

**PRACTICE PROBLEMS FOR THE FINAL EXAM - The answers are at the end of this.**

**The final exam will be 40 multiple choice questions. The formula sheet will be the last page of the final which you can tear off. Practice using the formula sheet on page 109 of your notes.**

THERE WILL BE NO MAKE UP TESTS!

**You will ONLY be able to use a calculator for the final.** So, make sure that you have one! If you need to purchase one, I recommend the TI-30XIIS. It is about \$15. Otherwise, you will have to attempt to do all computation by hand.

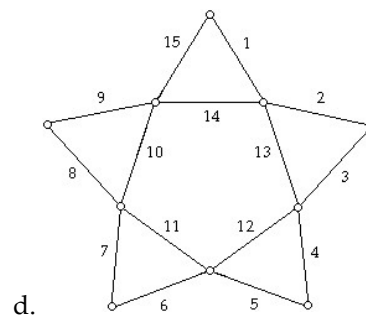
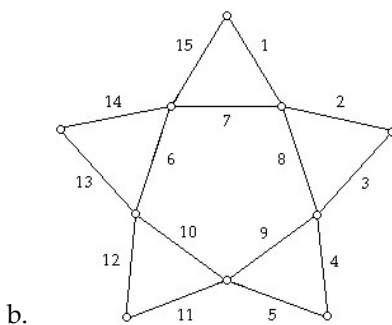
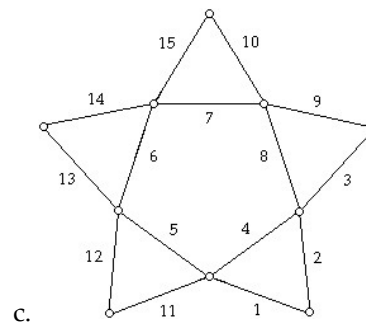
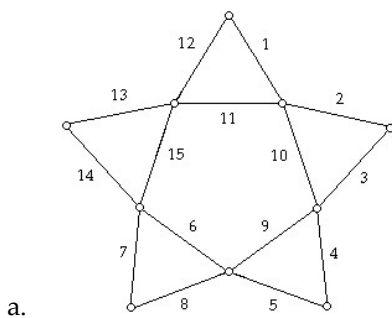
IF YOU ARE CAUGHT USING YOUR CELL PHONE OR SHARING A CALCULATOR, YOU WILL EARN A "0" ON THE EXAM.

This is a sample of problems. The test questions may be different from these, so be sure to rework the problems in the lecture notes and look through all of the homework and quiz questions by clicking on "Gradebook" and then click on the "review" link next to the assignments.

**Try these problems with your notes and see how well you do (answers at end).**

- 1) A graph has an Euler circuit if
  - a. It is connected and has an even number of edges
  - b. It is connected and has an even number of vertices
  - c. It is connected and every vertex has even degree.
  - d. Every vertex has even degree
  - e. None of these

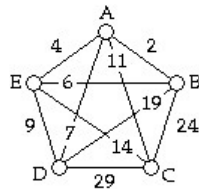
- 2) If the edges are labeled 1, 2, 3 and so on in the order in which they can be traveled, which labeling gives an Euler circuit?



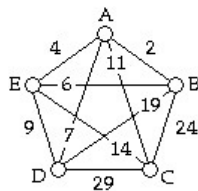
- 3) A tree is
- A) any graph that is connected and has no circuits.
  - B) any graph that has no circuits.
  - C) any graph that has no bridges.
  - D) any graph that is connected.
  - E) none of these
- 4) The number of edges in a tree with 29 vertices is
- A) 28
  - B) 30
  - C) 29
  - D)
  - E) none of these
- 5) The number of Hamilton circuits in a complete graph on 9 vertices is
- A) 9!
  - B)  $\frac{9 \times 8}{2}$
  - C) 9<sup>2</sup>
  - D) 8!
  - E) none of these

A delivery truck must deliver packages to 5 different store locations (A, B, C, D, and E). The trip must start and end at D. The graph below shows the distances (in miles) between locations. We want to minimize the total distance traveled.

- 6) The nearest-neighbor tour starting with vertex D is given by:
- A) D, A, B, E, C, D.
  - B) D, C, A, B, E, D.
  - C) D, B, E, C, A, D.
  - D) D, E, A, B, C, D.
  - E) none of these

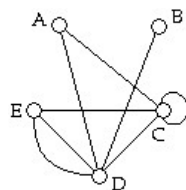


- 7) Using Kruskal's algorithm to find the minimal spanning tree, which edge should we choose third?
- A) BE
  - B) AB
  - C) AD
  - D) AE
  - E) none of these



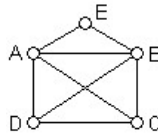
Use the figure below to answer the following question.

- 8) Vertex B is adjacent to
- A) every other vertex.
  - B) vertex A and vertex D only.
  - C) vertex D only.
  - D) vertex A and vertex C only.
  - E) none of these

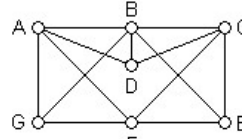


9) Which of the graphs has an Euler circuit?

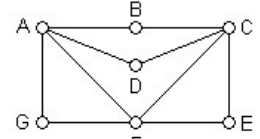
- A) Graphs 1 and 3
- B) Graph 1 only
- C) Graph 3 only
- D) Graph 2 only
- E) none of these



Graph 1

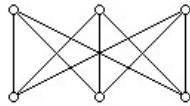


Graph 2

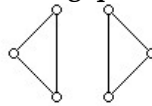


Graph 3

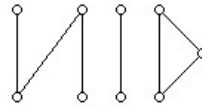
Use the figure below to answer the following question.



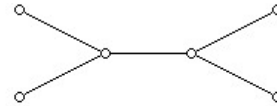
Graph 1



Graph 2



Graph 3



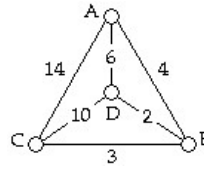
Graph 4

10) Which graphs are disconnected?

- A) Graph 2 only
- B) Graph 3 only
- C) Graph 1 and Graph 4
- D) Graph 2 and Graph 3
- E) none of these

11) The total weight of the minimum spanning tree using Kruskal's algorithm is

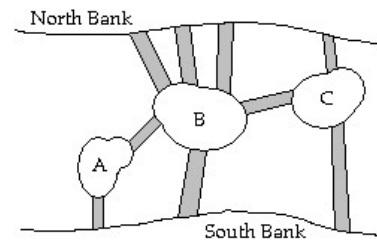
- A) 29
- B) 9
- C) 25
- D) 7
- E) none of these



In a certain city there is a river running through the middle of the city. There are three islands and nine bridges as shown in the figure below.

12) A graph that appropriately models this situation would have

- A) 3 vertices and 9 edges.
- B) 9 vertices and 5 edges.
- C) 5 vertices and 9 edges.
- D) 9 vertices and 3 edges.
- E) none of these



Assume you have a graph with vertex set  $V = \{A, B, C, D, E\}$  and edge set  $E = \{AB, AE, BD, BE, CD, \text{ and } DD\}$ .

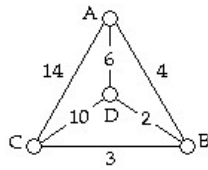
13) The degree of vertex D is

- A) 1
- B) 2
- C) 3
- D) 4
- E) none of these

A garbage truck must pick up garbage at 4 different dump sites (A, B, C, and D) as shown in the graph below, starting and ending at A. The numbers on the edges represent distances (in miles) between locations. The truck driver wants to minimize the total length of the trip.

