Name: _____ Class: _____ Date: _____ ID: A

Stats Review Day II

1. Darren measures the heart rate of 10 randomly selected students in his Algebra 2 class. What is the population? What is the sample?
   a. The Algebra 2 class is the population and the 10 randomly selected students are the sample.
   b. The high school is the population and the Algebra 2 class is the sample.
   c. The Algebra 2 class is the sample and the 10 randomly selected students are the population.
   d. The Algebra 2 class is the population and the high school is the sample.

2. How does an SAT score of 750 compare to an ACT score of 30.1? ← ~~compare z scores~~ compare normal curves & z-scores

	SAT	ACT
$\bar{x}$	500	20.8
σ	100	4.8

see next page

   a. The SAT score of 750 is better than an ACT score of 30.1 because 750 is 2.5 standard deviations above the mean of 500 while 30.1 is only about 2 standard deviations above the mean of 20.8.
   b. The ACT score of 30.1 is better than an SAT score of 750 because 30.1 is 2.5 standard deviations above the mean of 20.8 while 750 is only about 2 standard deviations above the mean of 500.
   c. The SAT score of 750 is better than an ACT score of 30.1 because 750 is 2.5 standard deviations above the mean of 100 while 30.1 is only about 2 standard deviations above the mean of 4.8.
   d. The SAT score of 750 is about equal to an ACT score of 30.1 because 700 is 2 standard deviations above the mean of 500 and 30.1 is 2 standard deviations above the mean of 20.8.

3. A bookstore wants to determine how many books the people in the surrounding neighborhood read per month on average. They survey each customer who enters their store for one week. Identify any bias in this method. If appropriate, suggest a method more likely to produce a random sample.

- Customers at a bookstore are more likely to read than others
- Library patrons are ignored

Non biased method

Ask questions as they exit the local grocery store, you would get a better sample of the population as a whole.

4. A restaurant chain's owners are trying to decide if they want to open up a franchise in your town. To help them decide, they want to find out how often people in your town go out to eat. A researcher interviews people leaving a local restaurant and asks them if they are excited that a new restaurant would be opening in their area. Identify the sampling method used. Is there a bias in this sampling method and/or question asked? Explain.

- Self selected sample
- This is biased because it [illegible] those who are out to eat
  Overrepresents those that are out to eat & ignore those who stay in to eat.
- A leading question was also asked, the implication is that one should be excited

Name: _____ ID: A

Is there any bias in the survey question? Explain.

5. Don't you think that Barry Sanders retired from the NFL too early?

Biased, this is another leading question because it suggests an answer.

6. What do think would help students pay more attention in class?

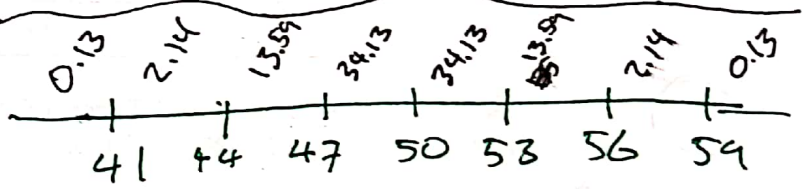
Non biased question, it doesn't suggest that there is a proper response

7. Two students in different classes took the same math test. Both students received a score of 87. In student A's class the mean was 78 and the standard deviation of 5. In student B's class the mean was 76 with a standard deviation of 4. Which student scored did better with respect to their class? Justify your answer.

compare z-scores/placement on the normal curve

See next page

8. Betty's Bite-Size Candies are packaged in bags. The number of candies per bag is normally distributed, with a mean of 50 candies and a standard deviation of 3. At a quality control checkpoint bags that contain fewer than 47 candies are removed. If 9,750 bags are produced per day, how many bags are removed daily?



0.13% 2.14% + 13.59% = 15.86% of 9750

# of bags removed: (0.1586)(9750)

$\approx$ 1546 or 1547

9. A population has a mean of 102.8 and a standard deviation of 15.4. If a data point has a z-value of 1.87 then what is the value of the data point?

$$1.87 = \frac{x - 102.8}{15.4}$$

$(1.87)(15.4) = x - 102.8$

$x = (1.87)(15.4) + 102.8$

$x \approx 131.6$

10. The average height of corn stalks in a field is 65 inches with a standard deviation of 2.7 inches.

a) Sketch a normal curve labeling the horizontal axis at one, two, and three standard deviations from the mean.
b) What is the range of corn heights that fall within approximately 95% of the mean?
c) What is the probability that a randomly selected stalk of corn is more than 63 inches high?
d) What is the probability that a randomly selected stalk of corn is less than 67.7 inches high?
e) What is the probability that a randomly selected stalk of corn is between 60 and 66 inches high?

