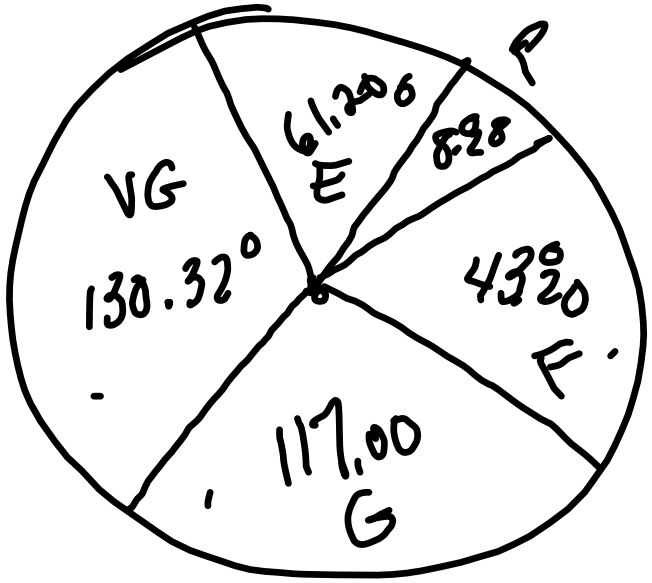
29		%	rel freq.	# of deg
	Excellent	17.0%	.17	$.17(360^\circ) = 61.20$
	Very Good	36.2	.362	$.362(360^\circ) = 130.32$
	Good	32.5	.325	$.325(360^\circ) = 117.00$
	Fair	12.0	.120	$.120(360^\circ) = 43.20$
	Poor	2.3	.023	$.023(360^\circ) = 8.28$
		100%	1.000	360°



Organizing and Graphing Quantitative Data

need to organize into groups called grouped data

2.15 all 50 employees of a company

Age	# of employees	Midpoint (mark)
18-30	12	24
31-43	19	37
44-56	14	50
57-69	5	63

Each class has a lower limit and an upper limit

18	30
31	43
44	56
57	69

midpoint (mark) $\frac{\text{upper limit} + \text{lower limit}}{2}$

$\frac{18+30}{2} = \frac{48}{2} = 24$

Upper boundary of class #1 is $\frac{\text{up limit of \#1} + \text{lower lim \# 2}}{2}$

$\frac{30+31}{2} = 30.5$

Class Boundaries

17.5 to < 30.5
30.5 to < 43.5
43.5 to < 56.5
56.5 to < 69.5

Class width = 13

Upper Bound - Lower Boundary

$30.5 - 17.5 = 13.0$

Must decide 3 things when making a frequency distribution table of quantitative data

① How many classes should there be?
5-20 depending on # of observations

Sturge's Rule
n = # of observations
# classes = $1 + 3.3 \log n$

② Class width
determine the difference between largest and smallest values in the data — then approximate the width by dividing by # of classes

③ Lower limits of the 1st class - or starting point

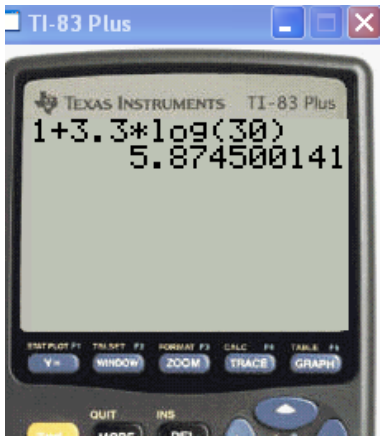
Homeruns hit by Major League Teams during the 2004 Season			
Team	**Home Runs**	**Team**	**Home Runs**
Arizona	135	Milwaukee	135
Atlanta	178	Minnesota	191
Baltimore	169	Montreal (now Washington)	151
Boston	222	New York Mets	185
Chicago Cubs	235	New York Yankees	242
Chicago White Sox	242	Oakland	189
Cincinatti	194	Philadelphia	215
Cleveland	184	Pittsburgh	142
Colorado	202	St. Louis	214
Detroit	201	San Diego	139
Florida	148	San Francisco	183
Houston	187	Seattle	136
Kansas City	150	Tampa bay	145
Loss Angeles Angels of Anahei	162	Texas	227
Los Angeles Dodgers	203	Toronto	145

