Exam 1 Study Guide MATH 1010

Name_____

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

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

1) The last four mayors were Democrats. Therefore, the next will be a Democrat. 1) _____

A) Inductive B) Deductive

2) $|-p| = p$, therefore $|-73| = 73$ 2) _____

A) Inductive B) Deductive

Determine the most probable next term in the sequence.

3) 1, 4, 1, 4, 4, 1, 4, 4, 4, 1, 4, 4, 4, 4, 1, 4, 4, 4, 4, 4 3) _____

A) 4 B) $\frac{1}{4}$ C) 1 D) 14

4) 0005, 0050, 0500, 5000, 5005 4) _____

A) 5050 B) 5000 C) 5500 D) 5006

Use inductive reasoning to predict the next equation.

5) $\frac{1}{3} = \frac{1}{2}\left(1 - \frac{1}{3}\right)$

$\frac{1}{3} + \frac{1}{9} = \frac{1}{2}\left(1 - \frac{1}{9}\right)$

$\frac{1}{3} + \frac{1}{9} + \frac{1}{27} = \frac{1}{2}\left(1 - \frac{1}{27}\right)$

$\frac{1}{3} + \frac{1}{9} + \frac{1}{27} + \frac{1}{81} = \frac{1}{2}\left(1 - \frac{1}{81}\right)$ 5) _____

A) $\frac{1}{3} + \frac{1}{9} + \frac{1}{27} + \frac{1}{81} + \frac{1}{243} = \frac{1}{3}\left(1 - \frac{1}{243}\right)$

B) $\frac{1}{3} + \frac{1}{9} + \frac{1}{27} + \frac{1}{81} + \frac{1}{729} = \frac{1}{2}\left(1 - \frac{1}{729}\right)$

C) $\frac{1}{3} + \frac{1}{9} + \frac{1}{27} + \frac{1}{81} + \frac{1}{243} = \frac{1}{2}\left(1 - \frac{1}{243}\right)$

D) $\frac{1}{3} + \frac{1}{9} + \frac{1}{27} + \frac{1}{81} + \frac{1}{162} = \frac{1}{2}\left(1 - \frac{1}{162}\right)$

Use the method of Gauss to find the sum.

6) $1 + 2 + 3 + \ldots + 650$ 6) _____

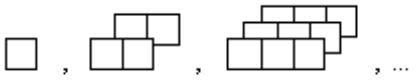
A) 422,500 B) 105,625 C) 211,250 D) 211,575

7) $4 + 8 + 12 + \ldots + 300$ 7) _____

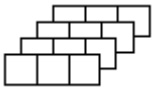
A) 11,250 B) 1406.25 C) 90,000 D) 11,400

Find a pattern and use it to solve the problem.

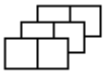
8) Draw the next figure in the pattern. 8) _____



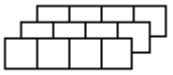
A)



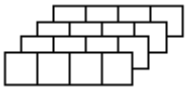
B)



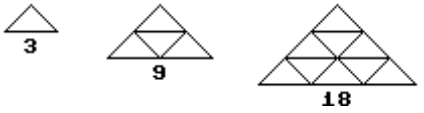
C)



D)



9) How many line segments are used in the next figure? 9) _____



A) 27 B) 30 C) 36 D) 24

Determine if the sequence is an arithmetic sequence, a geometric sequence, or neither. If it is either arithmetic or geometric, give the next term in the sequence.

10) 0, 7, 14, 28, 42, . . . 10) _____

A) arithmetic; 56 B) geometric; 56 C) neither

11) 9, 29, 49, 69, 89, . . . 11) _____

A) geometric; 109 B) neither C) arithmetic; 109

12) 5, 15, 45, 135, 405, . . . 12) _____

A) geometric; 1215 B) arithmetic; 1215 C) neither

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

13) 14, 25, 66, 137, 238, . . . 13) _____

A) 369 B) 399 C) 398 D) 339

Determine what the next equation would be, and verify that it is indeed a true statement.

14) 50 - 9 = 41 14) _____
500 - 89 = 411
5000 - 789 = 4211

A) 50,000 - 6,789 = 43,211 B) 50,000 - 6,789 = 493,211
C) 5000 - 6,789 = 43,211 D) 500,000 - 6,789 = 43,211

Use the indicated formula to find the sum.

15) Use $S = \frac{n(n+1)}{2}$ to find the sum of $1 + 2 + 3 + \ldots + 300$. 15) _____

A) 45,000 B) 45,150 C) 4515 D) 44,850

Use the appropriate formula to find the indicated figurate number.

