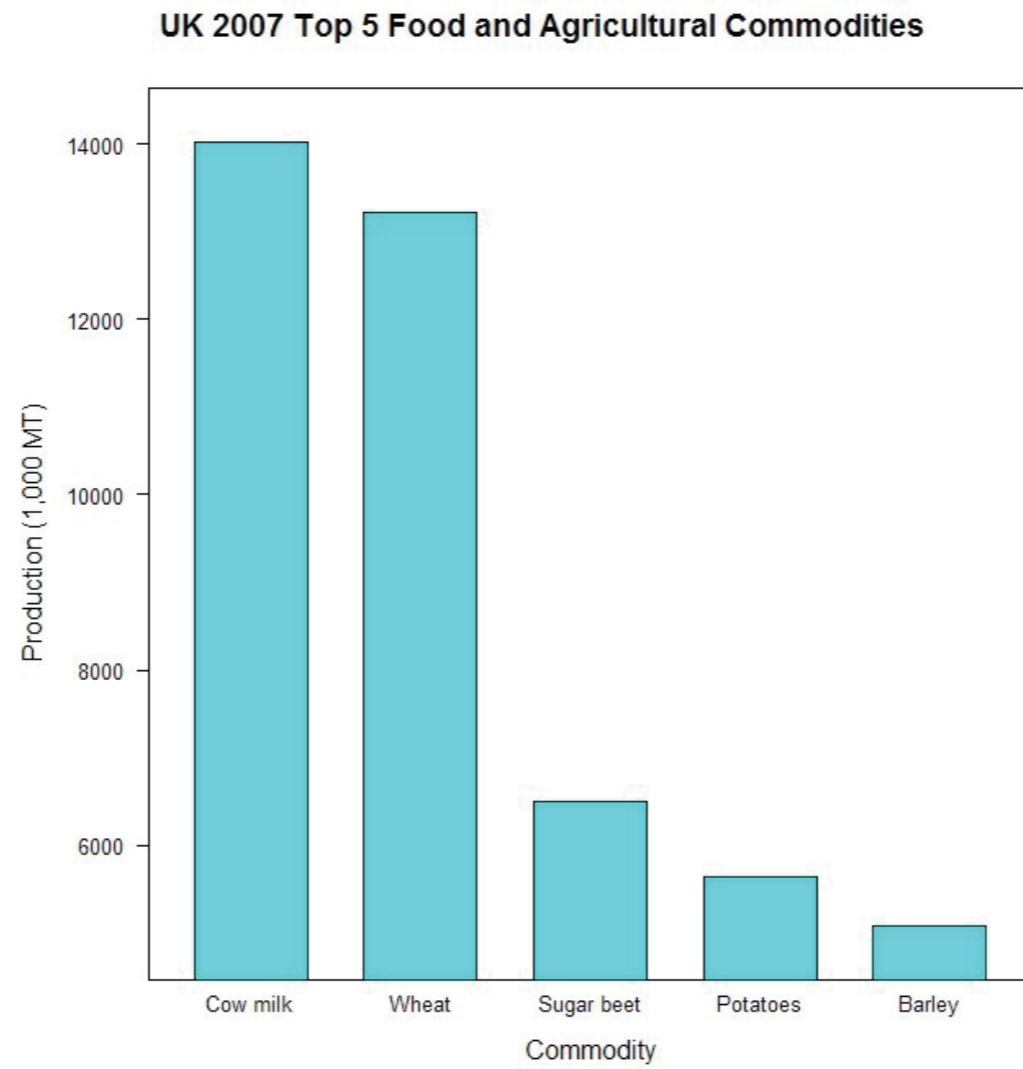
Histograms   •Similar to Bar Charts
•Use numerical data instead of categorical data
•No spaces between bars (unlike Bar Charts)
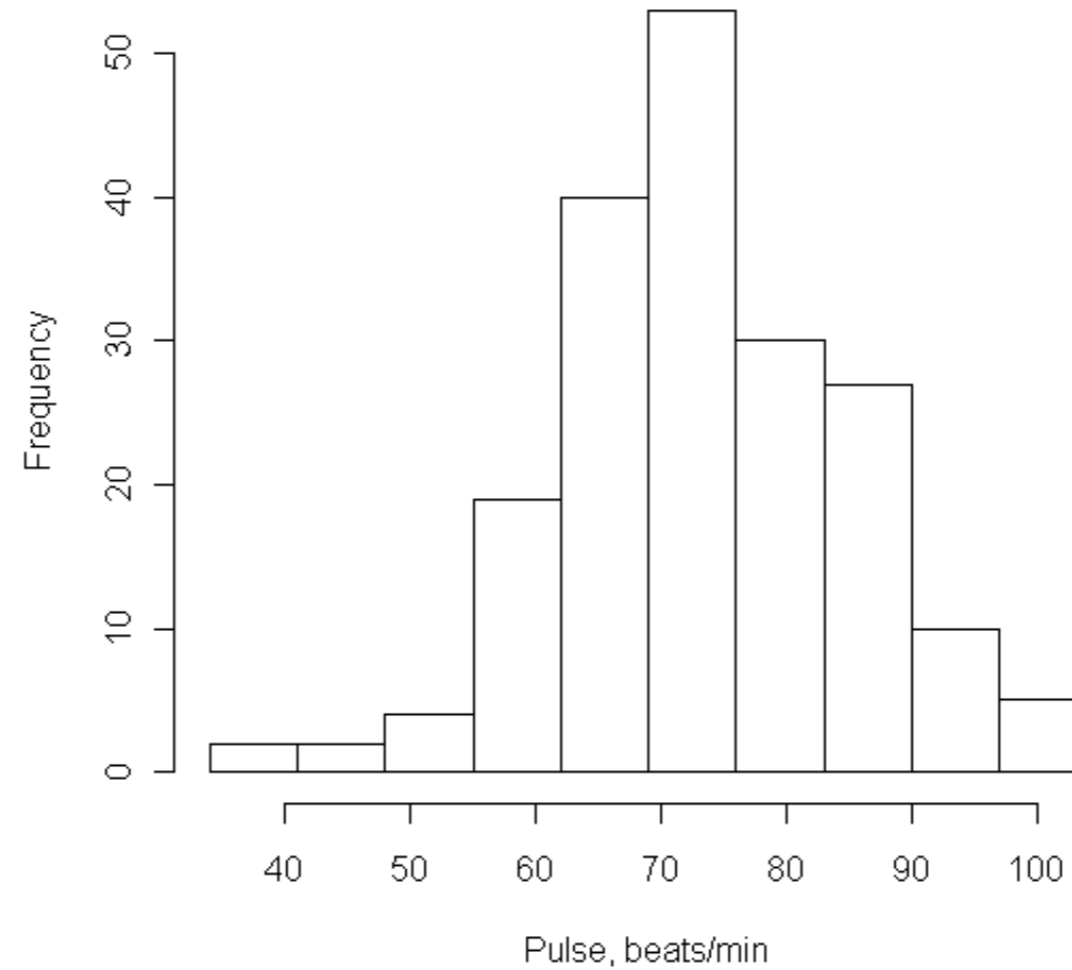 ✳Spaces between bars only if there is
   a gap in the data

