Math 1

Take out HW from
last night

MEASURES OF CENTER

Measures of center are __mean__ and __median__, and tell us where the __center of__ the data falls.

The mean/average best represents a data set when __there are NO outliers__.

The median best represents a data set when __there ARE outliers__.

Why do you think this is the case? __the mean is pulled toward the outliers__

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Data Set One: 16, 21, 20, 19, 21, ~~~~, 18, 21, 20

75 – 16
Max-min

$\overline{X}$
Mean: 25.7   Med
Median: 20   Range: 59   Outlier(s): 75

Explanation for best: median b/c there are outliers

Data Set Two: 99, ~~~~, 99, 100, 100, 98, 99

$\overline{X}$
Mean: 91   med
Median: 99   Range: 58   Outlier(s): 42

Explanation for best: median b/c there is an outlier

Data Set Three: 8, 24, 12, 9, 18, 8, 29, 8, 8, 12, 14, 14, 18, 28

Mean: 15   Median: 13   Range: 21   Outlier(s): None

Explanation for best: Mean b/c there are no outliers

Data Set Four: 80, 85, 75, 85, 70, 65, 60, 85

Mean: 75.6   Median: 77.5   Range: 25   Outlier(s) none

Explanation for best: means b/c no outliers

Data Set Five: 32, 29, 21, 36, 41, 5, 30, 29, 39

Mean: 29.1   Median: 30   Range: 36   Outlier(s) 5

Explanation for best: median b/c of outliers

Billstar estimates that revenue from all major North American concerts in 2005 was about $3.1 billion. The histogram below shows the average ticket price for the top 20 North American concert tours.

Concert Tours

35-40

150-160

Source: www.billboard.com

a. For how many of the concert tours was the average price $100 or more?

6 Concerts

b. Barry Manilow had the highest average ticket price.

    i. In what interval does that price fall?

    range

    $150-160

    ii. The 147,470 people who went to Barry Manilow concerts paid an average ticket price of $153.93. What was the total amount paid (gross) for all of the tickets?

    147,470 (153.93) = **$22,700,051.10**

c. The lowest average ticket price was for Rascal Flatts.

    i. In what interval does that price fall?

    $30-40

    ii. Their concert tour sold 807,560 tickets and had a gross of $28,199,995. What was the average price of a ticket to one of their concerts?
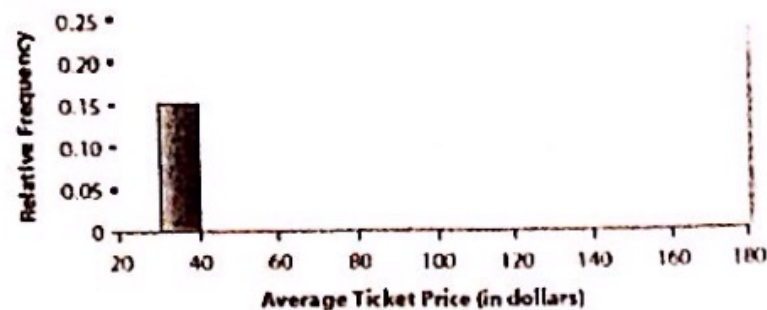
    $$\frac{28,199,995}{807,560} = \$34.92$$

Sometimes it is useful to display data showing the percentage or proportion of the data values that fall into each category. A relative frequency histogram has the proportion or percentage that fall into each bar on the vertical axis rather than the frequency or count. Shown below is the start of a relative frequency histogram for the average concert ticket prices in Problem 4.

a. Since prices between $30 and $40 happened 3 out of 20 times, the relative frequency for the first bar is $\frac{3}{20}$ or 0.15. Complete a copy of the table and relative frequency histogram. Just as with the histogram, an average price of $50 goes into the interval 50-60 in the table.

Concert Tours

Average Price (in $)	Frequency	Relative Frequency
30-40	3	$\frac{3}{20}$ = 0.15
40-50	4	.2
50-60	2	.1
60-70	2	.1
70-80	1	.05
80-90	1	.05
90-100	1	.05
100-110	2	.1
110-120	0	0
120-130	0	0
130-140	3	.15
140-150	0	0
150-160	1	.05
Total	20	

The relative frequency histograms below show the heights (rounded to the nearest inch) of large samples of young adult men and women in the United States.

Heights of Young Adult Men

14%

}13%

Relative Frequency as a Percentage

Height (in inches)

Heights of Young Adult Women

}29%

Relative Frequency as a Percentage

Height (in inches)

a. About what percentage of these young men are 6 feet tall? About what percentage are at least 6 feet tall?

$= 6ft \sim 11\%$

$\geq 6ft \sim 32\%$

b. About what percentage of these young women are 6 feet tall? About what percentage are 5 feet tall or less?

