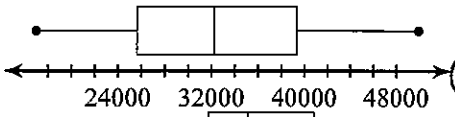
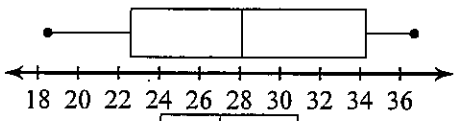
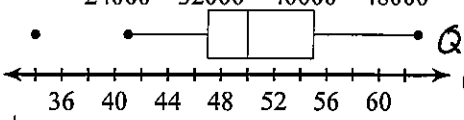
Answers to Sem. 2 Statistics Review (ID: 1)

1) 

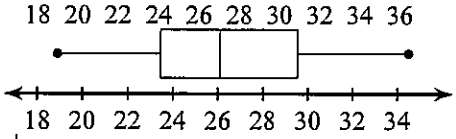
$Q_1 = 25{,}635$
$Q_3 = 39{,}340$

2) 

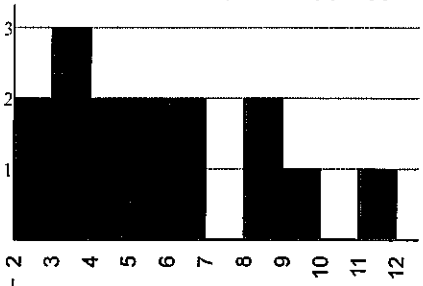
$Q_1 = 22.6$
$Q_3 = 34.3$

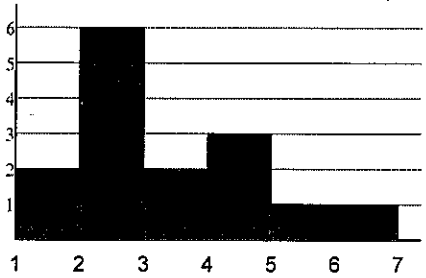
3) 

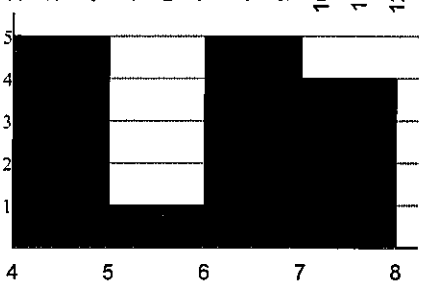
$Q_1 = 47$
$Q_3 = 55$

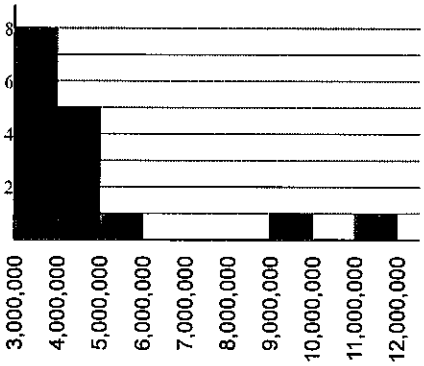
4) 

$Q_1 = 23.45$
$Q_3 = 29.55$

5) 

6) 

7) 

8) 

5. Center: between 3-5 hits
Shape: unimodal
skewed right
possible outlier between 11-12 hits
Spread: range = 10 hits
majority of data between 2 and 7 hits

6. Center: between 2-4
Shape: unimodal
skewed right
Spread: range 6 words
pretty even distribution of data

7. Center: between 6-7%
Shape: bimodal
slightly symmetric
Spread: range 4%
most of data between 6-8%

8. Center: between 4,000,000 and 6,000,000
Shape: strongly skewed to the right
possible outliers at 9-10 million and 11-12 million
Spread: range 9 million
majority of data between 3-5 million

Name Key Per: _____ Date _____

Normal Distributions Worksheet (12-7)

A set of data with a mean of 45 and a standard deviation of 8.3 is normally distributed. Find each value, given its distance from the mean.

