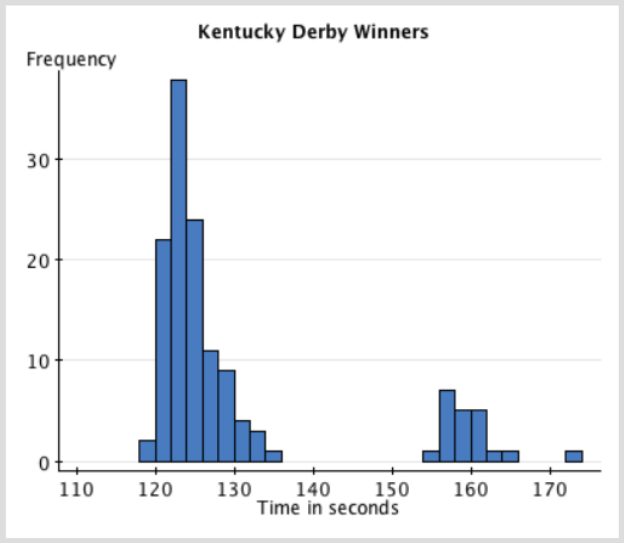
Name Key Date_____ Hour____

Statistics Review
Alg 2 Trig

1. The Kentucky Derby is a famous horse race.



a. Describe the shape of the histogram to the right (use two vocab words).

skewed right, bimodal

b. What could potentially cause the two distinct peaks?

male/female horses, track changed, steroid use, weather, training method changes

2. The data set below gives the numbers of home runs for the 10 batters who hit the most home runs during the 2005 Major League Baseball regular season. Find the standard deviation.

51, 48, 47, 46, 45, 43, 41, 40, 40, 39 $\mu = 44$

7 4 3 2 1 1 3 4 4 5

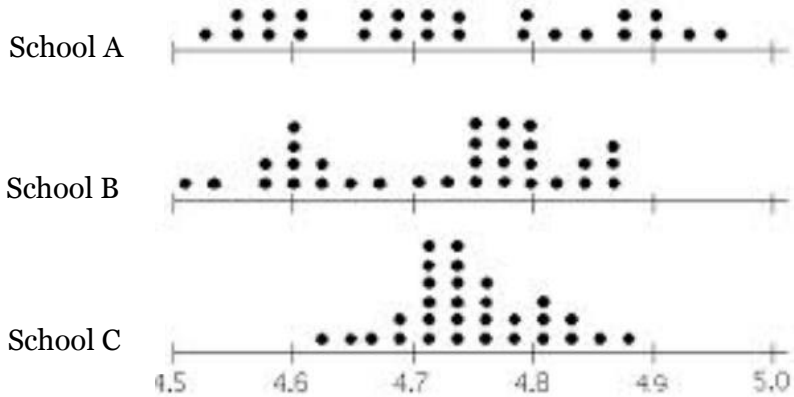
49 16 9 4 1 1 9 16 16 25

sum = 146

$\frac{146}{10} = 14.6$

$\sqrt{14.6} = 3.82$

3. The dot plots below represent the high school 1-mile run times (in minutes) of 3 local high schools. Which school would you expect to have the lowest standard deviation? Explain your reasoning.



because it has the smallest spread

4. Would you expect the distributions of these variables to be **uniform, unimodal, or bimodal**? **Symmetric or skewed?** *Explain why.*

a. Wing Span (measurement from fingertip to fingertip) of all juniors at Hinsdale Central.

Symmetric/Bimodal
(maybe)
↳ males and females

b. Number of children per family of students at Hinsdale Central.

Skewed right/unimodal
↳ most students will have 3,4,5,6... only a few will have more

c. Average calories consumed daily by Chicagoans.

Symmetric / Bimodal
(maybe? males/females)

5. *Think!* Give an example of a histogram that could be multimodal. What would account for the different modes? Explain.

ex. average heights of elementary students, middle school students, and high school students

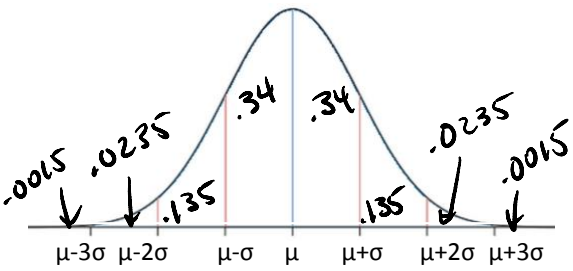
6. Find the following probabilities based on the normal distribution.

a. $P(x \le \mu + \sigma)$

.84

b. $P(\mu - 3\sigma \le x \le \mu + 2\sigma)$

.9735



c. $P(x \le \mu + 3\sigma)$

.9985

d. $P(x > \mu + \sigma)$

.16

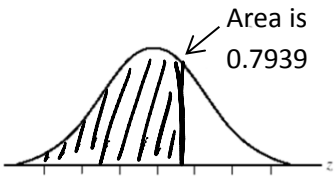
e. $P(\mu + \sigma \le x \le \mu + 3\sigma)$

