

**This is only a sampling of some problems to review. All exams, notes, quizzes, homework, and reviews should also be done.**

1) Use  $<$ ,  $>$  or  $=$  to write a true sentence:

a.  $\frac{9}{8}$        $\frac{10}{9}$                       b.  $5\bar{9}$       6                      c.  $\sqrt{8}$       2

2) Find a number between the two given numbers:

a.  $-\frac{19}{20}$  and  $-\frac{1}{20}$                       b.  $\frac{7}{12}$  and  $\frac{8}{13}$

3) Subtract:  $431\frac{3}{7} - 145\frac{3}{4}$ .      (Show all work and use only mixed numbers to perform the subtraction.)

4) Kathy is making horse feed by mixing  $20\frac{1}{4}$  lbs of rolled corn,  $17\frac{3}{4}$  lbs of rolled barley, and  $13\frac{1}{6}$  lbs of rolled oats. How much feed did she make? Show all work and use only mixed numbers.

5) Multiply:  $\frac{1}{4} \cdot 9\frac{1}{6}$

6) Yoshi found a board to make a shelf. It was  $6\frac{5}{6}$  feet long. He needed  $\frac{3}{4}$  of it for the shelf. How long was the shelf?

7) Divide: a.  $\frac{2}{3} \div 2$                       b.  $9 \div 0$                       c.  $0 \div \frac{3}{4}$

8) Use a rectangular region to illustrate  $\frac{3}{8} \times \frac{1}{4}$

9) One fifth of the expected potato crop was destroyed by insects and one-ninth was destroyed by blight.

a) What fraction of the expected crop survived?

b) If 9300 lbs of potatoes were HARVESTED, how many were EXPECTED?

10) Sue bought  $34\frac{1}{3}$  yards of ribbon. How many bows can Sue make if each bow uses  $\frac{5}{8}$  yards of ribbon? How much ribbon was left over?

- 11) Lee's recipe requires  $\frac{3}{4}$  cups of bran flakes. If he uses only a  $\frac{1}{8}$  cup measure, how many times will he need to fill it to make  $\frac{3}{4}$  cup?
- 12) Twenty acres are required to produce 125 bushels of cucumbers. At this rate, how many acres would be required to produce 195 bushels of cucumbers?
- 13) If every employee's salary at the University increases each year by  $\frac{1}{12}$  of that person's salary the previous year, find the following:
- Seth's present salary is \$50,401. What was his salary last year?
  - Christy's present salary is \$36,000. What will her salary be in 2 years?
- 14) If the ratio of boys to girls is 3 : 4, what is
- The ratio of boys to all students in the class?
  - If there are 28 students in the class, how many girls are in the class?
- 15) A 20-oz bottle of gourmet popcorn oil sells for \$1.68. A 60-oz bottle of generic popcorn oil sells for \$2.71. Which is the better buy?
- 16) Decide which property of real numbers is illustrated:
- $\frac{2}{3} + \left(-\frac{2}{3}\right) = 0$
  - $1 \cdot \frac{2}{3} = \frac{2}{3}$
  - $\frac{5}{8} \cdot \frac{8}{5} = 1$
- 17) a. Find the additive inverse of  $2x - 5y$   
 b. Find the multiplicative inverse of  $\frac{-2a}{3b}$
- 18) There is a law stating the "the ratio of the width to length for the American flag should be 10 to 19." Is a flag measuring 40 by 76 feet of the correct ratio?
- 19) Perform the following operations without a calculator:
- $17.1 - 6.7432$
  - $4.28 \div 0.2$
  - $21.6 \times 1.704$
- 20) Write using scientific notation:
- 0.00021
  - 146,000
- 21) Write as a reduced fraction:
- 0.346
  - $3.\overline{25}$
  - $0.58\overline{3}$

22) Classify as rational or irrational:

- a.  $3\sqrt{5}$       b.  $16.03143144314443\dots$       c. 4.7      d.  $6.\overline{41}$       e.  $\sqrt{169}$

23) Arrange the following real numbers in increasing order:

- 0.56     $0.\overline{56}$      $0.5\overline{6}$      $0.56556556\dots$      $0.\overline{566}$     0.5665665     $0.565566555666\dots$

24) Express the following fractions as decimals:

- a.  $\frac{316}{10}$       b.  $\frac{3}{8}$       c.  $\frac{3}{7}$

25) If 7.15 gallons of a certain liquid weigh 40 pounds, how much does one gallon weigh?  
Write your answer as a repeating decimal.