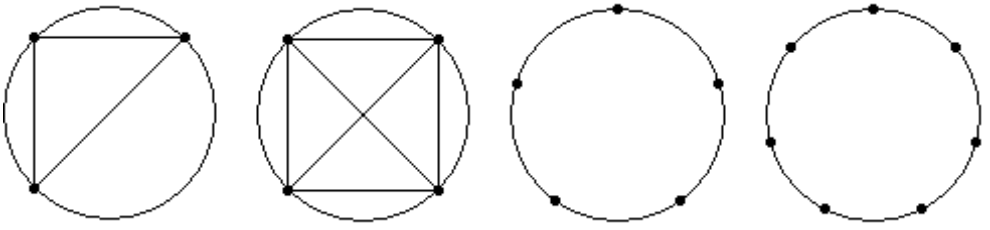
16) the 6th pentagonal number 16) _____

A) $P_6 = 57$ B) $P_6 = 21$ C) $P_6 = 36$ D) $P_6 = 51$

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

Solve the problem using inductive reasoning.

17) How many line segments are determined by joining dots on the last two circles? 17) _____



3 segments 6 segments ___ segments ___ segments

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

Determine the indicated term in the given sequence.

18) The 16th term of $\frac{4}{7}, \frac{5}{7}, \frac{6}{7}, \ldots$ 18) _____

A) $\frac{16}{7}$ B) $\frac{19}{7}$ C) $\frac{17}{7}$ D) $\frac{18}{7}$

Use logic to solve the problem.

19) In India, water lilies grow extremely fast. In one pond, a lily grew so fast that each day it doubled the area it covered. In 26 days it covered the pond. How long would it take 2 such lilies to cover the pond? 19) _____

A) 13 B) 6 C) 25 D) 26

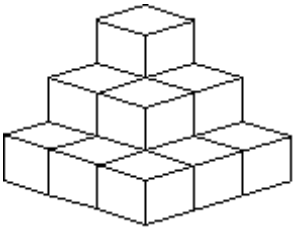
Solve the problem.

20) If you raise 9 to the 387th power, what is the units digit of the result? 20) _____

A) 7 B) 9 C) 1 D) 6

Determine the number of figures (of any size) in the design.

21) Cubes (of any size) 21) _____



A) 15 B) 14 C) 10 D) 9

List the elements in the set.

22) { x | x is an even integer smaller than 8} 22) _____

A) {0, 2, 4, 6} B) {2, 4, 6}

C) {..., -6, -4, -2, 2, 4, 6} D) {..., -6, -4, -2, 0, 2, 4, 6}

Identify the set as finite or infinite.

23) {x | x is a fraction between 63 and 64} 23) _____

A) Infinite B) Finite

Find n(A) for the set.

24) A = {700, 701, 702, ..., 7000} 24) _____

A) n(A) = 4 B) n(A) = 6301 C) n(A) = 6300 D) n(A) = 7000

Tell whether the statement is true or false.

25) {s, q, y, o, d} = {o, d, q, s, y} 25) _____

A) True B) False

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

26) {4, 6, 8} __ {3, 4, 5, 6, 8} 26) _____

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

Determine whether the statement is true or false.

Let A = {1, 3, 5, 7}
B = {5, 6, 7, 8}
C = {5, 8}
D = {2, 5, 8}
U = {1, 2, 3, 4, 5, 6, 7, 8}

27) D $\subseteq$ B 27) _____

A) True B) False

Find the number of subsets of the set.

28) {7, 8, 9} 28) _____

A) 7 B) 8 C) 6 D) 3

Find the number of proper subsets of the set.

29) {5, 6, 7} 29) _____

A) 7 B) 5 C) 6 D) 2

Let U = {1, 2, 4, 5, a, b, c, d, e}. Find the complement of the set.

30) C = {1, 2, 5, b, d} 30) _____

A) {4, a, b, c, e} B) {4, a, c, e} C) {3, 4, a, b, c, e} D) {3, 4, a, c, e}

The lists below show five agricultural crops in Alabama, Arkansas, and Louisiana.

Alabama	Arkansas	Louisiana
soybeans (s)	soybeans (s)	soybeans (s)
peanuts (p)	rice (r)	sugarcane (n)
corn (c)	cotton (t)	rice (r)
hay (h)	hay (h)	corn (c)
wheat (w)	wheat (w)	cotton (t)

Let U be the smallest possible universal set that includes all of the crops listed, and let A, K and L be the sets of five crops in Alabama, Arkansas, and Louisiana, respectively. Find each of the following sets.