14) An optimal tour (must use Brute Force Algorithm) is given by:

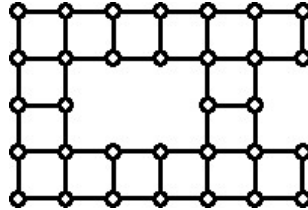
- A) A, D, B, C, A.
- B) A, B, D, C, A.
- C) A, C, B, D, A.
- D) A, D, C, B, A.
- E) none of these



Use the graph below to answer the following question.

15) An optimal Eulerization of this graph can be obtained by duplicating

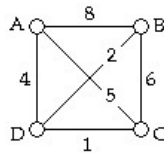
- A) 11 edges.
- B) 10 edges.
- C) 9 edges
- D) 12 edges.
- E) none of these



A delivery truck must deliver furniture to 4 different locations (A, B, C, and D). The trip must start and end at A. The graph below shows the distances (in miles) between location. We want to minimize the total distance traveled.

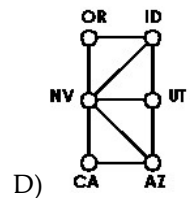
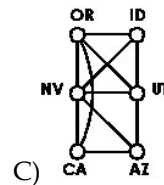
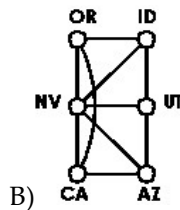
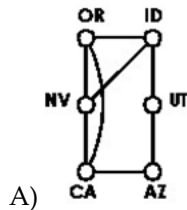
16) Use the cheapest-link algorithm (also called Best Edge Algorithm) and then write your answer starting with vertex A:

- A) A, C, B, D, A.
- B) A, D, B, C, A.
- C) A, B, D, C, A.
- D) A, D, C, B, A.
- E) none of these



Represent the following with a graph.

17)



18) Evaluate  $4!$

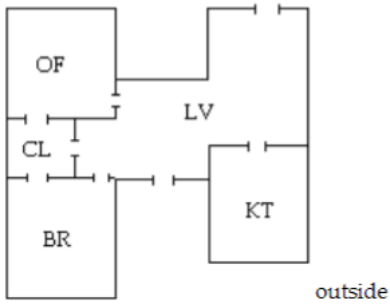
- A) 12
- B) 24
- C) 4
- D) 6
- E) none of these

19) a) Find 26% of 2,500,402

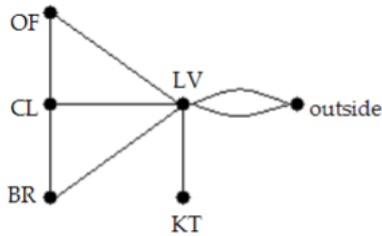
b) Find 104% of 26.

20)

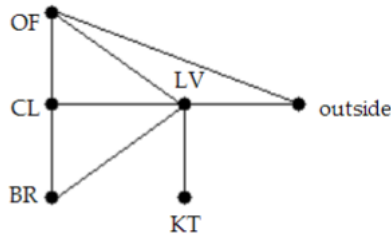
Draw a graph that models the floor plan. Use vertices to represent the rooms and the outside, and edges to represent the doors.



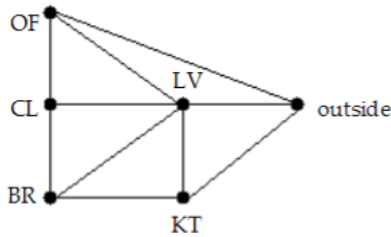
A)



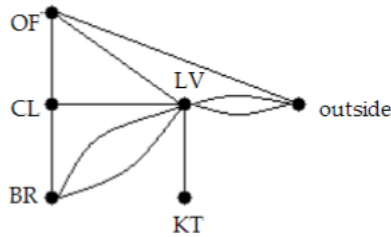
B)



C)

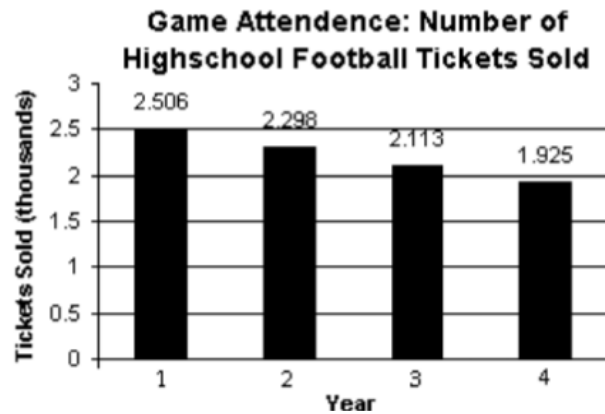


D)



21) Use the graph to answer the following. You may keep your answers in decimal form. Round to the nearest thousandth.

- Find the average yearly decrease
- Find an expression (mathematical model) that best describes the number of tickets sold, in thousands,  $n$  years after year 1.
- Estimate the number of tickets sold 6 years after year 1.



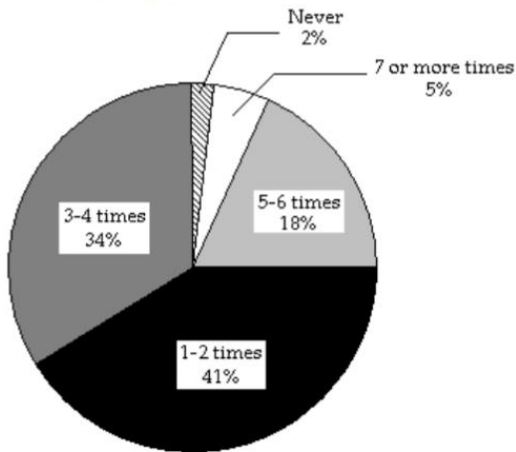
22) You rented an apartment for \$810 a month for 11 years. What is the total amount you paid in rent?

23) You spend \$41.28 for a meal. If you want to leave a 15% tip, estimate the amount of the tip.

24) If a person works full time and earns \$19,500 per year, estimate that person's hourly salary

- A) \$10    B) \$100    C) \$50    D) \$40

25) The circle graph shows the number of times a group of survey respondents watched the news in the past week. Use the chart to answer the question.



1) If the number of respondents in the study was approximately 44,947, estimate how many stated that they watched the news 5-6 times in the last week.

- A) 8000 respondents    B) 10,000 respondents  
C) 6000 respondents    D) 12,000 respondents

26) Kim needs to deliver checks to 5 houses. How many different ways can she visit these 5 houses if she starts and ends at her own house?

27) Use the graph from problem 8). State which vertices are even and which are odd.

28) Find an Euler path for Graph 1 in problem 9)

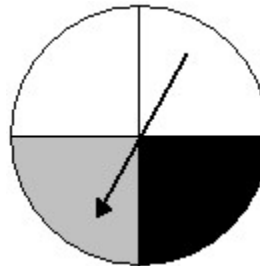
29) Find an Euler circuit for Graph 3 in Problem 9

30) Round 23485.15637 to the nearest:

- a) tenth    b) hundredth    c) ten-thousand    d) hundred    e) thousandth.

31) Give the probability that the spinner shown would land on black.

