

Section 17.1: Descriptive Statistics (Day 2)

Essential Question:

What is the difference & characteristics of a histogram, frequency polygon, and cumulative frequency polygon?

FREQUENCY and RELATIVE FREQUENCY TABLES

WORDS PER MINUTE

Class	Frequency	Cumulative Frequency
100-149	3	3
150-199	14	17
200-249	21	38
250-299	10	48
300-349	2	50

continue to sum frequencies

Total # of items

WORDS PER MINUTE

Class	Relative Frequency	Relative Cumulative Frequency
100-149	6%	6
150-199	28%	34
200-249	42%	76
250-299	20%	96
300-349	4%	100%

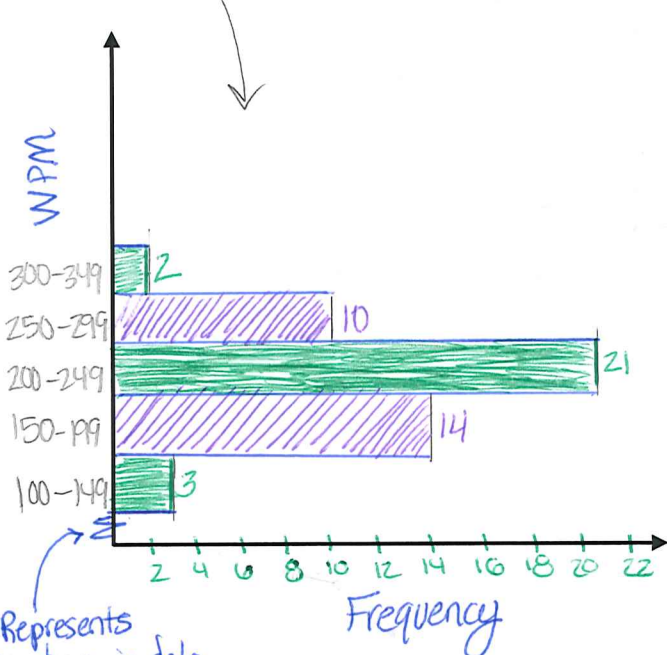
Relative = %

should always total 100%

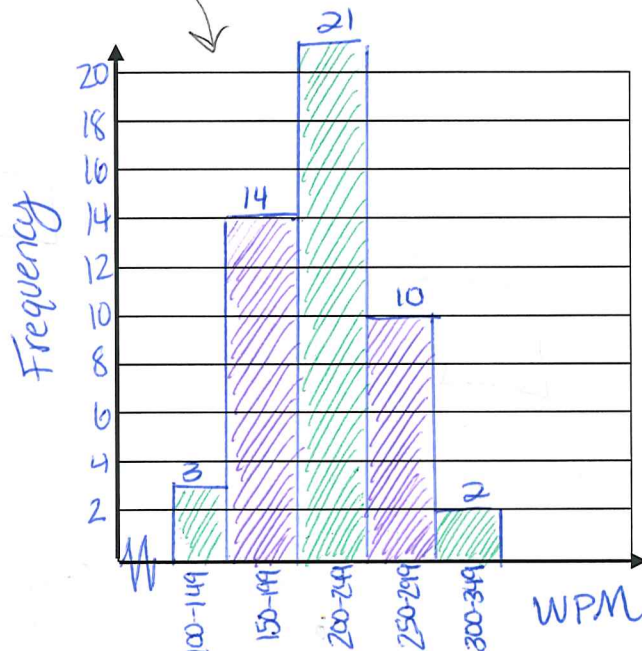
100-149
freq = 3 → $\frac{3}{50} = .06 = 6\%$

HISTOGRAM - bars are next to each other (NO GAPS)

Horizontal Bars



Vertical Bars



* Notice the resemblance in shape

FREQUENCY POLYGON

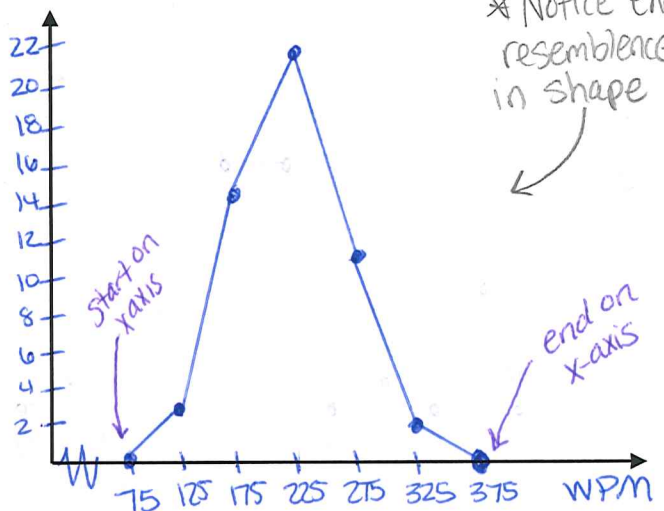
Vertical Axis: Label w/ integer frequencies OR relative frequencies (%)

Horizontal Axis: Show middle score of each class/interval

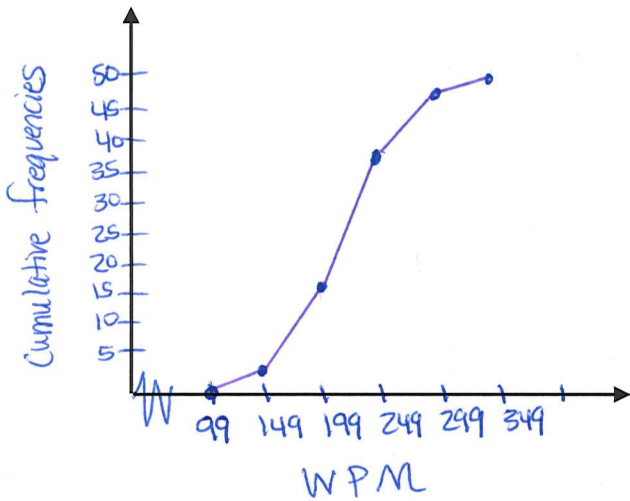
Polygon begins and ends on horizontal axis

WPM middle #

100-149	→	125
150-199	→	175
200-249	→	225 ...