26) Diane needs 2.75m of material at \$1.98 a meter, 4.75m of material at \$1.59 a meter, 5 spools of thread at 70¢ each, and 2 zippers at 75¢ each. Will a \$20 bill cover the purchase? What is her approximate bill?

27) Classify as true or false.

- a.  $\sqrt{x} = -8$  for some  $x$   
b.  $\sqrt{17} = 4.12\overline{3}$   
c.  $\pi = \frac{22}{7}$   
d.  $\sqrt{-x} = 4$  for some real  $x$   
e. A nonrepeating, nonterminating decimal is an irrational number.  
f. A repeating, nonterminating decimal is a rational number.

28) For  $a = 0.565\overline{2}$  and  $b = 0.5652020020002\dots$

- a. Find a rational number between  $a$  and  $b$ .  
b. Find an irrational number between  $a$  and  $b$ .

29) Simplify the following irrationals:

- a.  $\sqrt{48}$       b.  $\sqrt{125}$

30) a. Express 42% as a decimal and a fraction.  
b. 25 is 80% of what number?

31) A television was purchased and 8% tax was added to the purchase price. If the total bill was \$515.16, how much did the television cost?

- 32) If a new condo costs \$110,000 this year, what will it be worth in 10 years, if we assume a constant inflation rate of 12% a year, compounded annually?
- 33) A dress has been marked down from \$40 to \$32. What percent discount is this?
- 34) If you want to earn an annual rate of 10% on your investments, how much (to the nearest cent) should you pay for a note that will be worth \$5000 in 9 months?
- 35) To save for their retirement, a couple deposits \$10,000 in an account that pays 8% compounded quarterly. What will be the value of their investment after 25 years? How much interest will they have earned?
- 36) Suppose a bag contains 5 red and 2 white marbles. We randomly draw two marbles, one at a time. What is the probability of drawing marbles of different colors? Draw tree  
a. with replacement      b. without replacement
- 37) A teacher has prepared a 5-item test with the first three items being true or false and the last two items being multiple choice with 4 choices each. What is the probability that a student will score 100 percent if every answer is chosen at random?
- 38) If a couple plans to have 7 children, what is the probability of having at least 1 boy?
- 39) A hat contains the letters in the word GEOMETRY. If 3 letters are drawn from the hat one at a time without replacement, what are the odds against spelling the word TRY?
- 40) A sorority sold 132 tickets for a \$330 television set. What is the expected value of a single ticket if only one ticket wins?
- 41) There are 12 nominees for president and 10 for vice president. In how many ways can the slate be chosen?
- 42) Find the number of ways to rearrange the letters in the following word: PROBABILITY
- 43) How many different 3-person committees can be formed from a group of 6 people?
- 44) If there are 30 applicants for a job, in how many ways can a manager select a first, second, and third choice candidate for the position?

- 45) The odds that the horse Apollo 1000 wins a race are 5:7. What is the probability that he loses?
- 46) Use the following numbers, taken from a table of random digits, to simulate having 5 children.

79075 23287 68585 79156 70821 74944 78389 71870 14774 03844  
00749 81226 37395 97386 27461 51134 58213 28374 46175 17335

Repeat the experiment 20 times and give the experimental probability of having 2 boys and 3 girls.

- 47) Find the theoretical probability of having 2 boys and 3 girls. We are going to find the theoretical probability **without** writing out the complete tree of this experiment.
- We need to know how many branches containing 2 boys and 3 girls are in the tree. Find this out by using one of the counting methods from Section 7.5.
  - We need to find the probability of any one of these branches that have 2 boys and 3 girls.
  - Combine answers to 1st and 2nd steps to find the theoretical probability of having 2 boys and 3 girls.