- A)  $\frac{1}{2}$     B)  $\frac{1}{4}$     C)  $\frac{2}{3}$     D)  $\frac{1}{3}$     E) none of these



32) A bag contains 19 balls numbered 1 through 19. What is the probability that a randomly selected ball has an even number?

- A)  $\frac{9}{19}$     B)  $\frac{2}{19}$     C)  $\frac{19}{9}$     D) 9    E) none of these

33) A family has three children. What is the probability that two of the children are boys?

- A)  $\frac{1}{2}$     B)  $\frac{3}{8}$     C)  $\frac{2}{8}$     D)  $\frac{2}{3}$     E) none of these

34) Mendel found no dominance in snapdragons with respect to red and white flower color. When pure red (RR) and pure white (rr) parents are crossed, the resulting Rr combination (one of each gene) produces second generation offspring with pink flowers. Suppose one of these second generation pinks is crossed with a pure white. What is the probability that the resulting snapdragon will have white flowers?

- A) 0.5    B) 0.75    C) 0.25    D) 0    E) none of these

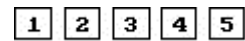
35) What is the probability that a randomly polled voter voted for Candidate C?

- A) 0.29    B) 0.50    C) 0.21    D) 0.12    E) none of these

Candidate	A	B	C	D	E
Votes for	12	24	21	29	14

36) What are the odds in favor of drawing a 1 from these cards?

- A) 1:4    B) 4:1    C) 5:1    D) 1:5    E) none of these



37) A card is drawn at random from a standard 52-card deck. Find the probability that the card is an ace or not a club.

- A)  $\frac{10}{13}$     B)  $\frac{43}{52}$     C)  $\frac{9}{13}$     D)  $\frac{35}{52}$     E) none of these

38) A fair die is rolled. What is the probability of rolling an odd number or a number less than 3?

- A)  $\frac{5}{6}$     B)  $\frac{2}{3}$     C) 1    D)  $\frac{1}{2}$     E) none of these

39) A bag contains 8 red chips and 5 blue chips. Two chips are selected randomly without replacement from the bag. What is the probability that the two chips are both blue? Round to the nearest thousandth.

- A) 0.128    B) 0.385    C) 0.256    D) 0.148    E) none of these

**For questions 40) and 41) Find the indicated probability. The table below shows the soft drink preferences of people in three age groups.**

	cola	root beer	lemon-lime
under 21 years of age	40	25	20
between 21 and 40	35	20	30
over 40 years of age	20	30	35

40) If one of the 255 subjects is randomly selected, find the probability that the person is over 40 and drinks cola.

- A)  $\frac{4}{19}$     B)  $\frac{4}{51}$     C)  $\frac{4}{17}$     D) 20    E) None of the above is correct.

41) If one of the 255 subjects is randomly selected, find the probability that the person is over 40 given the person prefers root beer.

- A)  $\frac{2}{5}$     B)  $\frac{6}{17}$     C)  $\frac{5}{17}$     D) 20    E) None of the above is correct.

42) If a single fair die is rolled, find the probability that the number rolled is 5 given that it is odd.

- A)  $\frac{1}{3}$     B)  $\frac{2}{3}$     C)  $\frac{1}{2}$     D)  $\frac{1}{6}$     E) none of these

- 43) Suppose you buy 1 ticket for \$1 out of a lottery of 1,000 tickets where the prize for the one winning ticket is to be \$500. What is your expected net winnings?
- A) -\$0.40    B) \$0.00    C) -\$1.00    D) -\$0.50    E) None of these
- 44) A bag contains 5 red marbles, 4 blue marbles, and 1 green marble. If a marble is selected at random, what is the probability that it is not blue?
- A)  $\frac{5}{3}$     B) 6    C)  $\frac{2}{5}$     D)  $\frac{3}{5}$     E) none of these
- 45) You are dealt two cards successively (without replacement) from a shuffled deck of 52 playing cards. Find the probability that both cards are black.
- A)  $\frac{1}{2652}$     B)  $\frac{25}{51}$     C)  $\frac{25}{102}$     D)  $\frac{13}{51}$     E) none of these
- 46) State the necessary piece of information that missing which prevents you from solving the problem. A car traveled at an average rate of 53 miles per hour and then reduced its speed to 42 miles per hour for the rest of the trip. If the trip took 4 hours, determine how long the car traveled at each rate.
- A) the time at each rate    B) the difference between the rates    C) the time of day    D) the destination    E) none of these.
- 47) Lauren owns 28 acres of land which she rents to a farmer for \$3812 per acre per year. Her property taxes are \$972 per acre per year. How much profit does she make on the land each year?
- A) \$79,520    B) \$133,952    C) \$105,764    D) \$107,708    E) none of these
- 48) A couch sells for \$1260. Instead of paying the total amount at the time of purchase, the same couch can be bought by paying \$400 down and \$80 a month for 12 months. How much is saved by paying the total amount at the time of purchase?
- A) \$980    B) \$100    C) \$300    D) \$10    E) none of these
- 49) A college cafeteria pays student cashiers \$10.20 per hour. Cashiers earn an additional \$1.30 per hour for each hour worked over 35 hours per week. A cashier worked 40 hours one week and 38 hours the second week. How much did this cashier earn in this two-week period?
- 50) A store received 300 containers of milk to be sold by February 1. Each container cost the store \$0.79 and sold for \$1.55. The store signed a contract with the distributor in which the distributor agreed to a \$0.50 refund for every container not sold by February 1. If 270 containers were sold by February 1, how much profit did the store make?
- 51) Reduce the fractions:
- A)  $\frac{40}{45}$     B)  $\frac{209}{285}$
- 52) Write as an improper fraction:  $18\frac{10}{23}$
- 53) Convert to a mixed number:  $\frac{79}{7}$
- 54) Express as a decimal a)  $\frac{13}{20}$  b)  $\frac{9}{11}$
- 55) Express as a rational number a) 0.42 b) 0.838
- 56) Of the 828 people polled about gardening, 276 replied that they plant a garden. What fractional part of those polled, expressed in lowest terms, plant a garden?



57)

An apartment complex offers apartments with four different options, designated by A through D.

A = number of bedrooms (one through four)

B = number of bathrooms (one through three)

C = floor (first through fifth)

D = outdoor additions (balcony or no balcony)

How many apartment options are available?

A) 120

B) 14

C) 16

D) 240

58) License plates in a particular state display 2 letters followed by 4 numbers. How many different license plates can be manufactured? (Repetitions are allowed.)

59) Jill pulls a card at random from a standard deck of 52 cards. What is the probability (as a reduced fraction) that it is a:

a) Ten

b) a face card

c) a prince

d) not a seven

60) If you are given odds 9 to 3 in favor of winning a bet, what is the probability of winning the bet?

61) A card is drawn from a 52-card deck and a fair coin is flipped. What is the probability of getting a jack and a heads? Write answer as reduced fraction.

62) The random variable  $X$  is the number of people who have a college degree in a randomly selected group of four adults from a particular town. Its probability distribution is given in the table. Find the expected value.

A) 1.73

B) 1.50

C) 1.60

D) 2.00

E) none of these

$x$	$P(X = x)$
0	0.1296
1	0.3456
2	0.3456
3	0.1536
4	0.0256

63) A game is played using one die. If the die is rolled and shows a 2, the player wins \$8. If the die shows any number other than a 2, the player wins nothing. If there is a charge of \$1 to play the game, what is the game's expected value?

64) What are the odds of rolling a number less than 3 on a standard die?

