MATH 1630 Name_____
FINAL EXAM REVIEW

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Decide whether the argument is an example of inductive or deductive reasoning.

1) Every coach knows his sport well. John Madden is a football coach. Therefore John Madden knows football well. 1) _____

2) 23 + 17 = 40, 43 + 47 = 90, 31 + 3 = 34. Therefore, the sum of two prime numbers is even. 2) _____

3) If $(-p)^2 = p^2$, then $(-7)^2 = 49$ 3) _____

Use the method of successive differences to determine the next term in the sequence.

4) 10, 22, 82, 190, 346, ... 4) _____

5) 7, 12, 30, 70, 141, 252, ... 5) _____

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Use problem solving strategies to solve the problem.

6) A rabbit grows so that every 2 months it doubles in weight. However, the rabbit will never go over 75 pounds. If a bunny is born on July 15th, weighing 2 pounds, in which month will it weigh 46 pounds? 6) _____

A) April B) February C) August D) July

7) Kelly is older than Donna but younger than Brenda. Donna is younger than Brandon. What is the first letter in the name of the oldest person? 7) _____

A) K B) S C) D D) B

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

8) A boxer takes 3 drinks of water after each of the first three rounds of a championship fight. After the fourth round he increases the number of drinks by 1. If he continues to increase his drinks by 1 after each round, how many drinks will he take between the 14th and 15th rounds? 8) _____

Solve the problem.

9) If you raise 9 to the 387th power, what is the units digit of the result? 9) _____

Find n(A) for the set.

10) A = {-8, -7, -6, ..., 0} 10) _____

11) $A = \left\{\frac{1}{2}, \frac{1}{3}, \frac{1}{4}, \frac{1}{5}, ..., \frac{1}{29}, \frac{1}{30}\right\}$ 11) _____

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Use $\subseteq$ or $\not\subseteq$ in the blank to make a true statement.

12) $\emptyset$ ___ $\emptyset$ 12) _____

A) $\subseteq$ B) $\not\subseteq$

13) {x | x is a counting number larger than 5} __ {7, 8, 9, ...} 13) _____

A) $\subseteq$ B) $\not\subseteq$

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Find the number of subsets of the set.

14) {x | x is an even number between 13 and 27} 14) _____

Find the number of proper subsets of the set.

15) {car, boat, truck, train} 15) _____

List the elements in the set .

Let U = {q, r, s, t, u, v, w, x, y, z}
A = {q, s, u, w, y}
B = {q, s, y, z}
C = {v, w, x, y, z}.

16) B ∩ C 16) _____

17) A ∩ B' 17) _____

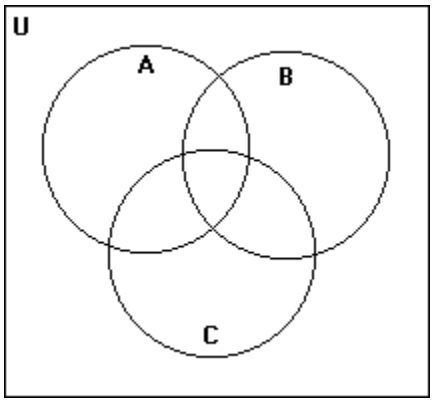
18) C' ∪ A' 18) _____

19) (A' ∪ C) ∩ B' 19) _____

20) B ∩ (A - C) 20) _____

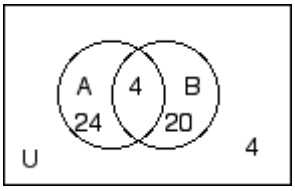
For the given sets, construct a Venn diagram and place the elements in the proper region.

21) U = {2, 4, 6, 8, 10, 12} 21) _____
A = {2, 6, 10}
B = {2, 4, 8}
C = {2, 8, 10, 12}



Find the cardinal number of the set.

22) The numbers in the Venn Diagram below represent cardinalities. 22) _____



Find n(A ∩ B').

Solve the problem.

23) A survey of a group of 116 tourists was taken in St. Louis. The survey showed the following: 23) _____

66 of the tourists plan to visit Gateway Arch;
50 plan to visit the zoo;
10 plan to visit the Art Museum and the zoo, but not the gateway Arch;
14 plan to visit the Art Museum and the Gateway Arch, but not the zoo;
18 plan to visit the Gateway Arch and the zoo, but not the Art Museum;
9 plan to visit the Art Museum, the zoo, and the Gateway Arch;
14 plan to visit none of the three places.

How many plan to visit the Art Museum only?

Write a negation for the statement.

24) Some athletes are musicians. 24) _____

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Let p represent a true statement, while q and r represent false statements. Find the truth value of the compound statement.

25) ~(p ∧ q) ∧ (r ∨ ~q) 25) _____

A) False B) True

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Construct a truth table for the statement.

26) ~s ∨ (~p ∨ s) 26) _____

Use De Morgan's laws to write the negation of the statement.

27) It is Saturday and it is not raining. 27) _____

Given p is true, q is true, and r is false, find the truth value of the statement.