- 48) If a letter is drawn from container 1, shown below, and placed in container 2, and then a letter is drawn from container 2, what is the probability that the last letter drawn is an E?

CARE		CHEER
#1		#2

- 49) An experiment consists of choosing a box and then drawing a letter. What is the probability that the letter drawn is an E?

CARE		CHEER
#1		#2

- 50) A game consists of rolling 2 dice. Rolling double 1's pays \$7.20. Rolling double 6's pays \$3.60. Any other roll pays nothing. What is the expected value for this game?

- 51) Two dice are tossed. Find the probability of getting a sum of at least 7.

- 52) There are 35 fish in a pond. We know that 16 of these fish are males, 4 of these males are salmon, and there are 7 salmon in the pond. What is the probability that a randomly selected fish is a salmon, given that it is a male?

53) Complete each of the following:

- a) If A is an impossible event, then  $P(A) =$  \_\_\_\_\_
- b) If A is a certain event, then  $P(A) =$  \_\_\_\_\_
- c) If A is any event, then \_\_\_\_\_  $P(A)$  \_\_\_\_\_
- d) If A is any event, then  $P(\bar{A}) =$  \_\_\_\_\_

54) A company selected 1000 households at random and surveyed them to determine a relationship between income level and the number of television sets in a home. The information gathered is listed in the table:

	0 TVs	1 TV	2 TVs	3 TVs	More than 3 TVs	TOTALS
less than \$12,000	0	40	51	11	0	
\$12,000 - 19,999	0	70	80	15	1	
\$20,000 - 39,999	2	112	130	80	12	
\$40,000 - 59,999	10	90	80	60	21	
\$60,000 or more	30	32	28	25	20	
TOTALS						

Compute the approximate empirical probabilities:

- a. of a household earning \$40,000 - 59,999 per year and owning 0 television sets.
- b. of a household earning less than \$20,000 per year or owning exactly 2 television sets.
- c. of a household earning more than \$39,999 per year and owning more than 3 television sets.
- d. of a household earning less than \$20,000 given that they own exactly 2 television sets.
- e. of a household owning exactly 3 television sets given that they earn \$20,000 - 59,999 per year

55) The following are the weights in kilograms of Mr. Brown's class: 28 25 24 27 32 35

- a) Find the range
- b) Find the mean
- c) Find the median
- d) Find the mode
- e) Find the variance
- f) Find the standard deviation

56) The table below show the soft drink preferences of people in three age groups.

	Cola	Root Beer	Lemon-Lime
under 21	40	25	20
between 21 and 40	35	20	30
over 40	20	30	35

- If one of the 255 subjects is randomly selected, find the probability that the person is over 40 and drinks cola.
- If one of the 255 subjects is randomly selected, find the probability that the person is over 40 given that they drink root beer.
- If one of the 255 subjects is randomly selected, find the probability that the person drinks root beer given that they are over 40 .

57) The following represent the grades of three exams from a class of 16 students.

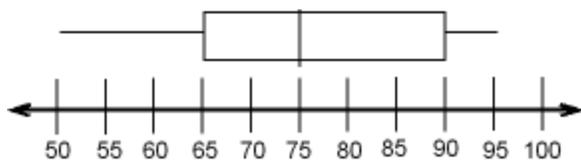
Exam I: 60 91 90 89 85 89 90 98 83 85 86 86 75 80 83 69

Exam II: 76 75 86 77 54 65 56 65 84 60 78 62 78 86 83 65

Exam III: 87 68 67 64 71 77 64 61 71 96 88 70 71 61 84 97

- Use the test scores for Exams I and II to draw a back to back stem and leaf with the stems defined to be the tens digit.
- Make a grouped frequency table for the scores of Exam II using the lowest score to start the first class and make 5 classes.
- Use the grouped frequency table to draw a histogram.
- Use the scores from Exam I to draw a line plot.
- Draw a box and whisker graph and determine if there are any outliers.

