

AP STATS SUMMER PACKET – ALGEBRA 2 REVIEW
MEAN, MEDIAN AND MODE – 100 Points
Due on 1st Day of School – September 8, 2009

Statistics are numerical values used to summarize and compare sets of data. **Mean, median and mode** represent measures of central tendency of data sets.

Mean – also called the average. Sum all of the data and divide by the number of data points. The mean of 1,2,5,4,3 is 3 (15 divided by 5). Represented by the symbol \bar{X} . These measures tell the what the center of the data is.

Advantages

1.

2.

Disadvantages

1.

2.

Name 2 situations (from the back) where the mean would be the best used?

Median – Order the data from low to high. If there is an odd number of data, select the middle data point. If there is an even number of data, select the middle two data points and then average them. The median of 2,2,2,5,6 is 2 (middle number is 2). The median of 2,2,2,5,6,7 is 3.5 (2+5)/2.

Advantages

1.

2.

Disadvantages

1.

2.

Name 2 situations (from the back) where the median would be the best used?

Mode - the data point that occurs the most. If none occur more than once, there is no mode. The mode of 2,2,2,6 is 2. The mode of 4,5,6 is none (none occur more than once). The mode of 4,4,4,4 is 4.

Advantages

1.

2.

Disadvantages

1.

2.

Name 2 situations (from the back) where the mode would be the best used?

VARIABILITY/VARIANCE

Data can also be presented on how spread out the data. For example, the number of people in the nuclear family has data points very close to one another. However, the number of pets can be very spread out, especially when you count the number of fish you might have.

Range – The difference between the largest and smallest data points. For example, the range of data point 1,3 and 100 is 99 (100 – 1).

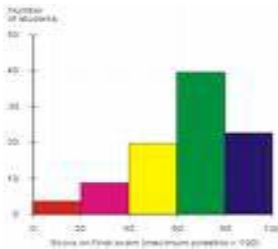
Standard Deviation – Standard deviation describes the typical difference (or deviation) between the mean and a data value. To calculate the standard deviation (σ – greek for sigma) of a data set, use the following formula. (Subtract the mean from each data point and then square that that number. Add them together and divide by the number of data points. Then take the square root of that number. Only use 1 decimal place.

$$\sigma = \sqrt{\frac{(x_1 - \bar{X})^2 + (x_2 - \bar{X})^2 + \dots + (x_n - \bar{X})^2}{n}}$$

PRESENTING DATA

There are many ways to present categorical and numerical data. Most are visual in nature to explain the data. Of course, things can be mis-represented by their presentation. You also can't necessarily see all the data.

Histogram – Data is put into “categories” or “groups” or “ranges”. The categories are then presented, meaning the individual data points are not divisible. In the chart below, the left column represents the number of data points in the range, the bottom represents the ranges or groups.



Advantages

- 1.
- 2.

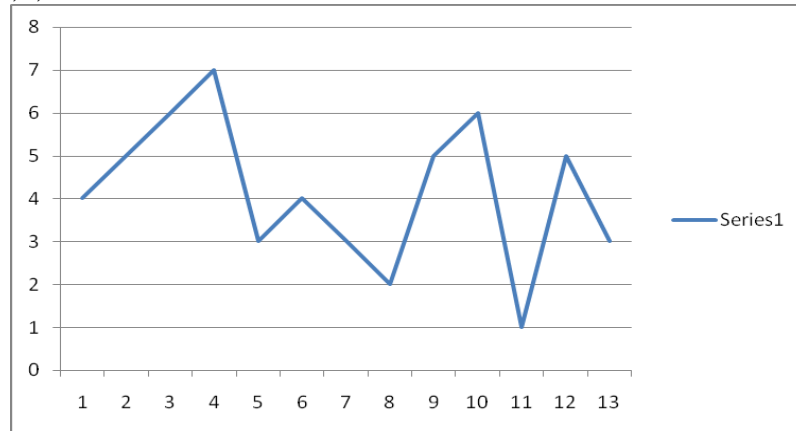
Disadvantages

- 1.
- 2.