See Next Page

(2) Find the z-scores for each score & compare them

$z_{750} = \frac{750 - 500}{100} = 2.50$ ←

$z_{30.1} = \frac{30.1 - 20.8}{4.8} \approx 1.94$ ←

These are both above average scores.

Since $z = 2.50$ is further above the mean than $z = 1.94$, we can say the score linked to $z = 2.50$ is the better score.

.....

(7) We can compare z-scores again

$z_A = \frac{87 - 78}{5} = 1.80$ ←

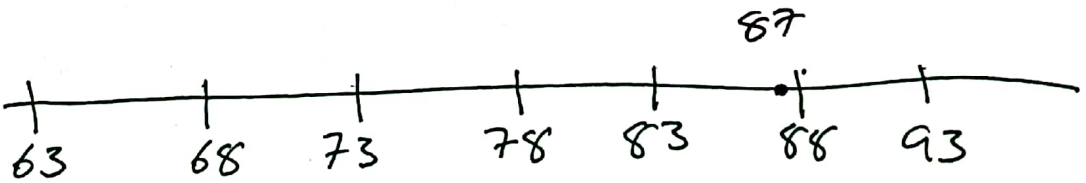
$z_B = \frac{87 - 76}{4} = 2.75$ ←

Remember these represent the # of standard deviations above the mean.

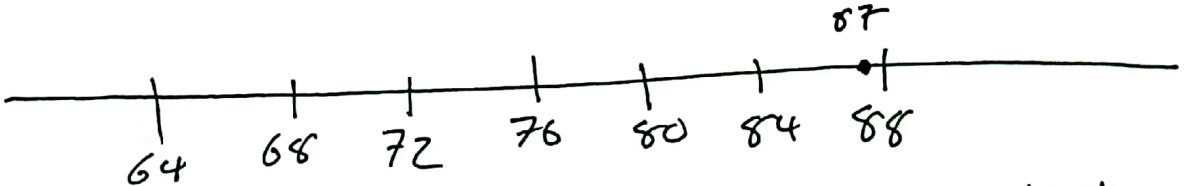
Since $z_B > z_A$ we can say that student B has a better score with respect to their class.

- You could get the same info from normal curves if you wish

Class A:



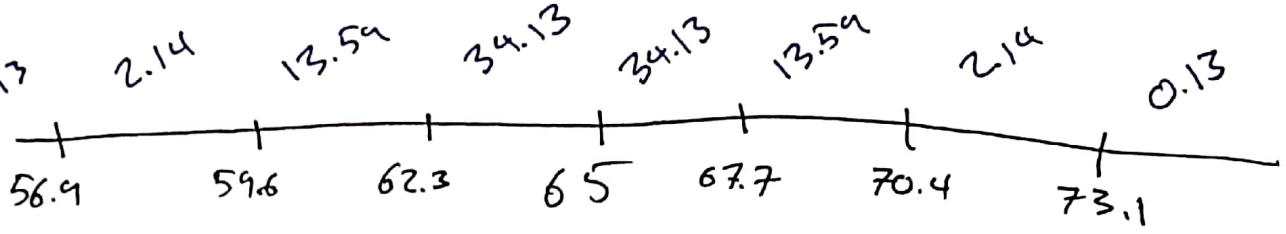
Class B:



We can see by the placement on the normal curve that 87% is better than almost all of the scores in class B.

(10)

(a)



(b) ~95% of the data is ±2σ's from $\bar{x}$.

Thus: **59.6 in – 70.4 in**

(c)

$z = \frac{63-65}{2.7} \approx -0.74$ ← since we are looking at more than 63 inches, we have to use the complement of the prob. from the table.

P(more than 63 in) = 1 – P(less than 63 in)

= 1 – 0.2296

= **0.7704**

(d)

0.13% + 2.14% + 13.59% + 34.13% + 34.13%

84.12% or 0.8412

(e)

$z_{60} = \frac{60-65}{2.7} \approx -1.85$

$z_{66} = \frac{66-65}{2.7} \approx 0.37$

To find between we find both probs off the table & subtract

P(corn is between 60 & 66 inches)

P(z < 0.37) – P(z < –1.85)

0.6443 – 0.0322

0.6121