58) Given the box and whisker graph below:



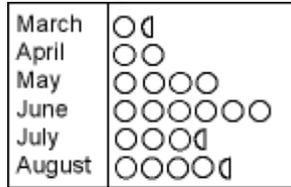
- Find the median.
- Find the first quartile.
- Find the third quartile.
- Find the interquartile range.
- Provide a set of data that fits this box plot.
- By looking at the box plot what can you conclude about the data?

59) The mean age of the 6 women in a class is 23. The mean age of the 10 men in the same class is 26. What is the mean age of the 16 students in the class?

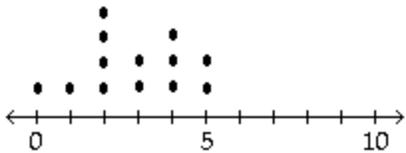
- 60) The mean age of the members of a family of 5 is 25. What will the mean age of the same family of five be 3 years from now?
- 61) The mean average for Ann's 5 test scores was 62.5. How much will a score of 100 increase her mean average?

62)

Marriage Licenses Issued  
(Each circle represents 20,000 licenses)

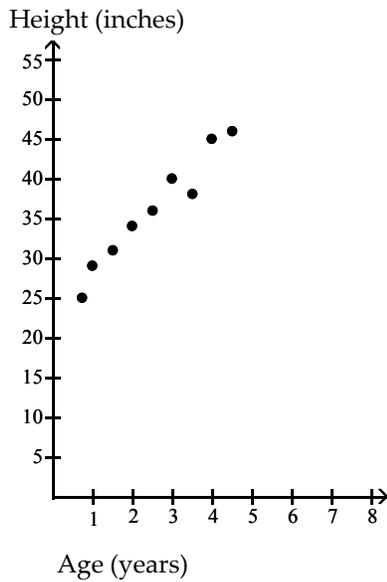


- a. In which month are the most licenses issued and how many are issued?
- b. How many more licenses were issued in August than in March?
- 63) A manufacturer records the number of errors each work station makes during the week. The data are as follows.



- a. What are the high and low scores?
- b. What is the mode?
- c. What is the median?
- d. What is the mean? (Round to 2 decimal places)
- 64) At one high school, the mean time for running the 100-yard dash is 15.2 seconds with a standard deviation of 0.9 seconds. The times are very closely approximated by a normal curve. Find the percent of times that are:
- a. Greater than 15.2 seconds      b. Less than 17 seconds
- c. Between 14.3 and 16.1 seconds      d. Greater than 16.1 seconds
- e. Between 15.2 and 16.1 seconds      f. Between 17 and 17.9 seconds

65) The following scatterplot shows the heights (in inches) of a group of children and their ages.



- a) From this data, *about* how old do you think a child is who is about 39 inches tall?  
b) What type of correlation is there for this data?
- 66) "38% of adults in the United States regularly visit a doctor." This conclusion was reached by a college student after she had questioned 520 randomly selected members of her college. What is wrong with her survey?
- 67) "7 out of 10 dentists recommend Brand X toothpaste." This finding is based on the results of a survey of 10 randomly selected dentists. What is wrong with this survey?
- 68) A questionnaire is sent to 10,000 persons. 5,000 respond to the questionnaire. 3,000 of the respondents say that they "love chocolate ice cream." We conclude that 60% of people love chocolate ice cream. What is wrong with this survey?