CUMULATIVE FREQUENCY POLYGON



Vertical Axis: Label w/ integer frequencies
OR relative (%) frequencies

Horizontal Axis:

Show largest score of each class or interval

Start at zero → on x-axis

but end at last freq. total

Ex 5:

Listed in the table are the sales-tax rates to the nearest whole percent for the 50 states.

a) Draw a frequency polygon and a cumulative frequency polygon.

b) Find the mean, median, and mode.

Mean = $\frac{5(0) + 1(2) + 10(4) + 10(5) + 18(6) + 5(7) + 1(8)}{50} = \frac{243}{50} = 4.86\%$

50 items
25 med 25

Median = 5%

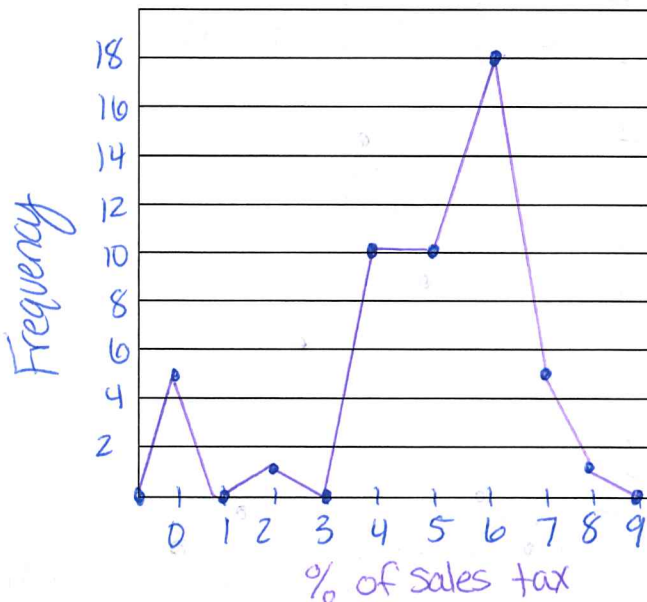
Mode = 6% (18 states)

% Rate	# of states	Cum. freq.
0	5	5
1	0	5
2	1	6
3	0	6
4	10	16
5	10	26
6	most=18	44
7	5	49
8	1	50 = total # of items

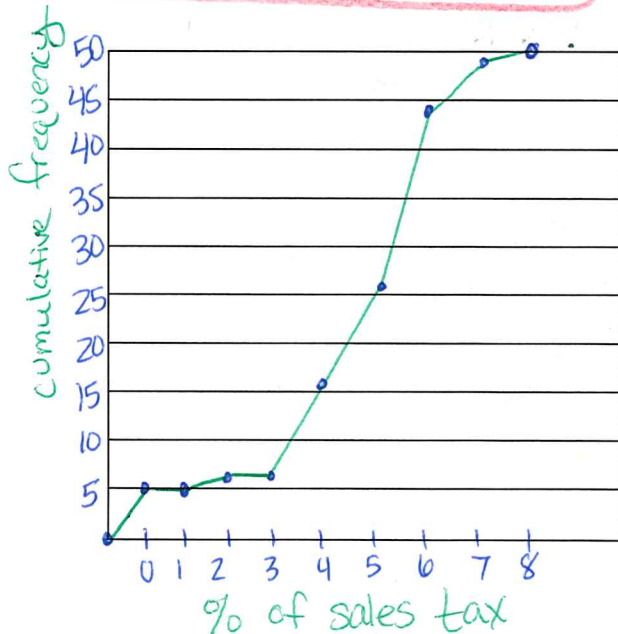
Item # 17-26 middle 25/26

c) Polygons for sales-tax rates

Frequency Polygon

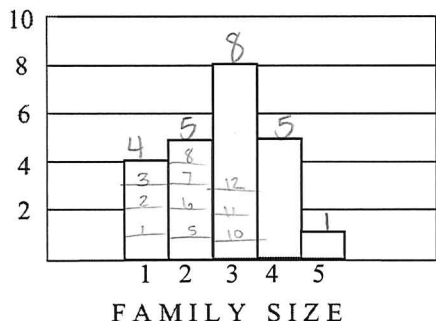


Cumulative Frequency Polygon



Ex 6:

Find the three measures of central tendency for the given histogram.



Add frequencies = $4 + 5 + 8 + 5 + 1 = 23$ items

$$\text{mean} = \frac{1(4) + 2(5) + 3(8) + 4(5) + 5(1)}{23} = \frac{63}{23}$$

median = 3 (12th item)

mode = 3 (most households have 3 people → 8 houses)

$$\frac{63}{23} \approx 2.739$$

Section 17.1 Summary (day 2):

Histogram

- Vertical or horizontal bars
- No gaps between bars unless the freq = 0
- axis labels
 - data (x or y)
 - freq. (x or y)
- draw straight bars (ruler!)

Freq. Polygon

- vertical axis label with frequencies
- horizontal axis label with data (middle #)
- Polygon begins and ends on x-axis
- plot points (x, y) (data item, freq.)

Cumulative freq. Polygon

- vertical axis label w/ cum. freq.
- horizontal axis label w/ data (largest #)
- Polygon begins on the x-axis
- ends @ total # of items or 100% (relative)
- plot points (x, y) (data item, cum. freq.)