28) [(~p → r) ∧ (~p ∨ q)] → r 28) _____

Construct a truth table for the statement.

29) (q → ~p) → (q ∧ ~p) 29) _____

Write the negation of the conditional. Use the fact that the negation of p → q is p ∧ ~q.

30) If the hammer is on the floor, the baby will get hurt. 30) _____

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Write the converse, inverse, or contrapositive of the statement as requested.

31) $q \rightarrow \sim p$ 31) _____

Inverse

A) $p \rightarrow \sim q$ B) $\sim p \rightarrow q$ C) $q \rightarrow p$ D) $\sim q \rightarrow p$

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Use an Euler diagram to determine whether the argument is valid or invalid.

32) Some TV shows are comedies. 32) _____

All comedies are hits.

Some TV shows are hits.

33) Some cars are considered sporty. 33) _____

Some cars are safe at high speeds.

Some sports cars are safe at high speeds.

Determine if the argument is valid or a fallacy. Give a reason to justify answer.

34) If it is cold, then you need a coat. 34) _____

You do not need a coat.

It is not cold.

35) If I'm hungry, then I will eat. 35) _____

I'm not hungry.

I will not eat.

Use a truth table to determine whether the argument is valid.

36) $p \rightarrow \sim q$ 36) _____

$q \rightarrow \sim p$

$p \vee q$

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Convert the number to decimal form.

37) 11100000_{two} 37) _____

A) 224 B) 448 C) 6 D) 22,200,000

38) $AB42_{sixteen}$ 38) _____

A) 42,842 B) 43,842 C) 43,840 D) 43,586

Convert the decimal number to the given base.

39) 6784 to base sixteen 39) _____

A) $1A80_{sixteen}$ B) $1A81_{sixteen}$ C) $1A08_{sixteen}$ D) $01A8_{sixteen}$

Convert the number to binary form.

40) 78 decimal 40) _____

A) 100111_{two} B) 1001110_{two} C) 101110_{two} D) 1011100_{two}

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Solve by the elimination method.

41) $9x - 6y = 6$
$-2x + 3y = -3$ 41) _____

Solve by the substitution method.

42) $x - 4y = 12$
$2x - 5y = 21$ 42) _____

Solve the problem.

43) There were 520 people at a play. The admission price was $2.00 for adults and $1.00 for children. The admission receipts were $690. How many adults and children attended? 43) _____

44) A musician plans to perform 5 selections for a concert. If he can choose from 9 different selections, how many ways can he arrange his program? 44) _____

45) If 11 newborn babies are randomly selected, how many different gender sequences are possible? 45) _____

46) Given a committee of 8 women and 11 men, count the number of different ways of choosing a president, a secretary, and a treasurer, if the president must be a woman and the secretary and treasurer must be men. Assume no one can hold more than one office. 46) _____

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

47) Four married couples have reserved eight seats in a row at the theater, starting at an aisle seat. In how many ways can they arrange themselves if all the women sit together and all the men sit together? 47) _____

A) 256 B) 576 C) 48 D) 1152

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

48) The library is to be given 5 books as a gift. The books will be selected from a list of 21 titles. If each book selected must have a different title, how many possible selections are there? 48) _____

49) A student is told to work any 8 out of 10 questions on an exam. In how many different ways can he complete the exam? (The correctness of his answers has no bearing.) 49) _____

50) How many five-digit counting numbers contain at least one 6? 50) _____

51) The chorus has six sopranos and eight baritones. In how many ways can the director choose a quartet that contains at least one soprano? 51) _____

Find the probability.

52) A bag contains 13 balls numbered 1 through 13. What is the probability that a randomly selected ball has an even number? 52) _____

53) Two fair 6-sided dice are rolled. What is the probability that the sum of the two numbers on the dice is greater than 10? 53) _____

Solve the problem.

54) A family has three children. What is the probability that two of the children are boys? 54) _____

Find the probability.

55) A fair die is rolled. What is the probability of rolling an odd number or a number less than 3? 55) _____

56) When two balanced dice are rolled, there are 36 possible outcomes. Find the probability that either doubles are rolled or the sum of the dice is 10. 56) _____

57) A card is drawn at random from a well-shuffled deck of 52 cards. What is the probability of drawing a face card or a red card? 57) _____

Use the general multiplication rule to find the indicated probability.

58) You are dealt two cards successively (without replacement) from a shuffled deck of 52 playing cards. Find the probability that both cards are black. 58) _____

59) You are dealt two cards successively (without replacement) from a shuffled deck of 52 playing cards. Find the probability that the first card is a king and the second card is a queen. 59) _____

Find the conditional probability.

60) If two cards are drawn at random without replacement from a standard deck, find the probability that the second card is a face card, given that the first card was a queen. 60) _____

Find the mean of the set of data.

61) 11, 10, 1, 18, 5, 5, 4, 10 61) _____

Find the median.

62) 7, 4, 26, 14, 47, 45, 33 62) _____

63) 9, 15, 28, 24, 32, 41 63) _____

Find the mode or modes.