1. +1 standard deviation from the mean

   53.3

2. +3 standard deviations from the mean

   69.9

3. -1 standard deviation from the mean

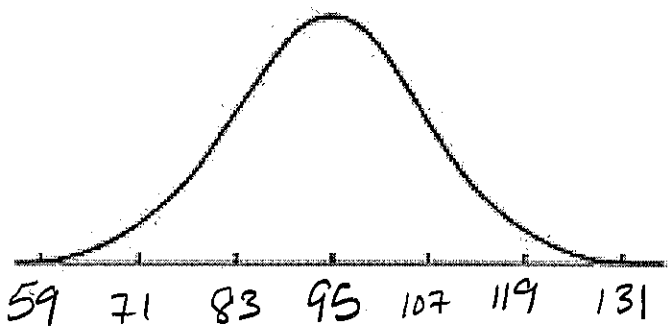
   36.7

4. -2 standard deviations from the mean

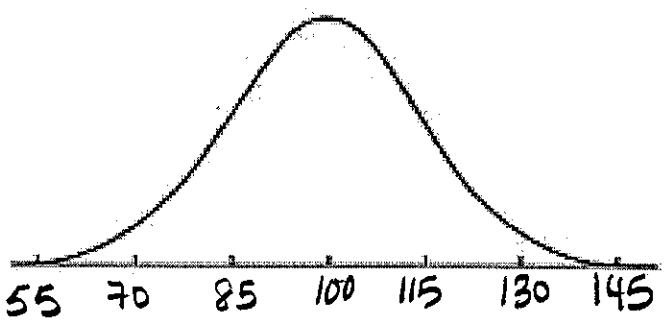
   28.4

Sketch a normal curve for each distribution. Label the *x*-axis at one, two, and three standard deviations from the mean.

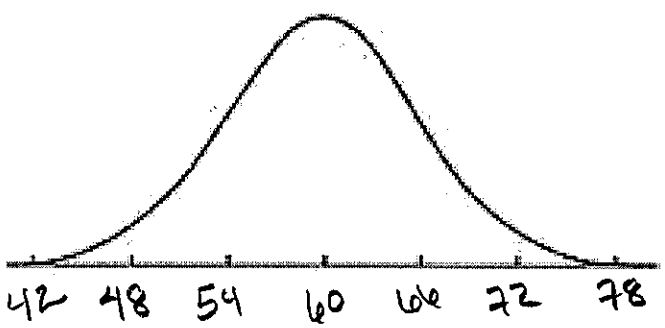
5. mean = 95; standard deviation = 12



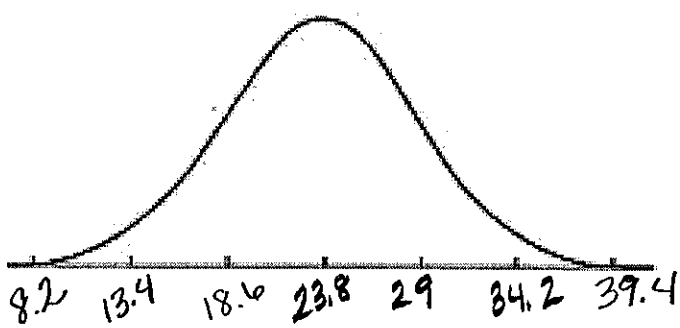
6. mean = 100; standard deviation = 15



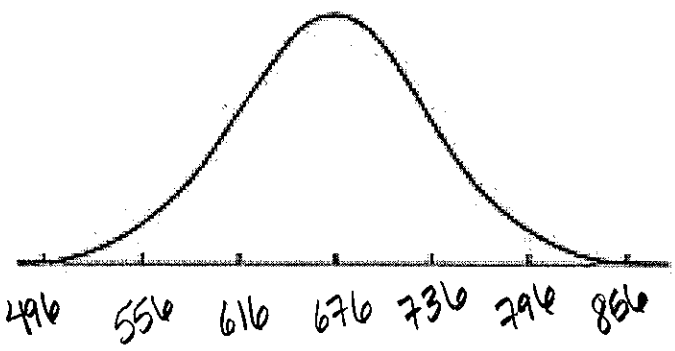
7. mean = 60; standard deviation = 6



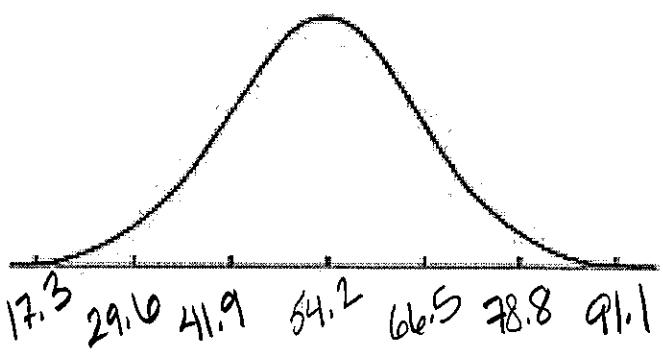
8. mean = 23.8; standard deviation = 5.2