Answer Key

Testname: T102\_FINAL\_REVIEW\_FALL\_2007

- 1) a. >            b. =            c. >
- 2) a. Sample answer:  $-\frac{17}{20}$             b. Sample answer:  $\frac{23}{39}$
- 3)  $285\frac{19}{28}$
- 4)  $51\frac{1}{6}$  pounds
- 5)  $\frac{55}{24}$  or  $2\frac{7}{24}$
- 6)  $5\frac{1}{8}$  feet
- 7) a.  $\frac{1}{3}$             b. undefined            c. 0
- 8)  $\frac{3}{32}$
- 9) a.  $\frac{31}{45}$             b. 13,500 lbs
- 10) 54 bows with  $\frac{7}{12}$  yds left
- 11) 6 times
- 12)  $31\frac{1}{5}$  acres
- 13) a. \$46,524            b. \$42,250
- 14) a.  $\frac{3}{7}$             b. 16 girls
- 15) the 60-oz bottle
- 16) a. Additive Inverse property of Real Numbers  
b. Multiplicative Identity property of Real Numbers  
c. Multiplicative Inverse property of Real Numbers
- 17) a.  $-2x + 5y$             b.  $\frac{3b}{-2a}$
- 18) Yes
- 19) a. 10.3568            b. 21.4            c. 36.8064
- 20) a.  $2.1 \times 10^{-4}$             b.  $1.46 \times 10^5$
- 21) a.  $\frac{173}{500}$             b.  $\frac{322}{99}$             c.  $\frac{7}{12}$
- 22) a. S            b. S            c. Q            d.  $\overline{Q}$             e.  $\overline{Q}$
- 23) .56, .56556556..., .565566555666...,  $\overline{.56}$ ,  $\overline{.566}$ , .56656665...,  $\overline{.56}$
- 24) a.  $\overline{31.6}$             b. 0.375            c.  $\overline{0.428571}$
- 25) 5.594405 ~ 5.6 pounds

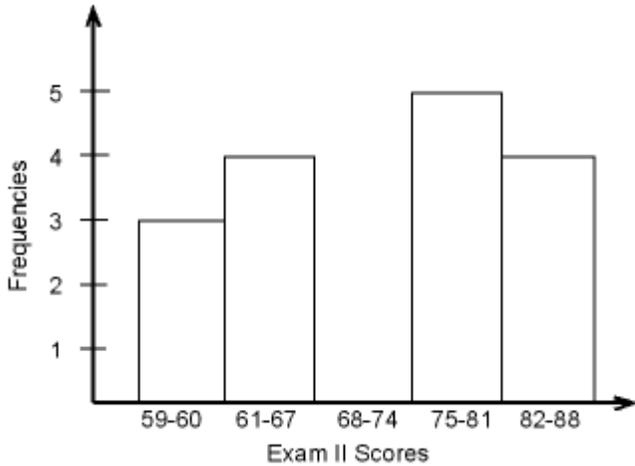


Answer Key

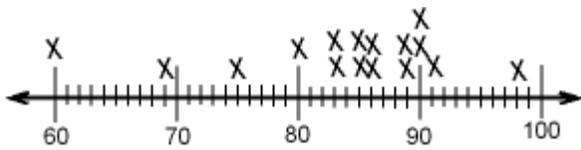
Testname: T102\_FINAL\_REVIEW\_FALL\_2007

61-67	4
68-74	0
75-81	5
82-88	4

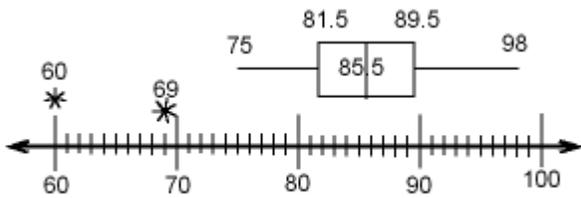
c.



d.



e.



$IQR=8$ ;  $1.5(8)=12$ ; 2 outliers: 60 & 69

58) a) 75 b) 65 c) 90 d)  $90 - 65 = 25$  e) answers vary

f) no outliers; 50% of its measurements lie between 65 and 90, so it varies a good bit

59) 24.875

60) 28

61) New average = 68.75; increase of 6.25

62) a. June; 120,000 b. 60,000

63) a. 0 and 5 b. 2 c. 3 d. 2.85

## Answer Key

Testname: T102\_FINAL\_REVIEW\_FALL\_2007

- 64) a. 50%                      b. 97.5%  
    c. 68%                      d. 16%  
    e. 34%                      f. 2.4% (or 2.35% is using 99.7% within 3s)
- 65) a) 3.5 years                b) positive
- 66) The sample is biased. College students are not representative of the U.S. population as a whole.
- 67) The sample was too small.
- 68) This is not a random sample. The survey is based on voluntary, self-selected responses and therefore has serious potential for bias.