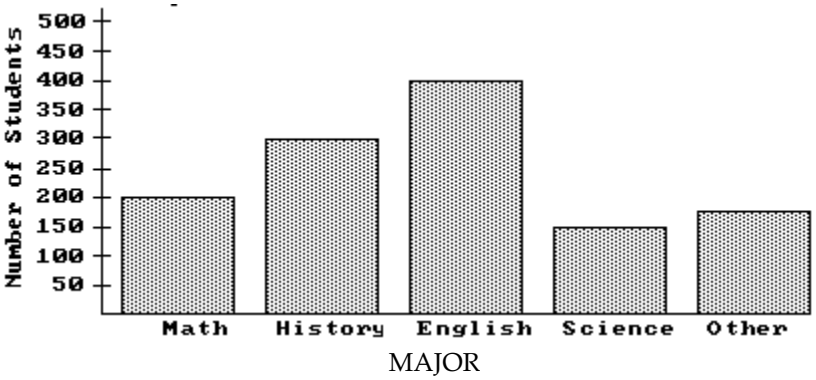
64) 61, 25, 61, 13, 25, 29, 56, 61 64) _____

Find the mean for the given frequency distribution.

65) 65) _____

Value	Frequency
14	1
19	6
24	4
29	3
35	2

The bar graph below shows the number of students by major in the College of Arts and Sciences. Answer the question

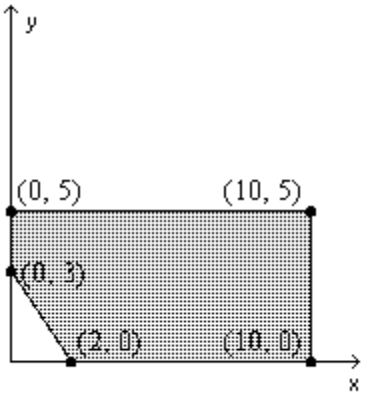


66) How many more English majors are there than history majors? 66) _____

67) Which two majors are the most popular? 67) _____

The graph shows a region of feasible solutions. Find the maximum or minimum values of the given expression.

68) Find the maximum and minimum of 20x + 5y. 68) _____



MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Solve the linear programming problem.

69) Stan and Ron's hobby is building birdhouses. The number of wren houses cannot exceed 4 times the number of martin houses. They cannot make more than 60 wren houses or more than 20 martin houses. The total production cannot exceed 75. The profit on a wren house is $8.70 and the profit on a martin house is $5.10. Find the maximum profit. 69) _____

A) $102.00 B) $598.50 C) $454.50 D) $798.00

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

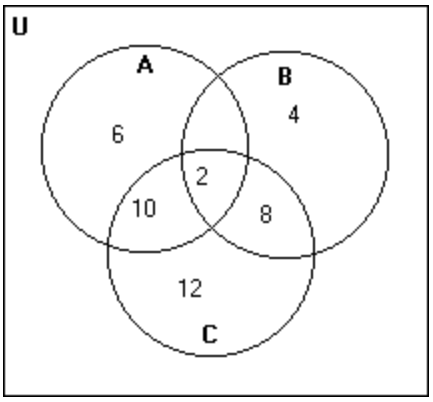
Find the median.

70) 5, 3, 28, 12, 47, 43, 43 70) _____

Find the mode or modes.

71) 5, 9, 87, 3, 2, 8, 76, 1, 4, 16 71) _____

1) Deductive
2) Inductive
3) Deductive
4) 550
5) 412
6) A
7) D
8) 14 drinks
9) 9
10) n(A) = 9
11) n(A) = 29
12) A
13) B
14) 128
15) 15
16) {y, z}
17) {u, w}
18) {q, r, s, t, u, v, x, z}
19) {r, t, v, w, x}
20) {q, s}
21)



22) 24
23) 13
24) No athlete is a musician.
25) B
26)

s	p	~s ∨ (~p ∨ s)
T	T	T
T	F	T
F	T	T
F	F	T

27) It is not Saturday or it is raining.
28) False
29)

q	p	(q → ~p) → (q ∧ ~p)
T	T	T
T	F	T
F	T	F
F	F	F

30) The hammer is on the floor and the baby will not get hurt.
31) D
32) Valid

33) Invalid
34) Valid by modus tollens
35) Fallacy by fallacy of the inverse
36) Invalid
37) A
38) B
39) A
40) B
41) {(0, -1)}
42) {(8, -1)}
43) 170 adults and 350 children
44) 15,120
45) 2048
46) 880
47) D
48) 20,349
49) 45
50) 37,512
51) 931 ways
52) $\frac{6}{13}$
53) $\frac{1}{12}$
54) $\frac{3}{8}$
55) $\frac{2}{3}$
56) $\frac{2}{9}$
57) $\frac{8}{13}$
58) $\frac{25}{102}$
59) $\frac{4}{663}$
60) $\frac{11}{51}$
61) 8
62) 26
63) 26
64) 61
65) 23.8
66) 100
67) English and history
68) 225, 15
69) B
70) 28
71) No mode