Name 2 situations (from the back) where the histogram would be the best used?

Line Chart – Numerical data is plotted to show how it relates to other data points in the total. In the chart below, it shows the data points plotted against each other.

4,5,6,7,3,4,3,2,5,6,5,3



Advantages

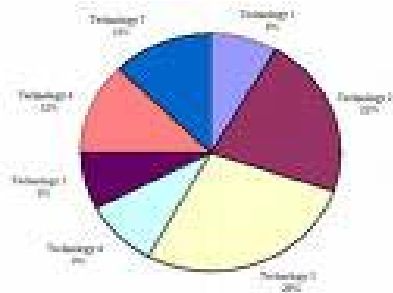
- 1.
- 2.

Disadvantages

- 1.
- 2.

Name 2 situations (from the back) where the line chart would be the best used?

Pie Charts – Data points are presented in a pie-shaped chart. The data is either counted or grouped. An example of counting is 4 of the 10 data points are 7 (so 40% of the pie is represented by the point of 7). An example of grouping is 4 of the 10 data points are between 1 and 3 (so 40% of the pie is represented by the group). Some examples are below.



Advantages

- 1.
- 2.

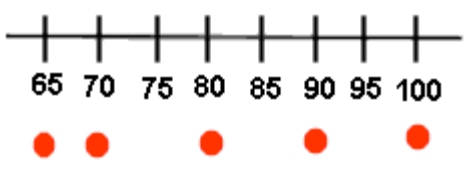
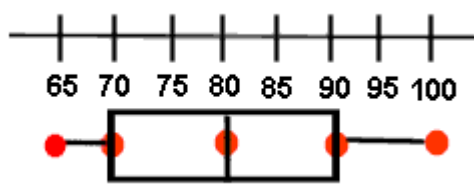
Disadvantages

- 1.
- 2.

Name 2 situations (from the back) where the pie chart would be the best used?

Box-And-Whiskers Plot – The box and whiskers plot is a numerical data presentation done with a number line representation of the data. Here’s how to construct one.

The data: Math test scores 80, 75, 90, 95, 65, 65, 80, 85, 70, 100

<p>Write the data in numerical order and find the first quartile, the median, the third quartile, the smallest value and the largest value.</p> <p> median = 80 first quartile = 70 third quartile = 90 smallest value = 65 largest value = 100 </p>	<p style="text-align: center;">median of all data, second quartile</p> <p style="text-align: center;">65, 65, 70, 75, 80, 80, 85, 90, 95, 100</p> <p style="text-align: center;">median of lower part, first quartile median of upper part, third quartile</p>
<p>Place a circle beneath each of these values on a number line.</p>	
<p>Draw a box with ends through the points for the first and third quartiles. Then draw a vertical line through the box at the median point. Now, draw the whiskers (or lines) from each end of the box to the smallest and largest values.</p>	

Some other types....

Scatter Plots – data is placed on a chart (like a coordinate plane). Scatter plots use the individual data points only, typically.

Bar Charts – Data is presented in bar heights. The data is the actual data points or grouped by categories.

YOUR PERSONAL PROJECT

- A. Complete the packet. Use your Algebra 2 skills to help you finish the packet.
- B. Look at the sample data collections. Select **2** of the items and make a poster of each with the following items on each poster.
 1. Draw a picture/Get internet pictures/magazine pictures to represent your data. (10 pts)
 2. Evaluate the situation given to you with the following questions. (90 pts)
 - a) Calculate the mean, median and mode of the data. Which one is better and why is the other two not as good?
 - b) Show the range and standard deviation of the data.
 - c) Present the data in 4 different styles. The histogram, box-and-whiskers plot and pie chart must be 3 of the 4. Which way seems the best and why? Could you have presented this data in a way that misrepresented the data? If so, make one. **Make you identify and label your x and y axis!**
 - d) Evaluate the data. Why did the data change? What could have caused it and is it important? Is the data representative of any large populations? Is the data set big enough to do all this work?
 - e) Be creative, colorful and accurate (remember you're trying to sell it!)