0 1 2 3 4 5 6 7 8 9
Symmetric, unimodal,
bell-shaped

0 1 2 3 4 5 6 7 8 9
Skewed right

0 1 2 3 4 5 6 7 8 9
Non-symmetric, bimodal

0 1 2 3 4 5 6 7 8 9
Uniform

0 1 2 3 4 5 6 7 8 9
Skewed left

0 1 2 3 4 5 6 7 8 9
Symmetric, bimodal

Histogram or Bar Chart?

UK 2007 Top 5 Food and Agricultural Commodities
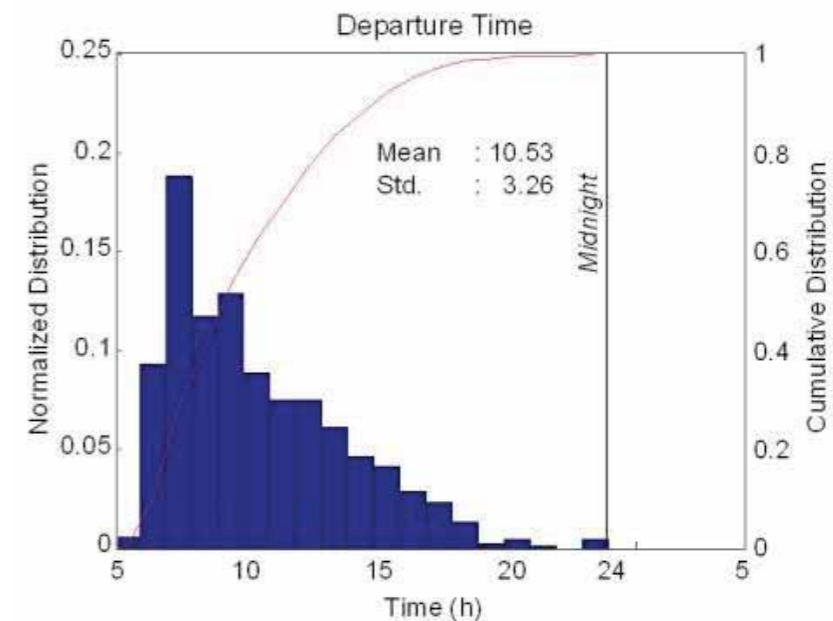
Bar Chart!!!

Histogram or Bar Chart?

Pulse Rate for a Sample of Students

Histogram!!!