65) If a shirt is marked up 30% and costs the store \$20 to purchase, how much will they sell it for?

66-69)

The correlation coefficient,  $r$  is given for a sample of  $n$  data points. Use the  $\alpha = 0.05$  column in a correlation significance table to determine whether or not we may conclude that a correlation does exist in the population.

1)  $n = 20$   $r = 0.5$

- A) Yes, we may conclude that there is a correlation.
- B) No, we may not conclude that there is a correlation.

2)  $n = 20$   $r = 0.04$

- A) No, we may not conclude that there is a correlation.
- B) Yes, we may conclude that there is a correlation.

3)  $n = 47$   $r = -0.395$

- A) Yes, we may conclude that there is a correlation.
- B) No, we may not conclude that there is a correlation.

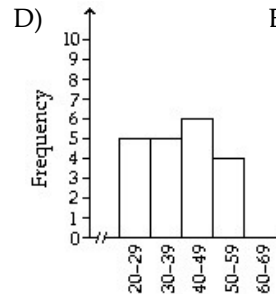
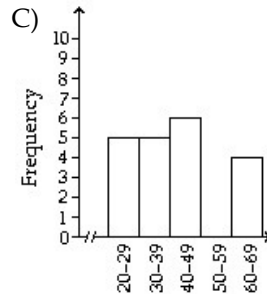
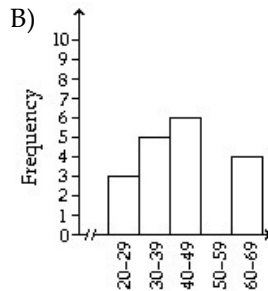
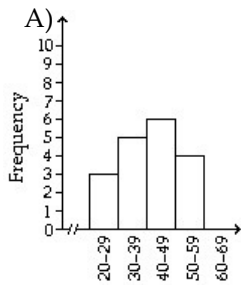
4)  $n = 37$   $r = -0.301$

- A) No, we can not conclude that there is a correlation.
- B) Yes, we can conclude that there is a correlation.

**NOT ON FINAL EXAM THIS SEMESTER**

70) The ages of the voters at a poll during a 20-minute period are listed below. Use five classes with a uniform width of 10 years, where the lower limit of the first class is 20 years. Construct the specified histogram.

35 29 48 63 64 38 21 23 41 68  
61 42 43 47 33 37 46 27 23 30



E) none of these

71) Which measure of center is most effected by outliers?

- A) mean
- B) median
- C) Mode

72) The preference ballots for presidency of the Reggae Appreciation Club (A, B, and C) are shown. Fill in the number of votes in the first row of the preference table.

ACB ACB ACB CBA  
BAC CBA ACB BAC  
BAC ACB CBA ACB  
ACB BAC BAC ACB

Number of Votes	_____		
First choice	A	B	C
Second choice	C	A	B
Third choice	B	C	A

- A) 

Number of Votes	8	5	3
First choice	A	C	B
Second choice	C	B	A
Third choice	B	A	C
- B) 

Number of Votes	8	5	3
First choice	A	B	C
Second choice	C	A	B
Third choice	B	C	A
- C) 

Number of Votes	9	4	3
First choice	A	B	C
Second choice	C	A	B
Third choice	B	C	A
- D) 

Number of Votes	8	6	2
First choice	A	B	C
Second choice	C	A	B
Third choice	B	C	A
- E) none of these

73) Diners at the Rive Gauche restaurant answer a questionnaire about their favorite course in a French meal. The choices are: Appetizer (A), Entree (E), and Dessert (D). Their votes are summarized in the following table. Which course is selected as the most favorite using the plurality method?

- A) Entree
- B) Dessert
- C) Appetizer
- D) It is a tie

Number of Votes	21	13	7	5
First choice	E	D	A	D
Second choice	A	A	D	E
Third choice	D	E	E	A

74) Four students are running for president of their dormitory: Debra (D), Farah (F), Jorge (J), and Hillary (H). The votes of their fellow students are summarized in the following preference table.

How many points would Debra receive using the Borda count method?

Number of Votes	52	35	22	10	4
First choice	D	F	J	F	H
Second choice	F	J	F	J	J
Third choice	H	H	H	D	D
Fourth choice	J	D	D	H	F

- A) 293 B) 10 C) 322 D) 123 E) 221

75) Four students are running for president of their graduating class: Debra (D), Farah (F), Jorge (J), and Hillary (H). The votes of their fellow students are summarized in the following preference table.

Who is declared the new president using the plurality-with-elimination method?

Number of Votes	48	47	17	7	5
First choice	J	F	J	F	H
Second choice	D	J	F	J	J
Third choice	F	H	H	D	D
Fourth choice	H	D	D	H	F

- A) Debra B) Jorge C) Hillary D) Farah E) It is a tie

76) The preference table shows the results of an election among three candidates, A, B, and C.

(a) Using the plurality method, who is the winner?

(b) Is the majority criterion satisfied?

- A) C; yes B) B; yes C) C; no D) A; yes E) A; no

Number of votes	10	4	2
First choice	C	B	A
Second choice	A	A	B
Third choice	B	C	C

77) The preference table shows the results of an election among three candidates, A, B, and C.

(a) Using the plurality method, who is the winner?

(b) Is the head-to-head criterion satisfied?

- A) A; yes B) B; yes C) B; no D) A; no E) C; yes

Number of votes	7	6	3
First choice	A	B	B
Second choice	B	C	A
Third choice	C	A	C

78) The preference table shows the results of a straw vote among three candidates, A, B, and C.

(a) Using the plurality-with-elimination method, which candidate wins the straw vote?

(b) In the actual election, the 3 voters in the 3rd column who voted B, C, and A, in that order, change their votes to C, B, A. Using plurality-with-elimination method, which candidate wins the actual election.

(c) Is the monotonicity criterion satisfied?

- A) C; A; no B) C; C; no C) A; A; yes D) A; C; yes E) C; A; yes

Number of voters	6	5	3	7
1 <sup>st</sup> choice	A	B	B	C
2 <sup>nd</sup> choice	C	A	C	B
3 <sup>rd</sup> choice	B	C	A	A

79) The preference table shows the results of an election among three candidates, A, B, and C.

(a) Using the plurality method, who is the winner?

(b) The voters in the two columns on the right move their last-place candidates from last place to first place. Construct a new preference table for the election. Using the table and the plurality method, who is the winner?

(c) Suppose that candidate C drops out of the new table, but the winner is still chosen by the plurality method. Is the irrelevant alternatives criterion satisfied?

Number of votes	7	6	3
First choice	A	B	C
Second choice	B	C	B
Third choice	C	A	A

- A) A; A; yes B) C; A; yes C) B; B; yes D) C; C; yes E) A; C no

80) Choose the sentence or sentences that accurately restate Arrow's Impossibility Theorem for more than 2 candidates.  
 I. It is mathematically impossible for any democratic voting system to satisfy any of the four fairness criteria.  
 II. It is mathematically impossible for any democratic voting system to satisfy all of the four fairness criteria.  
 III. It is mathematically impossible for any democratic voting system to satisfy some of the four fairness criteria.  
 IV. It is mathematically impossible for any democratic voting system to satisfy any more than one of the four fairness criteria.

