1. Given the data: 5.7 3.2 4.6 5.5 6.3 4.6 5.9 6.6 6.2 6.4
   a. Find the mean. b. Find the median.
   c. Find the mode. d. Find the range. e. Estimate the standard deviation.

2. For this data *(lifespans, in years, of eighteen tortoises of species "G")*:

138	142	144	138	99	114	162	134	94
110	148	138	148	149	145	169	140	136

   a. Draw a stem-and-leaf diagram for the data, using classes as indicated in part b.
   b. Classify the data, using intervals of width 10, in such a way that 99.5 will be one of the boundaries.
   c. Draw the histogram for the classified data.
   d. Find the median using the raw data. Optional: Use the histogram to estimate the median.
   e. Find the mean of the raw data
   f. Find the interquartile range.
   g. Draw a *box plot* of the data.

3. Give an example of two sets of data with the same mean but different standard deviations.
   Given the data: 25 27 28 32 has mean 28 and standard deviation ≐ 2.6* (h-o had 8.67, needs square root), find data with a mean of 13 and the same standard deviation. (* s = 2.94)

4. a. If every value in a set of data is tripled, how are the mean and standard deviation affected?
   b. If ten is added to every value in a set of data, how are the mean and standard deviation affected?
   c. If every value in a set of data is doubled, then decreased by five, how are the mean and std. dev. affected?
   d. The mean and the standard deviation of a set of "x" data (x_1, x_2, x_3, etc) are 42 and 10 respectively, what are the mean and standard deviation of the new "y" data obtained by letting each y be (x– 42)/10 for each x value? (That is $y_1 = (x_1 - 42)/10$ and $y_2 = (x_2 - 42)/10$ and so on.)

5. State whether each of the following situations is possible, and, if so, give an example.
   Can a standard deviation of a set of data be: a. zero? b. negative? c. larger than the mean of the data?

6. a. Give an example of data where the median is better than the mean to represent "typical value" of a population.
   b. Give an example of a situation where we might be more interested in the mode than in the median or mean.

7. On a test, Mr Jones' class of 40 averaged 68, & Ms. Smith's 20 students averaged 74. Find the combined mean.

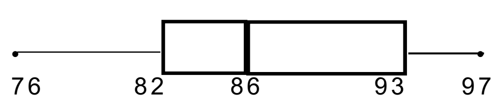
8. Two hundred kindergartners were asked their favorite color. Eighty responded "red"; fifty "green"; forty "blue"; six "yellow"; and twenty-four named other colors. Display these results in a pie chart.

9. In the following pictograph, each ⌂ stands for 1000 housing units. According to the graph, how many housing units are: a. included in the data? b. under ten years old? c. Estimate the median age of the housing units.

Ages of Housing Units

Age (yrs)	Number of houses
0 - 9	⌂⌂⌂⌂⌂⌂⌂⌂⌂⌂⌂⌂⌂⌂
10-19	⌂⌂⌂⌂⌂⌂
20-49	⌂⌂⌂⌂⌂⌂⌂
50+	⌂⌂⌂⌂⌂⌂

Scores of 250 students in BVUSD on the NMAT

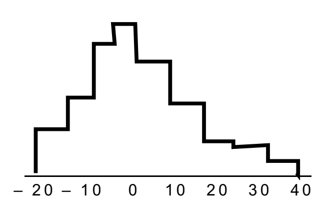


10. Using the box plot above right, find the range *and* the interquartile range.
    How many of the BVUSD students scored between 82 and 93 on the NMAT?

11. Jonathin earned 85 points on the first two tests, and 68 on the third. What score does he need on the upcoming fourth test so that his average on the tests will be at least a B (80 and above)? Should he study his head off, in an effort to earn an A ?

    Susan has an average of 86 for her first three tests.
    With a score of 100 on the fourth test, what will her average be?

12. The distribution at right appears as though it could have a standard deviation close to: a. – 20 b. 0 c. 20 d. 40 e. 60



*** SEE ALSO THE PRACTICE FINAL SECTION B. ***

1. a. 5.5 b. 5.8 c. 4.6 d. 3.4 e. $\sigma \doteq 1.05$ ($s = \{(2.3^2 + .9^2 + \cdots + 1.1^2)/9\}^{1/2} \doteq 1.11$)

2a. *Lifespans of 18 species G tortoises*

16	29
15	
14	0245889
13	46888
12	
11	04
10	
9	49

Legend: 9 | 49 represents 94 yrs & 99 yrs.

2b. 18 *tortoises of species G*

Lifespan (yrs.)	f
89.5- 99.5	2
99.5-109.5	0
109.5-119.5	2
119.5-129.5	0
129.5-139.5	5
139.5-149.5	7
149.5-159.5	0
159.5-169.5	2

2d. Median from the *raw* data: 139 *(average 138 & 140)*

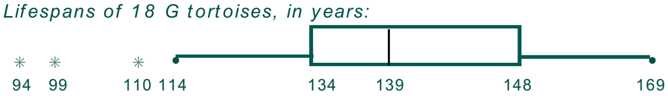
2e. *raw*: (94+ 99+ 110+ 114+ ... + 169)/18 = 2448/18 = 136

(If you did not have the raw data, you could estimate mean from histogram:
94.5x2 + 104.5x0 + 114.5x2 + . . . + 164.5x2)/18 ≈ 135.1
The small difference in the result is due to the inaccuracies introduced by using the mid-values for each class in place of the actual data values.)