DATA SETS

PICK ONE OF THESE (1 to 9)

1. You record your gas mileage from your car for 10 fillups.

18.4	18.8
20.2	15.2
20.4	19.4
17.8	18.3
19.2	19.8

2. You invest \$1000 in a Certificate of Deposit at the bank every 2 weeks. The bank gives you the following interest rates.

3.09	1.38
3.01	2.05
1.05	2.15
1.97	2.69
2.36	2.14

3. Your phone bill has the following text amounts to your bff every month.

1378	428
172	739
468	829
456	710
1289	660

4. Your time in the mile during the spring season is done weekly. Here are your times (minutes and seconds)

5:57	6:03
5:59	5:52
6:04	5:59
5:38	5:55
6:10	5:49

5. You record your television view hours every week for 10 weeks (hours and minutes)

10:30	15:00
12:25	25:30
15:20	3:30
25:35	15:15
8:40	21:10

6. You and Mr. Kallick go fishing every week. Here our fish count for 10 Saturdays.

20	15
43	8
39	11
0	29
33	56

7. You join the “Beanie Baby Club” because you like to collect them. You meet the other 10 club members and they have the following Beanie counts.

129	464
256	334
194	236
440	310
177	301

8. You record the number of hours you sleep for the past 10 nights. Wow, you need sleep!

6.5	4
8.5	11
6	9
9	3
7.5	12

9. You count the number of “marshmallow surprises” in your Lucky Charms cereal boxes (ok, you’re a freak). You’re looking for a pattern perhaps or you’re just weird.

825	851
995	750
732	775
752	789
872	861

AND PICK ONE OF THESE (10 THROUGH 18)

10. You go giggin' (finding) frogs by the local swamp to sell to the local cool cajun' restaurant. Here's your find for 10 Friday nights.

1	18
25	55
17	6
78	67
43	12

11. You spend your summer surfing in the local East Coast Championships. Your scores (out of 10) are:

7.2	8.2
8.3	8.9
9.1	6.4
5.5	7.0
7.8	8.3

12. You part of the summer volleyball professional tour (if you're a guy, then men's, if you a girl, then women's) recording statistics. Here are the number of spikes you record for each week's tournament.

49	155
249	90
137	114
201	162
89	159

13. You help out at the local SPCA. One of your jobs is to record the number of cats that come into the place. Here's your data to present.

15	9
12	29
3	15
38	4
6	21

14. You part of the “green team” at Target. Your job is to encourage patrons to purchase environmental friendly items. Your goal is \$2000 per week of sales. Here is your ten week numbers. What do you think of your results?

\$2876	\$1962
\$3097	\$3762
\$2875	\$2194
\$4011	\$1023
\$2259	\$2000

15. You’re saving money for your college spending. Your bank will transfer the balance in your account (if there is any) to your savings account. Here are your savings per week for 10 weeks. How’d you do?

\$129	\$8
\$13	\$4
\$64	\$156
\$299	\$37
\$115	\$7

16. You grocery shop for the local shelter and buy the same 15 items every week for them. The bill for the past 10 weeks is:

\$25.48	\$27.38
\$25.48	\$26.89
\$26.13	\$25.67
\$24.93	\$25.99
\$24.93	\$23.12

17. You have 10 cornfields. Over the summer you kept track of the number of ears produced by each cornfield.

649	792
1029	1115
542	912
1321	884
409	1098

18. You work for the local co-op. You buy piggies for the local farmers to add to their stocks. Here are your weekly totals for 10 weeks.

121	149
123	144
140	148
129	143
139	134

Calculator Help.

Go to the website www.mathbits.com

This website will help you review how to use your TI-83 calculator. It also would be good to try some of the Statistics activities. We will be doing using the statistical part of your calculator throughout the year, especially in the beginning. I want you to be proficient on your calculator using the statistical functions!

BONUS: Roll a pair of dice 100 times and record your scores. Calculate the mean, median, mode of your data. Calculate the range and standard deviation. Draw a box-and-whisker plot of the data. Write a paragraph on your observations. Do this on a separate poster. (up to 5 points)