- A) II only      B) I, III, and IV      C) I, II, and III      D) IV only      E) I only

81) State the appropriate fairness criteria. (majority, monotonicity, head-to-head, irrelevant alternatives)

- a) If a candidate wins an election and, in a reelection, the only changes are changes that favor the candidate, then that candidate should win the reelection.  
 b) If a candidate wins an election and, in a recount, the only changes are that one or more of the other candidates are removed from the ballot, then that candidate should still win the election.  
 c) If a candidate receives more than half the first-place votes in an election, then that candidate should be declared the winner.  
 d) If a candidate is favored when compared separately with every other candidate in an election, then that candidate should be declared the winner.

82) 80 voters are asked to rank four brands of cereal: A, B, C, and D. The votes are summarized in the preference table.

Number of Votes	38	29	11	2
First Choice	D	A	B	C
Second Choice	A	B	C	B
Third Choice	B	C	A	A
Fourth Choice	C	D	D	D

- a) Who is the winner using the Plurality method?  
 b) Who is the winner using the Borda Count method?

83) Diners at a local restaurant were asked to rank their choices for their favorite course of the meal. The choices were: Appetizer (A), Entrée (E), and Dessert (D). Which course is selected as their favorite using:  
 Pairwise Comparison (head-to-head)

Number of Votes	21	13	7	5
First choice	E	D	A	D
Second choice	A	A	D	E
Third choice	D	E	E	A

84) Answer the following question:

### Phone Battery Comparison

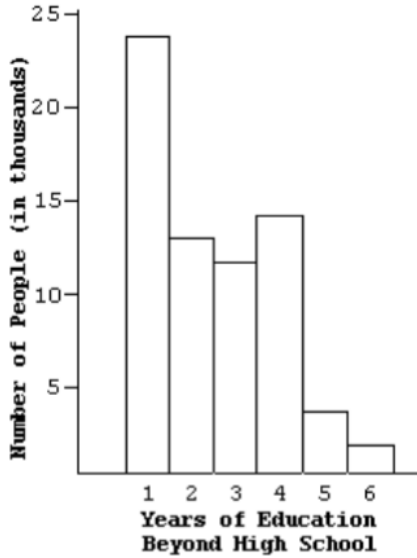
"Brand A"		"Brand B"	
LEAF	STEM	LEAF	STEM
8 8 7 5	0	7	
9 7 4 1 0	1	0 5 5 5 7 9	
2 2 2 1	2	0 2 2 6 7	
8 6 4 2 0	3	0 2 4 6 8	
	4		
	5	6	
1	6		
	7	5	

Key : 6 | 1 = 61 hours

- a) How many of Brand A batteries were tested?  
 b) What is the maximum hours that a Brand B battery lasted?  
 c) What is the least number of hours that a Brand A battery lasted?

85)

Which one of the following is true according to the graph?

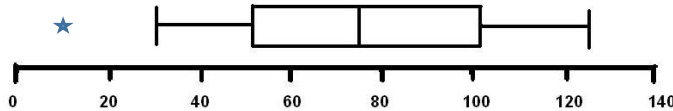


- A) More people had 4 years of education beyond high school than 3 years.
- B) The graph is based on a sample of approximately 62 thousand people.
- C) If the sample is truly representative, then for a group of 50 people, we can expect about 32 of them to have one year of education beyond high school.
- D) The percent of people with years of higher education greater than those shown by any rectangular bar is equal to the percent of people with years of education less than those shown by that bar.

86) In a college, some courses contribute more towards an overall GPA than other courses. For example, a science class is worth 4 credits; mathematics is worth 3 credits; History is worth 2 credits. The values of the grade letters are as follows, A= 4, B=3, C=2, D=1, F=0. What is the GPA of a student who made a "C" in Trigonometry, a "B" in American History, an "A" in Botany, and a "B" in Microbiology? Round to 2 decimal places.

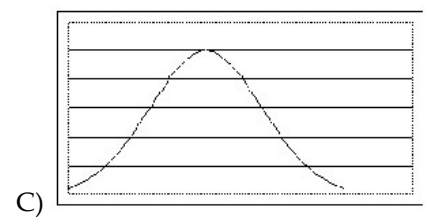
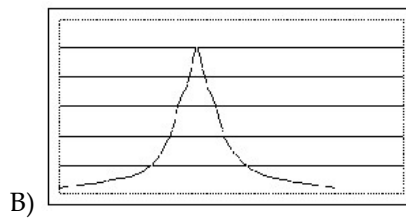
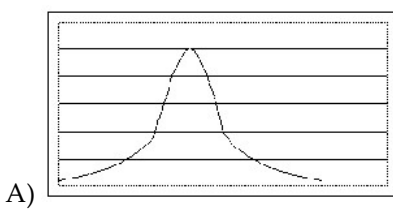
87) Use the following boxplot to answer the questions:

**Annual snow depth at Mathsville Ski Resort**



- a) Approximately what is the least annual snow depth at Mathsville Ski Resort?
- b) 50% of annual snowfalls fall below approximately how many inches?
- c) Is there an outlier? If so, approximate.
- d) What is the approximate value of the first quartile?

88) Which of the distributions has the greatest variation?



89) Find the standard deviation for the following test scores. (round all answers to the tenths place)

85, 100, 90, 96, 87, 94 Remember, only round your final answer, not in the intermediate steps.

- A) 4.4
- B) 92
- C) 32.4
- D) 5.7
- E) 5.2

90) At one college, GPA's are normally distributed with a mean of 2.9 and a standard deviation of 0.4. What percentage of students at the college have a GPA between 2.1 and 3.7? Use 68-95-99.7% rule.

- A) 99.7%    B) 68%    C) 84%    D) 95%    E) 83%

91) At one college, GPA's are normally distributed with a mean of 2.9 and a standard deviation of 0.4. What percentage of students at the college have a GPA more than 3.3? Use 68-95-99.7% rule.

92) The amount of Jen's monthly phone bill is normally distributed with a mean of \$ 56 and a standard deviation of \$ 12. Fill in the blanks. 68% of her phone bills are between \$\_\_\_ and \$\_\_\_. Use 68-95-99.7% rule.

- A) 44, 68    B) 32, 56    C) 32, 80    D) 56, 68    E) 20, 96

93) At one college, GPA's are normally distributed with a mean of 2.9 and a standard deviation of 0.4. What percentage of students at the college have a GPA between 2.5 and 3.7? Use 68-95-99.7% rule.

- A) 68%    B) 95%    C) 81.5%    D) 50%    E) 75%

94) During the questioning of 76 potential jury members, 51% said that they had already formed an opinion as to the guilt of the defendant. Give the margin of error as a percentage to one decimal place.

- A) 1.3%    B) 11.5%    C) 22.9%    D) 5.7%    E) 12.9%

95) During the questioning of 71 potential jury members, 50% said that they had already formed an opinion as to the guilt of the defendant. Find a 95% confidence interval for the true population proportion.

- A) 48.6% to 51.4%    B) 49.9% to 50.1%    C) 38.1% to 61.9%    D) 44.1% to 55.9%    E) 45% to 55%

96) The National Education Association collects data on the number of years of teaching experience of high-school teachers. A sample taken this year of 19 high school teachers yielded the following data on number of years of teaching experience. Obtain the five-number summary for the given data.

- A) 1, 4, 20, 26, 33  
B) 1, 4, 18.0, 26, 33  
C) 1, 3.75, 18.0, 25.25, 33  
D) 1, 3.75, 20, 25.25, 33  
E) None of these

33	13	1	20	31
7	3	11	2	23
25	1	33	26	4
16	24	21	31	

97) Draw a stem and leaf plot for the data set in question 31.