9. mean = 676; standard deviation = 60

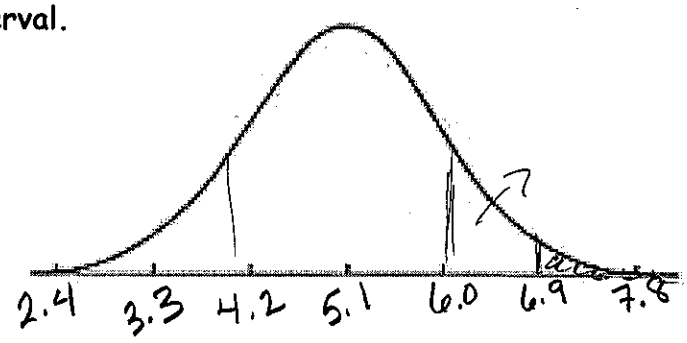


10. mean = 54.2; standard deviation = 12.3



A set of data has a normal distribution with a mean of 5.1 and a standard deviation of 0.9. Find the percent of data within each interval.

11. Sketch a normal curve for the distribution.



12. between 6.0 and 6.9 13.5%

13. greater than 6.9 2.35%

14 between 4.2 and 6.0 68%

15. less than 4.2 15.85%

16. less than 5.1 50%

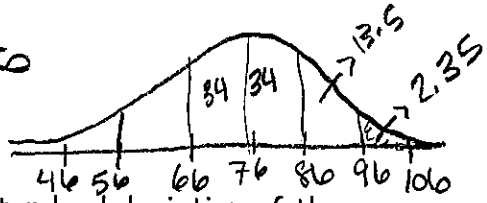
17. between 4.2 and 5.1 34%

18. Test scores are normally distributed with a mean of 76 and a standard deviation of 10.

.95 99.7 rule

a. In a group of 230 tests, how many students score above 96?
2.35% × 230 = 5.4 → 5 to 6 students

b. In a group of 230 tests, how many students score below 66?
50% − 34% = 16% (.16)(230) = 36.8 about 37



c. In a group of 230 tests, how many students score within one standard deviation of the mean?
(.68)(230) = 156.4 so 156 − 157 student

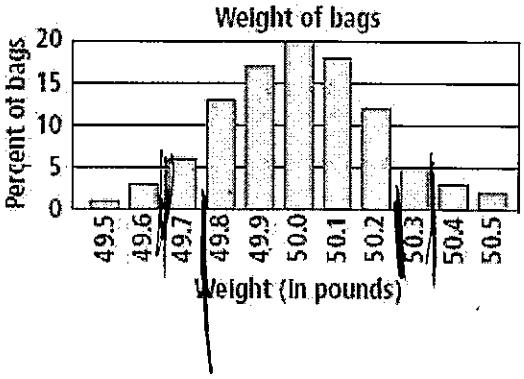
19. The number of nails of a given length is normally distributed with a mean length of 5.00 in. and a standard deviation of 0.03 in.

a. Find the number of nails in a bag of 120 that are less than 4.94 in. long.
$\frac{4.94-5.00}{.03} = -2$ .0228
(.0228)(120) = 2.73 about 3 nails

b. Find the number of nails in a bag of 120 that are between 4.97 and 5.03 in. long.
$\frac{4.97-5}{.03} = -1$ .1587 $\frac{5.03-5}{.03} = 1$ .8413 .8413 − .1587 = .6826
.6826 (120) 82 nails

c. Find the number of nails in a bag of 120 that are over 5.03 in. long.
1 − .8413 = .1587 (.1587)(120) 19 nails

20. The actual weights of bags of pet food are normally distributed. The mean of the weights is 50.0 lb, with a standard deviation of 0.2 lb. Use the graph for a – c.