2f. IQR = $Q_3 - Q_1$ = 148 – 134 = 14

1½ IQRs = 21 134 – 21 = 113 ... making 94, 99 & 110 all outliers.

Lifespans of 18 G tortoises, in years:

2g. 

3. Data set: 10,20,30 has mean 20, $\sigma \doteq 2.6$ ($s \doteq 3.1$). Data set: 19,20,21 has mean 20, $\sigma \doteq .8$ ($s = 1$).
Data set: 10, 12, 13, 17 will have mean 13 (15 less than 28) and standard deviation unchanged!

4. a. Values *AND* distances are tripled- so mean and s are both tripled.
b. Values increase, distances between values do not change. Std Dev is unchanged, mean increases by 10.
c. Mean is doubled, less five; s doubles. d. 0 & 1.

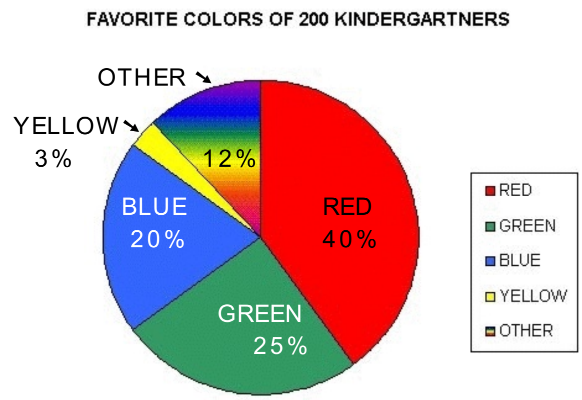
5. a. Yes. {4, 4, 4, 4, 4} b. No. ($\sqrt{\ }$ ≥0) c. Yes, they are independent {-20, 0, 20}

6a. The median is a better indicator of a "typical" value when some extremely high or extremely low values are involved; for instance, in a class of twenty students, most receive an allowance between \$1 and \$5 per week, but one child receives \$150/week—that one high value would raise the mean from somewhere between \$1 and \$5 to between \$8 and \$12, yet only one child receives over \$5. (More discussion: see DSB-6.)

6b. I am going to manufacture hats in one size only. I want to choose the size that will fit the greatest number of women. Suppose, for example, 45% of women wear size "S", 30% "M", 20% "L", and 5% "XL". By manufacturing size "S", my hats will fit 45% of women. If S is 18", M is 19", L is 21" and XL is 23", the median is 19" (M) and the mean is 19.15" (M)—size M hats would fit only 30%. (In reality, I'd make 19" hats, labelled "S"!)

7. 70. *(How: (40x66+ 20x76)/60 . Note there are twice as many in Jones'class, and the mean is twice as close to 68 as it is to 74.)*

8. See right.
(e.g. Red: 80/200 = 40% 40% of 360° = 144°)



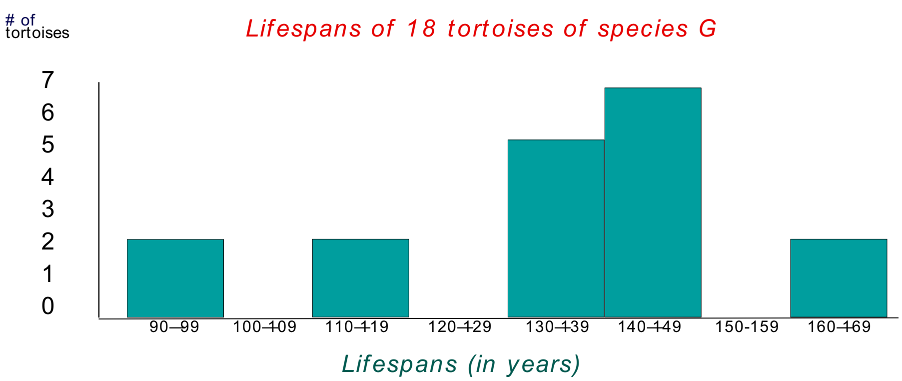
9. a. (14 + 6 + 7 + 6) x 1000 housing units
= 33000 housing units.
b. 14000 units are under 10 years old.
c. The median age is about halfway from 10 to 19... which is roughly 15 years old.

Percentage within middle two quartiles = 50%

11. Jonathin needs 4x80 = 320 pts total.

For an A, he needs 4x90 = 360 pts total.
360 – 238 = 122 pts. Not possible.
Susan's new average will be (100+ (3x86)) /4 = 89.5
(Susan needs some extra bonus pts. to get an A.)

12. 20 is the best answer. 40 is a little too high; notice the entire range is 60. a,b,e are obviously impossible!

2c. 

*** SEE ALSO THE PRACTICE FINAL SECTION B. ***