98) A set of data items is normally distributed with a mean of 50 and a standard deviation of 7. Find the z-score for a data value of 41 (round to 1 decimal place)

- A) -1.3    B) 34.9    C) 1.3    D) 0.7    E) -1.4

99) Weights of yellowfin tuna follow a normal distribution with a mean weight of 68 pounds and a standard deviation of 12 pounds. According to the z-score table, approximately what percent of yellowfin tuna should weigh less than 62 pounds?

- A) 77.34%    B) 69.15%    C) 26.47%    D) 30.85%    E) 42%

100) Weights of yellowfin tuna follow a normal distribution with a mean weight of 68 pounds and a standard deviation of 12 pounds. According to the z-score table, approximately what percent of yellowfin tuna should weigh more than 85 pounds?

- A) 91.92%    B) 86.43%    C) 8.08%    D) 13.57%    E) 15%

101) Weights of yellowfin tuna follow a normal distribution with a mean weight of 68 pounds and a standard deviation of 12 pounds. According to the z-score table, approximately what percent of yellowfin tuna should weigh between 62 and 72 pounds?

102) A set of data items is normally distributed with a mean of 700 and a standard deviation of 10. Find the data item in this distribution that corresponds to a z score of 1.5.

103) What is the mode for the following data set? 1, 1, 4, 5, 6, 10, 12, 14, 33, 33, 38  
 A) No mode    B) 11    C) 33    D) 1    E) 1 and 33

104) What is the range for the following data set? 1, 1, 4, 5, 6, 10, 12, 14, 33, 33, 38  
 A) 37    B) 11    C) 38    D) 10    E) 19

105) In a study to determine the most popular automobile on the road, which of the following is the most representative sample?

- A) A random sample of the cars driving on the highway
- B) A random sample of the cars that drive by your house
- C) A random sample of the cars parked at a local high school
- D) A random sample of the cars parked at an airport

106) State the mean, median mode, and midrange for each of the following groups of data.

Group A = 8, 4, 5, 7, 2, 6, 6, 3

Group B = 10.2, 13.4, 6.8, 9.1, 15.2

Stress Rating	Frequency
0	5
1	1
2	4
3	13
4	18
5	16
6	15
7	34
8	26
9	19
10	15

107) The table on the left, shows the responses of a group of students who were asked the question: "How stressed have you been in the last week on a scale of 0 to 10 with 0 being not stressed at all and 10 being as stressed as possible?"

- a) How many students were involved in the study?
- b) Which stress rating describes the greatest number of students? \_\_\_\_ out of 10
- c) How many students rated their stress level in the last week less than 5?

108) A professor had students keep track of their social interactions for a week. The number of social interactions over the week is shown in the grouped frequency distribution on the right.

- a) Identify the lower limit of the third class
- b) What is the class width?
- c) How many students had at least 45 social interactions for the week?

Number of Social Interactions	Frequency
10-14	6
15-19	18
20-24	19
25-29	12
30-34	10
35-39	8
40-44	4
45-49	3
50-54	1
55-59	2

109) Which data presentation is described?

(Grouped Frequency Distribution, Histogram, Frequency Distribution, Stem-and-Leaf Plot)

- a) A data presentation that separates each data item into two parts
- b) A data presentation with data values listed in one column and the adjacent column indicates the number of times each value occurs
- c) A visual presentation of data using a bar graph with bars that touch each other, and the heights of the bars represent the frequency of the data

110) Identify the measure of central tendency (mean, median, mode).

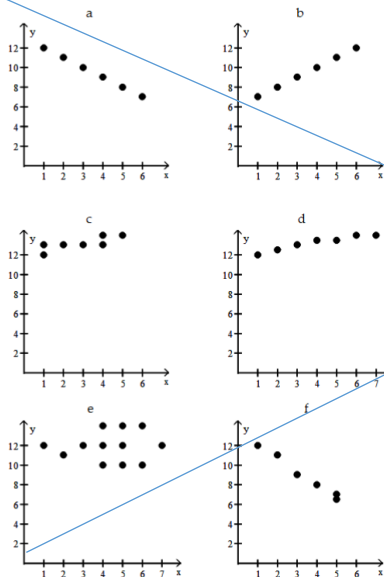
- a) The measure of central tendency that is the data item in the middle of ranked, or ordered, data is called the \_\_\_\_\_.
- b) A data value that occurs most often in a data set is the measure of central tendency called the \_\_\_\_\_.
- c) The sum of all the data items divided by the number of data items, is the measure of central tendency called the \_\_\_\_\_.

111) A sample obtained in such a way that every element in the population has an equal chance of being selected is called a \_\_\_\_\_ sample. Is a call-in poll on radio or television a good example of this type of sample?

112) Find the mean, median and mode for the data items in the given frequency distribution.

Score	Frequency
x	f
1	4
2	2
3	5
4	7
5	10
6	6
7	9
8	11
9	12
10	12

Use the scatter plots to answer the following two questions.



**NOT ON TEST THIS SEMESTER**

113) Which graph indicates a perfect negative correlation?

114) In which scatterplot is  $r=0.01$ ?

115) Express the fraction as a percent:  $13/80$

- A) 16.25 %
- B) 1.63 %
- C) 61.54 %
- D) 6.15 %
- E) none of these



- 116) Express the percent as a decimal: 580%
- A) 58            B) 5.8            C) 5.81            D) 0.58            E) none of these
- 117) Write the decimal as a percent. 0.00952
- A) 0.000952%    B) 0.476%            C) 0.9052%            D) 0.0952%            E) none of these
- 118) What percent of 110 is 40.7?
- A) 370%            B) 3.7%            C) 37%            D) 0.37%            E) none of these
- 119) Jeans with an original price of \$ 44 are on sale at 25% off. What is the sale price of the jeans? (Round to the nearest cent, if necessary.)
- A) \$42.90            B) \$55.00            C) \$33.00            D) \$11.00            E) none of these
- 120) A dress regularly sells for \$ 130. The sale price is \$ 84. Find the percent decrease of the sale price from the regular price.
- A) 182.6%            B) 64.6%            C) 54.8%            D) 35.4%            E) none of these
- 121) Find the amount of simple interest owed if \$300 is invested at 4% interest for 4 months.            Round to nearest cent.
- A) \$ 304.00            B) \$ 4.00            C) \$ 48.00            D) \$ 348.00            E) none of these
- 122) If \$ 160 is invested for 3 years at 8% simple interest, how much is in the account at the end of the 3 years? Round to nearest cent.
- A) \$ 184.00            B) \$ 1038.40            C) \$ 198.40            D) \$ 172.80            E) none of these
- 123) The principal  $P$  is borrowed and the loan's future value,  $A$ , at time  $t$  is given. Determine the loan's simple interest rate,  $r$ , to the nearest tenth of a percent.  $P = \$ 170$ ;  $A = \$ 205.70$ ;  $t = 3$  years
- A) 7.3%            B) 5.5%            C) 7%            D) 14%            E) none of these
- 124) Determine how much you would have to invest now to have \$5500 after 1 year at a 10% simple interest. Round to nearest dollar.
- A) \$ 5050            B) \$ 5000            C) \$ 50100            D) \$ 5010            E) none of these
- 125) Lonnie needs extra money to buy a truck to start up a delivery service. He takes out a simple interest loan for \$6000 for 6 months at a rate of 7.25% . How much interest must he pay, and what is the future value of the loan?
- A) interest: \$ 2610.00 ; future value: \$ 8610.00    B) interest: \$ 217.50 ; future value: \$ 6230.50  
 C) interest: \$ 237.27 ; future value: \$ 6237.27    D) interest: \$ 217.50 ; future value: \$ 6217.50  
 E) none of these
- 126) The principal represents an amount of money deposited in a savings account subject to compound interest at the given rate. Find how much money will be in the account after the given number of years, and how much interest was earned. Principal: \$ 6000; Rate: 6%; Compounded: semiannually; Time: 4 years
- A) amount in account: \$ 7574.86; interest earned: \$ 1574.86  
 B) amount in account: \$ 6753.05; interest earned: \$ 753.05  
 C) amount in account: \$ 7600.62; interest earned: \$ 1600.62  
 D) amount in account: \$ 9563.09; interest earned: \$ 3563.09  
 E) none of these

127) Which is the better choice: \$1000 deposited for a year at a rate of 5.5% compounded semiannually or at a rate of 5.4% compounded quarterly?