a. About what percent of bags of pet food weigh less than 49.8 lb? 12.5 + 6 + 3 + 1 =
22.5%

b. In a group of 250 bags, how many would you expect to weigh more than 50.4 lb?
(.02)(250) = 5 bags

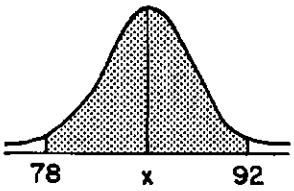
c. In a group of 50 bags, how many would you expect to be within 1.5 standard deviations of the mean?
6 + 12.5 + 16 + 20 + 17 + 11 + 5
87.5%

−1 1

21. In the accompanying diagram, the shaded area represents approximately 95% of the scores on a standardized test. If these scores ranged from 78 to 92,

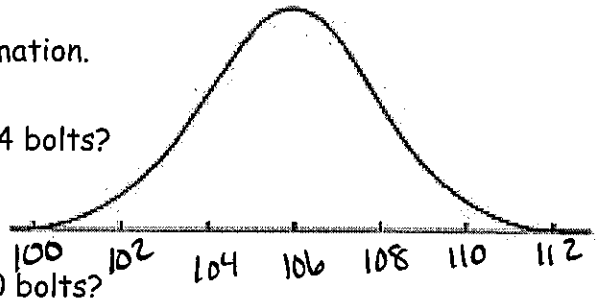
a) What is the mean? 85

b) What is the standard deviation? 3.5



22. A machine is used to put bolts into boxes. It does so such that the actual number of bolts in a box is normally distributed with a mean of 106 and a standard deviation of 2.

a) Draw and label the Normal curve from the information.



b) What percentage of boxes contain more than 104 bolts?

$\frac{104-106}{2} = -1$ 84.13%

c) What percentage of boxes contain more than 110 bolts?

2.28%

d) What percentage of boxes contain less than 108 bolts?

84.13%

e) What percentage of boxes contain less than 100 bolts? .13%

f) What percentage of boxes contain between 102 and 112 bolts?

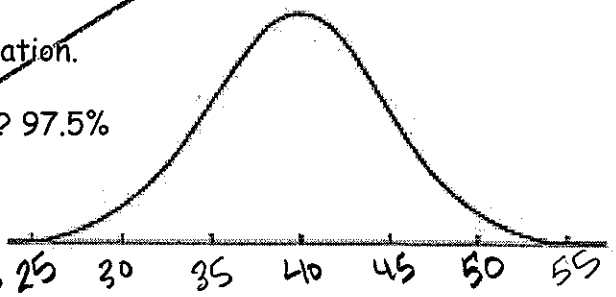
.0228 .9987 97.5%

g) What percentage of boxes contain between 100 and 106 bolts?

.5000 − .0013 = 49.87%

23. The heights of the people if the planet Ixx are normally distributed with a mean of 40 inches and a standard deviation of 5 inches. [They are a vertically diverse people.]

a) Draw and label the Normal curve from the information.



b) 97.5% of Ixxians are over _____ inches tall? 97.5%

c) 16% of Ixxians are over _____ inches tall?

d) 50% of Ixxians are under _____ inches tall?

e) 97.5% of Ixxians are under _____ inches tall?

f) the most "average" 68% of Ixxians are between _____ and _____ inches tall?

g) 84% of Ixxians are over _____ inches tall?

24. On a standardized test, Phyllis scored 84, exactly one standard deviation above the mean. If the standard deviation for the test is 6, what is the mean score for the test?

78

25. The heights of a group of girls are normally distributed with a mean of 66 inches. If 95% of the heights of these girls are between 63 and 69 inches, what is the standard deviation for this group?

63 64.5 66 67.5 69

$\sigma = 1.5$

26. A set of scores with a normal distribution has a mean of 50 and a standard deviation of 7. Approximately what percent of the scores fall in the range 36-64?

-2 .0228 2 .9772 95.44%

27. On a standardized test with a normal distribution, the mean was 64.3 and the standard deviation was 5.4. What is the best approximation of the percent of scores that fell between 61.6 and 75.1?

-.5 .3085 2 .9772 66.87%

28. The mean of a normally distributed set of data is 52 and the standard deviation is 4. Approximately 95% of all the cases will lie between which measures?