classes $= 1 + 3.3 \log 30$

$= 5.8$

So between 5 & 6

Author chose 5



∴ the class width

therefore $\frac{242 - 135}{5}$

$= 21.4$

round to 22

We will start at 135

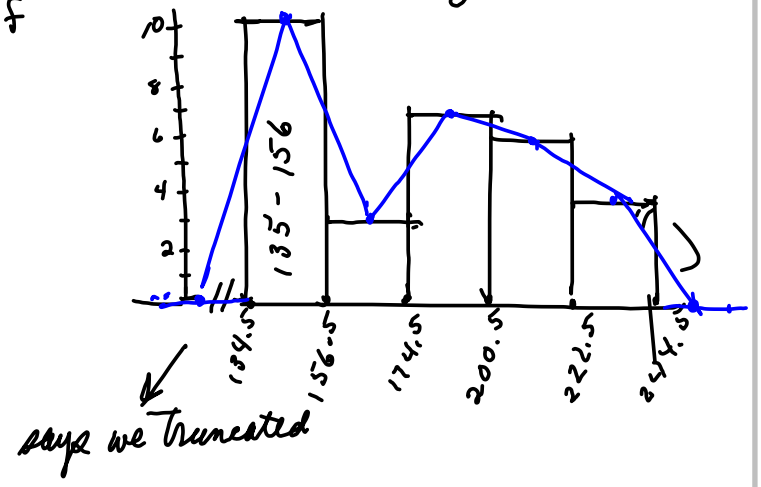
$135 + 22 - 1$

$\begin{array}{r} 135 \\ 110 \\ \hline 244 \end{array}$ $\begin{array}{r} 22 \\ 5 \\ \hline 110 \end{array}$

Class # of homeruns	class boundaries	freq.	rel freq.	%
135 - 156	134.5 to < 156.5	10	.333	33.3
157 - 178	156.5 to < 178.5	3	.100	10.0
179 - 200	178.5 to < 200.5	7	.233	23.3
201 - 222	200.5 to < 222.5	6	.200	20.0
223 - 244	222.5 to < 244.5	4	.133	13.3
		$\sum f = 30$	.999	99.9

$\frac{f}{\sum f}$ =

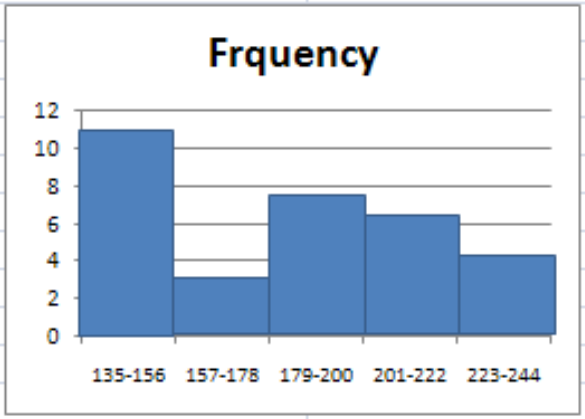
a Histogram



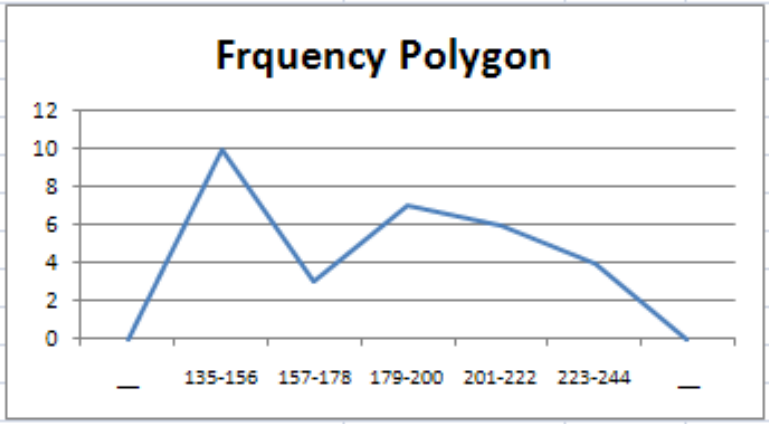
says we truncated

Frequency polygon

Total Home Runs	Class Boundaries	Frquency	Relative frequency	% frequency
135-156	134.5 to less than 156.5	10	0.333	33.3
157-178	156.5 to less than 178.5	3	0.100	10.0
179-200	178.5 to less than 200.5	7	0.233	23.3
201-222	200.5 to less than 222.5	6	0.200	20.0
223-244	222.5 to less than 244.5	4	0.133	13.3
	totals	30	0.999	99.9



A **histogram** is a bar chart where all of the bars touch



A **frequency polygon** is a graph formed by joining the midpoints of the tops of succesive bars in a histogram with straight lines.
NOTE: Must start and end with the zeros

Qd Quantitative discreet
(i.e. countable)