- A) They are the same.
- B) The rate of 5.5% compounded semiannually is better.
- C) The rate of 5.4% compounded quarterly is better.

128) Brad wants to have \$17,000 available to buy a car in 5 years. How much must he deposit now at 9% compounded monthly to reach that goal?

- A) \$10857.89
- B) \$11377.13
- C) \$12,313.19
- D) \$9983.66
- E) none of these

129) Find the value of the annuity. Round to the nearest cent. Periodic Deposit: \$2500 at the end of every three months  
Rate: 5.5% compounded quarterly Time: 11 years

- A) \$ 77,642.93
- B) \$ 145,269.81
- C) \$ 331,585.45
- D) \$ 149,767.27
- E) none of these

130) How much must you deposit every six months at 10% compounded semiannually if you want to \$310,000 at the end of 8 years? Do not round in intermediate steps. Then round UP to the nearest dollar. Then find the interest.

- a) In order to have \$310,000 in 8 years, you must deposit \_\_\_\_\_ every 6 months.
- b) \_\_\_\_\_ of the \$310,000 comes from deposits and \_\_\_\_\_ comes from interest.

131) Suppose that you borrow \$10,000 for four years at 8% toward the purchase of a car. Find the monthly payments and the total interest for the loan. Round to the nearest dollar.

132) Suppose that you decide to buy a car for \$25,485, including taxes and license fees. You saved \$7000 for a down payment and can get a five-year loan at 6.52%. Find the monthly payment and the total interest for the loan.

- A) \$362; \$3235
- B) \$499; \$4455
- C) \$636; \$19,675
- D) \$362; \$19,675
- E) none of these

133) Suppose that you drive 40,000 miles per year and gas averages \$4 per gallon. (i) What will you save in annual fuel expenses by owning a hybrid car averaging 40 miles per gallon rather than an SUV averaging 20 miles per gallon? (ii) If you deposit your monthly fuel savings at the end of each month into an annuity that pays 5.9% compounded monthly, how much will you have saved at the end of seven years?

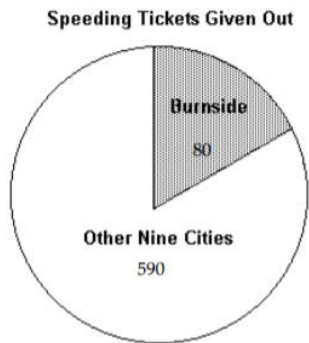
134) Find the amount in the account at the end of 5 years if \$4000 is invested at 3% compounded continuously

- A) \$4824.11
- B) \$5201.86
- C) \$4647.34
- D) \$4646.47
- E) none of these

135) A vacuum cleaner dealership sold 360 units in 2011 and 383 units in 2012. Find the percent increase or decrease in the number of units sold. Round to the nearest tenth of a percent.

136) 12.5% of what number is 8?

137) The circle graph shows the total number of speeding tickets given out in one month in a 10-city area. What percent of the total tickets were given out in Burnside?



- A) 12%    B) 14%    C) 0.12%    D) 0.14%    E) none of these.

138) Use the chart below to solve the problem. If you are not self-employed and earn \$128,000, what are your FICA taxes? Round to the nearest dollar.

**Use the 2012 FICA tax rates in the table below to solve the problem.**

Employee's Rates	Matching Rates Paid by the Employer	Self-Employed Rates
<ul style="list-style-type: none"> <li>5.65% on first \$110,000 of income</li> <li>1.45% of income in excess of \$110,000</li> </ul>	<ul style="list-style-type: none"> <li>7.65% on first \$110,000 paid in wages</li> <li>1.45% of wages paid in excess of \$110,000</li> </ul>	<ul style="list-style-type: none"> <li>13.3% on first \$110,000 of net profits</li> <li>2.9% of net profits in excess of \$110,000</li> </ul>

139) Find the gross income, the adjusted gross income, and the taxable income:

A taxpayer earned wages of \$65,100, received \$840 in interest from a savings account, and contributed \$2300 to a tax-deferred retirement plan. He was entitled to a person exemption of \$3500 and had deductions totaling \$5680.

140) Use the table to find the taxes owed for

- a) a head of household with a \$75,000 taxable income and \$4500 tax credit.  
 b) Single female, no dependents. Gross Income: \$35,000. Adjustments \$3000. Deductions: \$2,000 charitable contributions, \$2500 student loan interest. Tax credit: none. (Note: check deductions against standard deduction)

**Use the table to calculate the tax owed. Round to the nearest cent.**

Tax Rate	Single	Married Filing Separately	Married Filing Jointly	Head of Household
10%	up to \$8700	up to \$8700	up to \$17,400	up to \$12,400
15%	\$8701 to \$35,350	\$8701 to \$35,350	\$17,401 to \$70,700	\$12,401 to \$47,350
25%	\$35,351 to \$85,650	\$35,351 to \$71,350	\$70,701 to \$142,700	\$47,351 to \$122,300
28%	\$85,651 to \$178,650	\$71,351 to \$108,725	\$142,701 to \$217,450	\$122,301 to \$198,050
33%	\$178,651 to \$388,350	\$108,726 to \$194,175	\$217,451 to \$388,350	\$198,051 to \$388,350
35%	more than \$388,350	more than \$194,175	more than \$388,350	more than \$388,350
Standard Deduction	\$5950	\$5950	\$11,900	\$8700
Exemptions (per person)	\$3800	\$3800	\$3800	\$3800

141) You decide to work part-time at a local supermarket. The job pays \$8.50 per hour and you work 20 hours per week. Your employer withholds 10% of your gross pay for federal taxes, 5.65% for FICA taxes, and 2% for state taxes.

- What is your weekly gross pay?
- How much is withheld for federal taxes each week?
- How much is withheld per week for FICA taxes?
- How much is withheld per week for state taxes?
- What is your weekly net pay?
- What percentage of your gross pay is withheld for taxes?

142) Periodic Deposit: \$50 at the end of every month      Find the interest earned. Do not round until the final answer. Then round to the nearest dollar.  
 Rate: 4.25% compounded monthly  
 Time: 9 years

143) Average Annual Costs of Owning and Operating a Car for Selected Cars Average Costs Per Mile

Average Costs Per Mile			
Model	Operating	Ownership	Total
Car A	\$0.21	\$0.78	\$0.99
Car B	\$0.11	\$0.58	\$0.69
Car C	\$0.26	\$0.32	\$0.58
Car D	\$0.19	\$0.64	\$0.83

(a) If you drive 20,000 miles per year, what is the total annual expense for Car B? (b) If the total annual expense for Car B is deposited at the end of each year into an IRA paying 8.4% compounded yearly, how much will be saved at the end of five years? Round your answer to the nearest dollar, if necessary.