$= 6ft \sim 1\%$

$\leq 5ft \sim 7\%$

c. If there are 5,000 young men in this sample, how many are 5 feet, 9 inches tall? If there are 5,000 young women in this sample, how many are 5 feet, 9 inches tall?

14% of 5000
$(.14)(5000) = \boxed{700}$

4% of 5000
$(.04)(5000) = \boxed{200}$

d. Walt Disney World recently advertised for singers to perform in *Beauty and the Beast--Live on Stage.* Two positions were Belle, with height 5'5"-5'8", and Gaston, with height 6'1" or taller. What percentage of these young women would meet the height requirements for Belle? What percentage of these young men would meet the height requirements for Gaston? (Source: corporate.disney.go.com/auditions/disneyworld/roles_dancersinger.html)
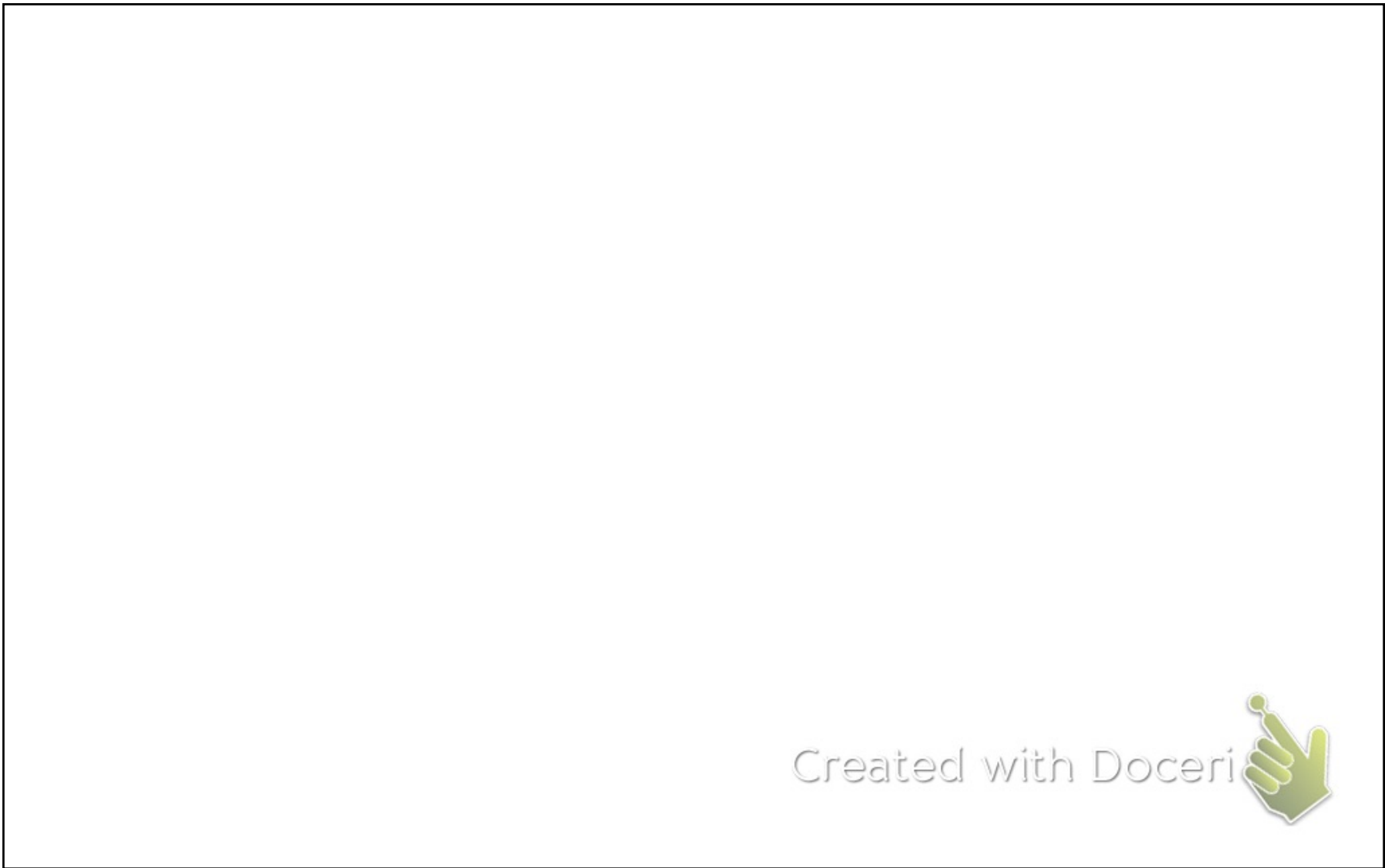
Describing Data Sets

a. 10, 10, 10, 10, 15   8, 9, 10, 11, 13

b. $\frac{80}{}$ $\frac{800}{}$

   mean: 4   mean: 113
   Med: 40   med: 40

c. mean 39.8   outliers   → median
   med .00038   → 8.6 & 310