31) The set of crops in U. 31) _____

A) {c, h, n, p, r, s, t, w}
B) {s, p, c, w, r, t, n}
C) {s, p, c, h, w, s, r, t, h, w, s, n, r, c, t}
D) {s, p, c, h, w, r, t, n, c}

Solve the problem.

32) List all possible proper subsets of the set {2, 6, 7}. 32) _____

A) {2}, {6}, {7}, {2, 6}, {2, 7}, {6, 7}
B) {2}, {6}, {7}, {2, 6}, {2, 7}, {6, 7}, {2, 6, 7}
C) ∅, {2}, {6}, {7}, {2, 6}, {2, 7}, {6, 7}, {2, 6, 7}
D) ∅, {2}, {6}, {7}, {2, 6}, {2, 7}, {6, 7}

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}.

33) $A \cap B'$ 33) _____

A) {r, s, t, u, v, w, x, z}
B) {t, v, x}
C) {u, w}
D) {q, s, t, u, v, w, x, y}

34) $A \cup (B \cap C)$ 34) _____

A) {q, s, u, w, y, z}
B) {q, y, z}
C) {q, w, y}
D) {q, r, w, y, z}

Let U = {all soda pops}, A = {all diet soda pops}, B = {all cola soda pops}, C = {all soda pops in cans}, and D = {all caffeine-free soda pops}. Describe the set in words.

35) $A' \cap C$ 35) _____

A) All non-diet soda pops and all soda pops in cans
B) All diet soda pops and all soda pops in cans
C) All non-diet soda pops in cans
D) All diet soda pops in cans

The lists below show five agricultural crops in Alabama, Arkansas, and Louisiana.

Alabama	Arkansas	Louisiana
soybeans (s)	soybeans (s)	soybeans (s)
peanuts (p)	rice (r)	sugarcane (n)
corn (c)	cotton (t)	rice (r)
hay (h)	hay (h)	corn (c)
wheat (w)	wheat (w)	cotton (t)

Let U be the smallest possible universal set that includes all of the crops listed, and let A, K and L be the sets of five crops in Alabama, Arkansas, and Louisiana, respectively. Find each of the following sets.

36) $A' \cap K'$ 36) _____

A) $\emptyset$ B) {c, n, p, r, t} C) {c, p, r, t} D) {n}

Let A and B be sets with cardinal numbers, n(A) = a and n(B) = b, respectively. Decide whether the statement is true or false.

37) $n(A \cup B) = n(A) + n(B) - n(A \cap B)$ 37) _____

A) True B) False

Tell whether the statement is true or false.

38) {3, 9, 15} = {0, 3, 9, 15} 38) _____

A) True B) False

Find the Cartesian product.

39) A = {8, 4, 11} 39) _____

B = {14, 15}

Find A × B.

A) {(8, 14), (8, 15), (4, 14), (4, 15), (11, 14), (11, 15)}

B) {(14, 8), (14, 4), (14, 11), (15, 8), (15, 4), (15, 11)}

C) {(8, 14), (4, 15)}

D) {(8, 14), (4, 11), (11, 14)}

Find the indicated cardinal number.

40) Find n(A × B) given that A = {2} and B = {1, 3}. 40) _____

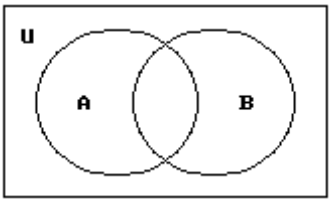
A) 1 B) 4 C) 3 D) 2

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

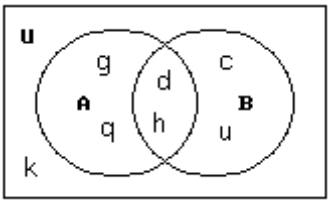
41) Let U = {c, d, g, h, k, u, q} 41) _____

A = {d, h, g, q}

B = {c, d, h, u}



A)



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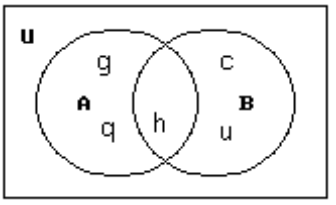
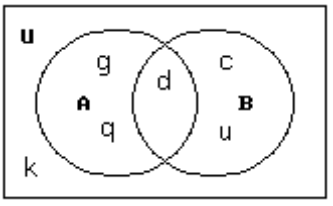
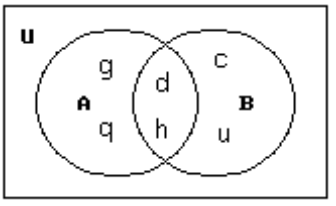


C)

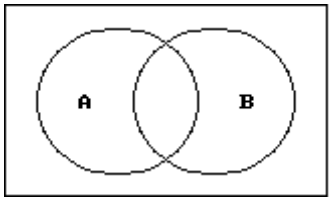


D)

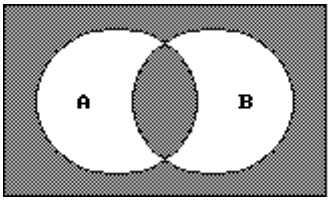


Shade the regions representing the set.

