Math 135 – Test 1
2/5/15

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Take your time and make sure you follow all instructions. Where necessary, work must be shown in order to receive partial credit. Include input into the calculator in order to receive partial credit.

1. Identify the five variables in the following example and then state if each variable is categorical or quantitative.   [10 pts]

   A *Car Magazine* article about 30 new Sport Utility Vehicles (SUV) lists each vehicle's Name, Weight, Fuel Economy (Miles Per Gallon, MPG), Color, and Powertrain (4 wheel drive or front wheel drive).

   Name – Categorical
   Weight – quantitative
   Fuel Economy – quantitative
   Color – categorical
   Powertrain – Categorical

2. Use the graphs of the following distributions A & B to answer the questions below. Use C if neither is the answer   [2 pts each]

A   B
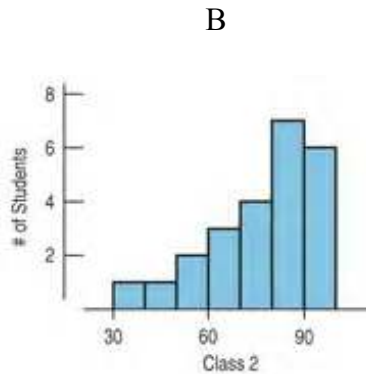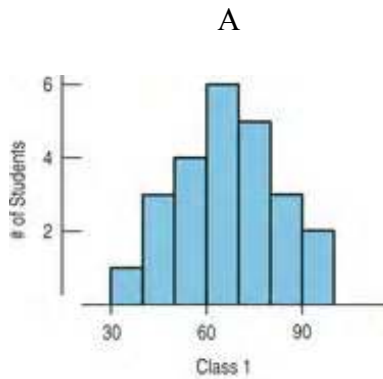
a) Which of the distributions is symmetric?   _A_

b) Which of the distributions is skewed to the right?   _C_

c) Which of the distributions will have the mean equal to the median?   _A_

d) Which of the distributions will have the mean less than the median?   _B_

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3. Suppose a distribution is Normal with mean of 80 and standard deviation of 12. Determine the
   answers to the following   .   [5 pts each]

   a) What is the z-score for a score of 62?

   $$Z \text{ of } 62 = \frac{62-80}{12} = \frac{-18}{12} = -1.5$$

   b) The 68-95-99.7 rule says approximately what percent is between 68 and 92?

   $80-12 = 68$
   $80+12 = 92$ 68%

   c) The 68-95-99.7 rule says approximately the upper 2.5% is above what value?

   $95\% \begin{cases} 80 - 2(12) = 56 \\ 80 + 2(12) = 104 \end{cases}$

   104

4. Students in an Intro Stats course were asked to describe their political views as Liberal, Moderate, or
   Conservative as seen in the table below. Use the table to answer the question   [4 pts each]

	Female	Male	
Liberal	35	50	85
Moderate	36	44	80
Conservative	6	21	27
	77	115	192

   a) What percent of the class is Female?

   77/192
   .4010416667

   $$\frac{77}{192} = 40.1\%$$

   b) What percent of Males were Moderate?

   77/192
   .4010416667
   44/115
   .3826086957
   44/80
   .55

   $$\frac{44}{115} = 38.3\%$$

   c) What percent of those who consider themselves Conservative were Female?

   44/80
   .3826086957
   .55
   6/27
   .2222222222
   6/77
   .0779220779

   $$\frac{6}{27} = 22.2\%$$

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5. The following stem and leaf plot gives low temperatures (F°) reported in several cities.   [22 pts]

```
7 | 2
6 | 013
5 | 013589
4 | 459
3 | 23
2 |
1 | 1
```
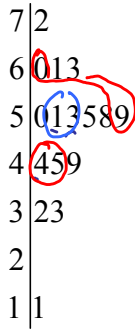
$$M = \frac{51+53}{2} = 52$$

$$Q_1 = \frac{44+45}{2} = 44.5$$

$$Q_3 = \frac{59+60}{2} = 59.5$$

a) Calculate the Five-Number Summary and construct a Boxplot for the scores.

$Min = 11$ $Q_1 = 44.5$ $M = 52$ $Q_3 = 59.5$ $Max = 72$

$IQR = 59.5 - 44.5 = 15$

$LF = 44.5 - 1.5(15) = 22$

$UF = 59.5 + 1.5(15) = 82$
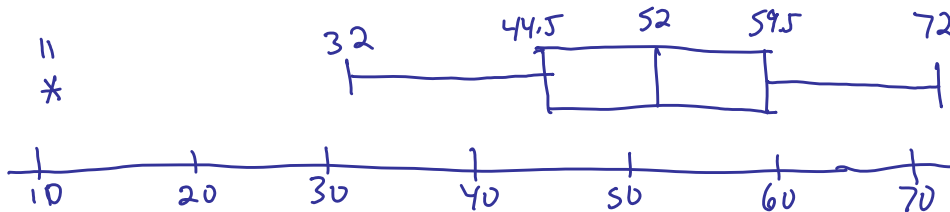
b) Use your calculator to find the Mean and the Standard Deviation for the scores.

```
1-Var Stats
x̄=49.75
Σx=796
Σx²=42850
Sx=14.71733672
σx=14.25
↓n=16
```

$\bar{x} = 49.8$

$S = 14.7$

4. Calculate the standard deviation for the numbers {3, 4, 7, and 10} by filling in the table below and using the formulas discussed in class. (Work must be shown in order to receive ANY credit)   [10 pts]

```
↓n=16
16+1+4+9
            30
√(30/3
       3.16227766
√(30/4
       2.738612788
```

x	$x - \bar{x}$	$(x - \bar{x})^2$
3	$3-6 = -3$	$(-3)^2 = 9$
4	$4-6 = -2$	$(-2)^2 = 4$
7	$7-6 = 1$	$1^2 = 1$
10	$10-6 = 4$	$4^2 = 16$

$n = 4$

24 30

$\bar{x} = \frac{24}{4} = 6$

$S = \sqrt{\frac{30}{3}} = 3.2$

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7. The Body Mass Index (BMI) of adults is normally distributed with a mean of 25.6 and a standard deviation of 4.7. Use the Normal distribution commands on your calculator (NormalCDF or InvNorm) to answer the questions. Write down your calculator input to receive partial credit

[7 pts each]

a) What percent of adults have BMIs between 21.0 and 30.0?

Normalcdf $(21, 30, 25.6, 4.7)$

```
normalcdf(21,30,
25.6,4.7
         .6615489116
normalcdf(28,100
000,25.6,4.7
         .3048021645
```

66.2 %

b) What percent of adults have BMIs over 28.0?

Normalcdf $(28, 100000, 25.6, 4.7)$

```
         .6615489116
normalcdf(28,100
000,25.6,4.7
         .3048021645
normalcdf(-10000
0,28,25.6,4.7
         .6951978355
```
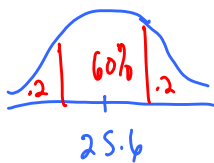
30.5 %

c) The lower 25% of adults have BMIs below what value?

InvNorm $(.25, 25.6, 4.7)$

```
         .6951978355
invNorm(.25,25.6
,4.7
         22.42989818
invNorm(.75,25.6
,4.7
         28.77010182
```

22.4

d) The middle 60% of adults have BMIs between what two values?

InvNorm $(.2, 25.6, 4.7)$ & InvNorm $(.8, 25.6, 4.7)$

21.6   and   29.6

```
         28.77010182
invNorm(.2,25.6,
4.7
         21.6443802
invNorm(.8,25.6,
4.7
         29.5556198
```

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