44 – 60

29. Battery lifetime is normally distributed for large samples. The mean lifetime is 500 days and the standard deviation is 61 days. Approximately what percent of batteries have lifetimes *longer than* 561 days?

1 .8413 1-.8413 = .1587 15.87%

30. A test was given to 120 students, and the scores approximated a normal distribution. If the mean score was 72 with a standard deviation of 7, approximately what percent of the scores were 65 or higher?

$\frac{65-72}{7}$ -1 .1587 84.13%

HSM III **Semester 2 Statistics Review**

Make sure you know and understand all of the vocabulary from this module. Know how to describe center, shape, and spread. Know all the different sampling methods and the differences between them.

➢ Observational Study or Experiment?

1. Which of the following is an observational study and which is an experiment?

(a) A Stat 113 instructor announces a study session to be held the night before a test. The instructor lists the students who attended the session and compares their scores to the remaining Stat 113 students' scores.

Observation

(b) To determine whether a review session will improve his students' test scores, a Stat 113 instructor divides his class into two groups. He then requires one group to attend a study session and compares the test results of each group.

Experiment

➢ Population and Sample, Parameter and Statistic

2. You are interested in the proportion of Stat 113 students that will end up with an A this semester. Identify the

(a) population: All Stat students (113)

(b) parameter: Grade of A

3. The mean income of all subscribers to a particular magazine is **$26000**. We draw a random sample of 100 subscribers and find that their mean income is **$27300**. Identify the

(a) population: all subscribers to a magazine

(b) sample: 100 subscribers

(c) parameter: mean income

➢ Types of Sampling

4. Which sampling method was utilized? Why?

(a) Student organization looking to get signatures for a petition camp out in front of Class of 1950 Lecture Hall.

Convience

(b) Select three students from a class to receive ice cream by putting all the students' names in a hat and picking out three names randomly.

SRS

(c) Select three female students and three male students to receive ice cream by putting all the men's names in one hat and all the women's names in a different hat and picking out three names from each hat.

Stratified

(d) In Fall 1995, the BBC in Britain requested viewers to call the network and indicate their favorite poem.

Voluntary

(e) Divide the class into four groups (freshman, sophomore, junior and senior) and take a random sample of two students from each group.

Stratified

(f) Priceline.com randomly e-mails a Customer Satisfaction Survey for certain transactions done on its site in which customers choose to either respond or not.

Voluntary

Probability

5. The two way table shows the distribution of members of the audience at a play. Complete the table then find the probabilities.

	Stalls	Circle	Balcony	Total
Adults	36	39	37	112
Children	41	21	31	93
Total	77	60	68	205

a. $P(Adult \cap Balcony)$ $\frac{37}{205}$

18%

b. $P(Children \cup Stalls)$ $\frac{129}{205}$

63%

c. $P(Adult|Balcony)$ $\frac{37}{68} =$

54%

d. $P(Adult \cup Balcony)$ $\frac{143}{205}$

70%

e. $P(Children)$

$\frac{77}{205} = 38\%$

f. $P(Children \cap Circle)$

$\frac{21}{205}$ 10%

g. $P(Children|Circle)$

$\frac{21}{60}$ 35%

h. $P(Stalls \cup Circle)$

$\frac{137}{205}$ 67%

6. The two way table shows the distribution of preferred ice cream flavors of different groups of people. Calculate the totals and find each of the probabilities.

	Chocolate	Vanilla	Neither	
Children	40	22	15	77
Teens	12	16	45	73
Adults	55	54	10	119
	107	92	70	269

a. $P(Teens \cap Vanilla)$

$\frac{16}{269} = 6\%$

b. $P(Children)$ $\frac{77}{269}$ 29%

c. $P(Teens \cup Chocolate)$

$\frac{168}{269} = 62\%$

d. $P(Adults|Neither)$ $\frac{10}{70} = 14\%$

e. $P(Children \cap Neither)$

$\frac{15}{269}$ 6%

f. $P(Adults \cup Chocolate)$

$\frac{171}{269}$ 64%

g. $P(Teens|Chocolate)$

$\frac{12}{107}$ 11%

h. $P(Chocolate|Children)$

$\frac{40}{77}$ 52%

i. $P(Chocolate \cup Vanilla)$

$\frac{199}{269}$ 74%

j. $P(Adults \cap Vanilla)$

$\frac{54}{269} = 20\%$