42) A' ∩ B' 42) _____



A)



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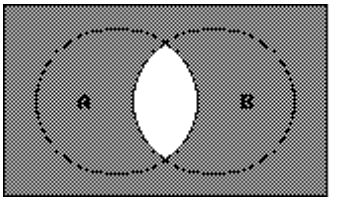

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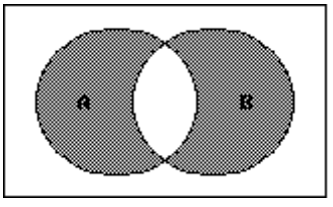

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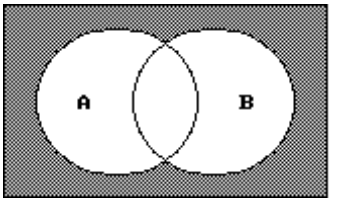
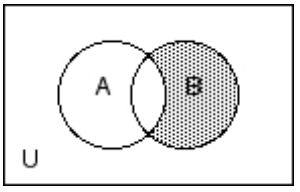


Write a description of the shaded region using the symbols A, B, C, ∪, ∩, -, and ′ as needed.

43) 43) _____



A) B - A′ B) B ∩ A′ C) A - B D) A ∩ B′

Decide whether the given statement is always true or not always true.

44) (A ∩ B) ⊆ B 44) _____

A) Not always true B) Always true

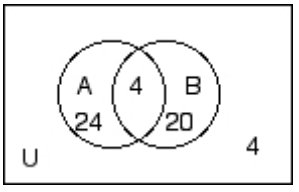
Describe the conditions under which the statement is true.

45) A ∩ A' = A 45) _____

A) A = ∅ B) A = U C) A ≠ ∅ D) Always true

Find the cardinal number of the set.

46) The numbers in the Venn Diagram below represent cardinalities. 46) _____



Find n(A ∪ B).

A) 52 B) 4 C) 24 D) 48

Find the cardinal number of the indicated set. Use the cardinal number formula.

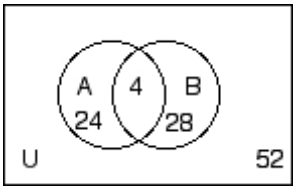
47) If n(A) = 40, n(B) = 117 and n(A ∪ B) = 137, what is n(A ∩ B)? 47) _____

A) 10 B) 22 C) 20 D) 60

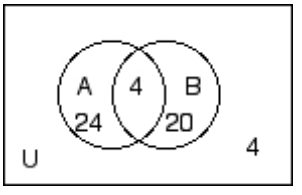
Draw an appropriate Venn diagram and use the given information to fill in the number of elements in each region.

48) n(U) = 52, n(A) = 28, n(A ∩ B) = 4, n(B′) = 28 48) _____

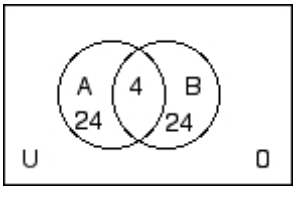
A)



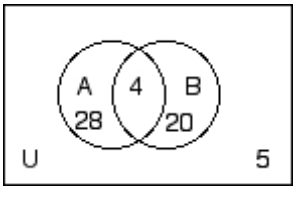
B)



C)



D)



1) A
2) B
3) C
4) A
5) C
6) D
7) D
8) D
9) B
10) C
11) C
12) A
13) A
14) A
15) B
16) D
17) 4 + 3 + 2 + 1 = 10 segments
    6 + 5 + 4 + 3 + 2 + 1 = 21 segments
18) B
19) C
20) B
21) A
22) D
23) A
24) B
25) A
26) A
27) B
28) B
29) A
30) B
31) A
32) D
33) C
34) A
35) C
36) D
37) A
38) B
39) A
40) D
41) A
42) D
43) B
44) B
45) A
46) D
47) C
48) B