.1585

f. $P(\mu - 2\sigma \le x \le \mu + \sigma)$

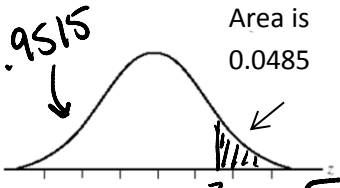
.815

7. Find the value of z from the standard normal distribution that satisfies each of the following conditions. (Use the value that comes closest.)



z

$z < .82$

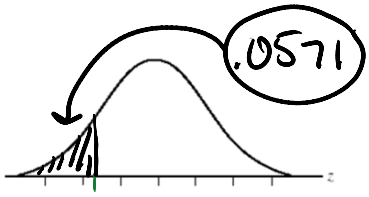


z

$z > 1.66$

8. Find the following probabilities using the standard normal distribution.

a. $P(z < -1.58)$

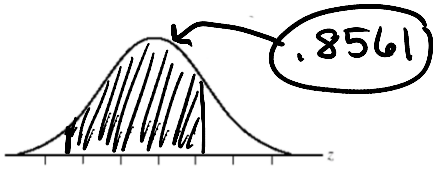


b. $P(z > 0.53)$

$1 - .7019 =$

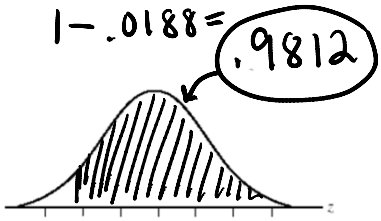
c. $P(-2.4 < z < 1.1)$

$.8643 - .0082 =$



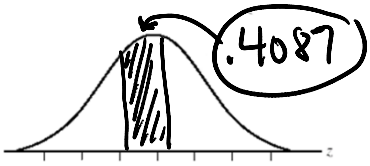
d. $P(z > -2.08)$

$1 - .0188 =$

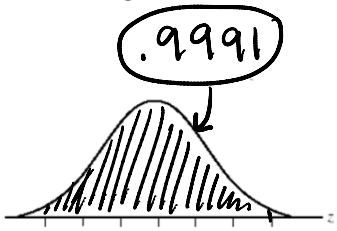


e. $P(-0.85 < z < 0.27)$

$.6064 - .1977 =$



f. $P(z < 3.11)$



9. A shoe manufacturer collected data regarding men's shoe sizes and found that the distribution of sizes fits a normal curve. If the mean shoe size is 11 and the standard deviation is 1.5, find:

a. the percentage of men whose shoe size is greater than 12.5

subtract from 1

$z = \frac{12.5 - 11}{1.5} = 1 \rightarrow .8413$ $\quad 1 - .8413 = \boxed{.1587}$

b. the percentage of men whose shoe size is less than 10.5

$z = \frac{10.5 - 11}{1.5} = -.33 \rightarrow \boxed{.3707}$

c. the percentage of men whose shoe size is between 9.5 and 13

$z = \frac{13 - 11}{1.5} = 1.33 \rightarrow .9082$

$z = \frac{9.5 - 11}{1.5} = -1 \rightarrow .1587$

$.9082 - .1587 = \boxed{.7495}$

10. You take both the SAT (Scholastic Aptitude Test) and the ACT (American College Test). You score 650 on the mathematics section of the SAT and 29 on the mathematics section of the ACT. ACT and SAT scores are both normally distributed. For the SAT, the mean is 514 with a standard deviation of 118. For the ACT, the mean is 21.0 and the standard deviation is 5.3.

*Note*** (Percentile means what percent of people are at or below your score)*

a. What percentile is your SAT math score?

$z = \frac{650-514}{118} = 1.15$ $\boxed{.8749}$

b. What percentile is your ACT math score?

$z = \frac{29-21}{5.3} = 1.51$ $\boxed{.9345}$

c. On which test did you perform better? Explain your reasoning.

The ACT test → higher percentile

11. Battery lifetime is *normally distributed* for large samples. The mean lifetime is 500 days and the standard deviation is 61 days.

a. What percent of batteries have a lifetime that is greater than 600 days?

$z = \frac{600-500}{61} = 1.64 \rightarrow .9495$

$1 - .9495 = \boxed{.0505}$

b. What percent of batteries have a lifetime between 370 and 500 days?

$z = \frac{500-500}{61} = 0 \rightarrow .5$

$z = \frac{370-500}{61} = -2.13 \rightarrow .0166$

$.5 - .0166 = \boxed{.4834}$

c. Find the lifetime if the z-score is -1.7.

$-1.7 = \frac{x-500}{61}$

$-103.7 = x - 500$

$\boxed{396.3 \text{ days} = x}$

d. Find the lifetime if the area under the normal distribution curve is 84.85%.

$z = 1.03$

$1.03 = \frac{x-500}{61}$

$62.83 = x - 500$

$\boxed{562.83 = x \text{ days}}$