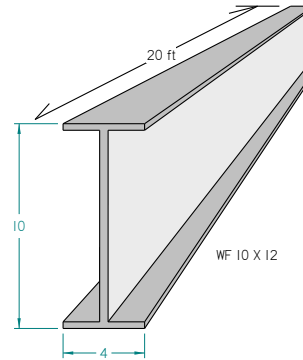**Problem 1 -** Steel wide flange beams (shown to the right) are used in constructing the frames of modern buildings and other steel structures. Beams may be purchased from US, German, Japanese, or Chinese sources.100 each 10" X 4" X 20' (nominal weight = 12 pounds per linear foot) beams are purchased from each country and 12 randomly selected beams from each country were weighed.

These 12 sample weights by country are shown in the table below:

20 ft

10

WF 10 X 12

4

Determine the following:

The mean and standard deviation for each of the 4 countries' samples (US, Germany, Japanese, and Chinese).
20 foot beams **should** weigh __at least__ 240 lbs. *Calculate the probability (using the Z curve) of getting a beam that weighs 240 lbs __or LESS__ from each country. Explain what this probability means.*

Beam #	USA	Germany	China	Japan
1	245.7	248.9	247.4	240.1
2	246.8	260.0	253.5	251.4
3	232.9	209.1	247.2	261.9
4	253.1	242.7	237.2	262.2
5	252.9	253.1	246.8	256.4
6	245.2	223.8	228.3	246.7
7	242.8	243.7	257.8	249.4
8	248.6	266.2	219.4	257.2
9	232.5	252.2	259.1	253.3
10	236.5	264.4	236.4	257.2
11	253.6	263.0	230.4	248.5
12	246.2	254.5	213.4	241.4

3. Calculate the coefficient of variation for each sample.

4. Which country seems to have the best "quality control"? Explain why.

Problem 2 - The frequency distribution table shown to the right describes the speeds of drivers ticketed by the Canon City Police Department during October - December 2013. These drivers were driving down Highway 50 vicinity of Safeway where the posted speed limit is <u>30 miles per hour</u>.

Calculate (mathematically) the mean and standard deviation of the sample data summarized in the frequency distribution table.
Can you make any generalized statements about the driving population passing by Safeway on Highway 50? EXPLAIN WHY OR WHY NOT.

Speed	Frequency
34 - 37	46
38 - 41	32
42 - 45	25
46 - 49	14
50 - 53	7
54 - 57	3
58 - 61	1

Problem 3 The US ARMY captured 20 enemy tanks during WWII having the serial numbers listed to the right. Assume the tanks were randomly captured and that the enemy tank serial numbers are sequential.

Estimate the total number of enemy tanks produced by the enemy.

Create a box plot of these serial numbers.

Research this famous statistics problem as necessary.

Tank	Serial #
1	655
2	543
3	113
4	748
5	802
6	298
7	223
8	486
9	732
10	637
11	776
12	107
13	566
14	673
15	742
16	702
17	525
18	188
19	795
20	311

CCHS Math   Chapter 3 Test (take home) Name: _____

Stats   (100 Points)   2/20/2015

racing times in seconds

Problem 4 - You wish to compare the relative racing statistics races for two racing quarter horses. A randomly selected **sample of** 15 (n = 15) of each horse's last 100 races (in seconds) is shown to the right.

One horse (Crazy Legs) runs exclusively in 5 furlong races while the other horse (Dead Weight) runs exclusively in 8 furlong races [one furlong = 220 yards].

Answer the following:

(10 Points) If Cray Legs ran a 5 furlong race in 68 seconds, compute what would be an equivalent time for Dead Weight in an 8 furlong race.
(10 Points) Compute the probability Dead Weight will run a race in more than 95 seconds but less than 115 seconds.
(5 Points) What would be an "unusual value" for Crazy Leg to run a race in? Explain why.
(5 Points) A race of 104 seconds for Dead Weight would be in what quartile?

Race	Crazy Legs	Dead Weight
1	78.36	117.73
2	75.78	111.03
3	79.49	115.55
4	66.74	98.15
5	73.47	113.57
6	69.78	131.88
7	76.31	98.07
8	56.52	107.51
9	72.03	81.38
10	70.50	110.21
11	69.54	111.87
12	50.85	96.22
13	74.12	108.12
14	73.25	116.47
15	61.40	89.67

Bonus: The Washington Monument was completed in 1884 and is capped by an aluminum pyramid inscribed with the Latin words "Laus Deo". What do these words mean (in English)?

Why do you think the creators/designers of the monument used these words?