144)

Average Costs Per Mile			
Model	Operating	Ownership	Total
Car A	\$0.24	\$0.76	\$1.00
Car B	\$0.12	\$0.59	\$0.71
Car C	\$0.28	\$0.31	\$0.59
Car D	\$0.16	\$0.66	\$0.82

If you drive 10,000 miles per year, by how much does the total annual expense for Car A exceed that of Car C over five years?

- A) \$20,500                      B) \$4100                      C) \$79,500                      D) \$15,900

145) The price of a home is \$250,000. The bank requires a 10% down payment. After the down payment, the balance is financed with a 15-year fixed-rate mortgage at 5.5%. Determine the monthly mortgage payment (excluding escrowed taxes and insurance) to the nearest dollar.

- A) \$ 1838                      B) \$ 1853                      C) \$ 1938                      D) \$ 1826                      E) none of these

146) The price of a home is \$260,000. The bank requires a 20% down payment and one point at the time of closing. The cost of the home is financed with a 15-year fixed-rate mortgage at 7%.

- Find the required down payment.
- Find the amount of the mortgage.
- How much must be paid for the one point at closing?

- A) a. down payment: \$ 52,000  
 b. amount of mortgage: \$ 208,000  
 c. points paid at closing: \$ 2600
- B) a. down payment: \$ 52,000  
 b. amount of mortgage: \$ 208,000  
 c. points paid at closing: \$ 2080
- C) a. down payment: \$ 52,000  
 b. amount of mortgage: \$ 208,000  
 c. points paid at closing: \$ 5200
- D) a. down payment: \$ 52,000  
 b. amount of mortgage: \$ 208,000  
 c. points paid at closing: \$ 20,800

147) Prepare a loan amortization schedule for the first three months of the following mortgage loan.

AMORTIZATION SCHEDULE

Annual % rate: 7%

Amount of Mortgage: \$ 300,000

Monthly payment: \$ 1995.00

Term: Years 30, Months 0

Number of Monthly Payments: 360

Payment Number	Interest Payment	Principal Payment	Balance of Loan
1			
2			
3			

A)

Payment Number	Interest Payment	Principal Payment	Balance of Loan
1	1750.00	245.00	299,811.00
2	1748.90	246.10	299,385.57
3	1747.13	247.87	299,260.70

B)

Payment Number	Interest Payment	Principal Payment	Balance of Loan
1	1750.00	245.00	299,755.00
2	1748.57	246.43	299,508.57
3	1747.13	247.87	299,260.70

C)

Payment Number	Interest Payment	Principal Payment	Balance of Loan
1	1750.00	245.00	299,755.00
2	1748.57	246.43	299,508.57
3	1871.93	123.07	299,385.50

D)

Payment Number	Interest Payment	Principal Payment	Balance of Loan
1	1750.00	245.00	299,755.00
2	1748.57	246.43	299,753.57
3	1747.13	247.87	299,260.70

148) The lower your credit score, the more likely you are to get credit

- A) TRUE      B) False

149) True or False: Paying the required minimum on your credit card bill ensures that you will not be charged any interest and is a good way to avoid credit-card debt.

\*\*Review vocabulary from your lecture note booklet\*\*

- 1) C  
2) D  
3) A  
4) A  
5) D  
6) A  
7) C  
8) C  
9) C  
10) D  
11) B  
12) C  
13) D  
14) D  
15) D  
16) C  
17) B  
18) B  
19) a) 650104.52  
b) 27.04  
20) A  
21) a) decrease 0.194 thousand  
b)  $T=2.506-.194n$   
c) 1.342 thousand  
22) \$106,920  
23) \$6.19  
24) A  
25) A  
26) 120  
27) Odd: B,C,D,E, Even: A  
28) many answers  
Ex. C,B,E,A,B,D,A,  
29) Many answers  
Ex. A,B,C,D,A,F,C,E,F,G,A  
30) a) 23485.2 b) 23485.16  
c) 20,000 d) 23500  
e) 23485.156
- 31) B  
32) A  
33) B  
34) A  
35) C  
36) A  
37) A  
38) B  
39) A  
40) B  
41) A  
42) A  
43) D  
44) D  
45) C  
46) A  
47) A  
48) B  
49) \$806  
50) \$196.50  
51a) 8/9 b) 11/15  
52) 424/23  
53) 11 2/7  
54) a) 0.65 b)  $0.\overline{81}$   
55) a) 21/50 b) 419/500  
56) 1/3  
57) A  
58) 6,760,000  
59) a) 1/13 b) 3/13 c) 0 d) 12/13  
60)  $\frac{3}{4}$   
61) 1/26  
62) C  
63) \$.33  
64) 1:2  
65) \$26
- 66) A  
67) A  
68) A  
69) A  
70) C  
71) A  
72) B  
73) A  
74) A  
75) B  
76) A  
77) B  
78) A  
79) A  
80) A  
81) a) monotonicity  
b) irrelevant alternatives  
c) majority  
d) head-to-head  
82) a) D b) A  
83) No winner (3 way tie)  
84) a) 19 b) 75 hours c) 5 hours  
85) A  
86) 3.08  
87) a) 30 in b) 75 in. c) 10 d) 51  
88) C  
89) D  
90) D  
91) 16%  
92) A  
93) C  
94) B  
95) C  
96) A  
97)  
0 | 1 1 2 3 4 7  
1 | 1 3 6  
2 | 0 1 3 4 5 6  
3 | 1 1 3 3  
98) A  
99) D  
100) C  
101) 32.83%

- 102) 715  
 103) E  
 104) A  
 105) A  
 106)  
Group A                      Group B  
 Mean: 5.125                      Mean: 10.94  
 Median: 5.5                      Median: 10.2  
 Mode: 6                      Mode: No mode  
 Midrange: 5                      Midrange: 11  
 107) a) 166 b) 7 c) 41  
 108) a) 20 b) 5 c) 6  
 109) a) Stem-and-Leaf Plot  
       b) Frequency Distribution  
       c) Histogram  
 110) a) median b) mode c) mean  
 111) random, no  
 112) Mode: 9,10; Median: 7; Mean 6.62  
 113) A  
 114) E  
 115) A  
 116) B  
 117) E  
 118) C  
 119) C  
 120) D  
 121) B  
 122) C  
 123) C  
 124) B  
 125) D  
 126) C  
 127) B  
 128) A  
 129) D  
 130) a) 13,104 b) \$209,664 \$100,336  
 131) \$244; \$1712  
 132) A  
 133) (i) \$4000; (ii) \$34,564  
 134) C  
 135) increase of 6.4%.  
 136) 64  
 137) A  
 138) \$6476  
 139) \$65940; \$63640; \$54460  
 140) A) \$8895.00 B) \$2902.50  
 141) a) \$170 b) \$17 c) \$9.61 d) \$3.40 e)  
 \$139.99 f) 17.7%  
 142) \$1164  
 143) A) (a) \$13,800; (b) \$81,607  
 144) A  
 145) A  
 146) B  
 147) B  
 148) False  
 149) False