MATH 1630

Exam 1 Review Problems

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 answers were false. Therefore, the next will be false.
   A) Inductive  
   B) Deductive

2) Fresh fruit costs more in winter. This is January. Therefore these fresh strawberries will cost more.
   A) Inductive  
   B) Deductive

3) $23 + 17 = 40$, $43 + 47 = 90$, $31 + 3 = 34$. Therefore, the sum of two prime numbers is even.
   A) Deductive  
   B) Inductive

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

Determine the most probable next term in the sequence.

4) 34, 28, 22, 16, 10
4) __________

5) \( \frac{3}{2}, \frac{5}{4}, \frac{7}{6}, \frac{9}{8}, \frac{11}{10} \)
5) __________

6) 1, 4, 2, 8, 4, 16
6) __________

Use inductive reasoning to predict the next equation.

7) \( 6 \times 8 = 7 \times 9 - 15 \)
  \( 8 \times 10 = 9 \times 11 - 19 \)
7) __________

8) \( (5 \times 1) \times (2 \times 1) = 10 \)
  \( (5 \times 10) \times (2 \times 2) = 200 \)
  \( (5 \times 100) \times (2 \times 3) = 3000 \)
8) __________

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

Use the method of Gauss to find the sum.

9) \( 1 + 2 + 3 + \ldots + 850 \)
   A) 722,500  
   B) 361,250  
   C) 180,625  
   D) 361,675
9) _______

10) \( 1 + 2 + 3 + \ldots + 875 \)
    A) 767,376  
    B) 383,250  
    C) 382,812.5  
    D) 191,406.25
10) _______

Use the indicated formula to find the sum.

11) Use \( S = n^2 \) to find the sum of \( 1 + 3 + 5 + \ldots + 701 \).
    A) 122,500  
    B) 123,200  
    C) 123,201  
    D) 123,202
11) _______

12) Use \( S = n^2 \) to find the sum of \( 1 + 3 + 5 + \ldots + 999 \).
    A) 249,001  
    B) 498,002  
    C) 62,500  
    D) 250,000
12) _______
Use the method of successive differences to determine the next term in the sequence.
13) 14, 20, 31, 47, 68, ...
   A) 98       B) 89       C) 99       D) 94

14) 10, 22, 82, 190, 346, ...
   A) 550      B) 597      C) 598      D) 502

Determine what the next equation would be, and verify that it is indeed a true statement.
15) 14 + 41 = 55
    15 + 51 = 66
   A) 44 + 33 = 77   B) 61 + 16 = 77   C) 16 + 61 = 82   D) 16 + 61 = 77

16) 32 + 10 = 42
    43 + 21 = 64
    54 + 32 = 86
   A) 56 + 43 = 99   B) 65 + 43 = 108  C) 65 + 32 = 97   D) 64 + 53 = 117

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)

18) Find the number of games played in a round robin tournament for the given numbers of teams. In a round robin tournament every team plays every other team once.

<table>
<thead>
<tr>
<th>Number of teams</th>
<th>Number of games played</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 teams</td>
<td>3 games</td>
</tr>
<tr>
<td>4 teams</td>
<td>6 games</td>
</tr>
<tr>
<td>5 teams</td>
<td>10 games</td>
</tr>
<tr>
<td>6 teams</td>
<td></td>
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<tr>
<td>7 teams</td>
<td></td>
</tr>
</tbody>
</table>

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

Use problem solving strategies to solve the problem.
19) 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?
   A) August       B) February      C) April       D) July

2
20) 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?
   A) B  
   B) D  
   C) K  
   D) S

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

Solve the problem.
   21) If you raise 9 to the 387th power, what is the units digit of the result?  
   21) ________________

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

   22) If you raise 4 to the 214th power, what is the units digit of the result?
       A) 2  
       B) 6  
       C) 4  
       D) 8

   22) ________________

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

List the elements in the set.
   23) \{x \mid x \text{ is an integer between } 3 \text{ and } 7\}  
   23) ________________

   24) \{x \mid x \text{ is a negative multiple of } 5\}  
   24) ________________

   25) \{x \mid x \text{ is a counting number less than } -4\}  
   25) ________________

Identify the set as finite or infinite.
   26) \{x \mid x \text{ is an odd counting number}\}  
   26) ________________

   27) \left\{ \frac{1}{2}, \frac{5}{2}, \frac{25}{4}, \frac{125}{8}, \ldots, \frac{3125}{32}, \frac{16807}{256} \right\}  
   27) ________________

Find \(n(A)\) for the set.
   28) \(A = \{300, 301, 302, \ldots, 3000\}\)  
   28) ________________

   29) \(A = \{x \mid x \text{ is a month in the year}\}\)  
   29) ________________

   30) \(A = \left\{ \frac{1}{2}, -\frac{1}{2}, \frac{2}{3}, -\frac{2}{3}, \frac{3}{4}, -\frac{3}{4}, \ldots, \frac{19}{20}, -\frac{19}{20} \right\}\)  
   30) ________________

Tell whether the statement is true or false.
   31) \(6 \subseteq \{x \mid x \text{ is an even counting number between } 8 \text{ and } 14\}\)  
   31) ________________

   32) \(\{s, q, y, o, d\} = \{o, d, q, s, y\}\)  
   32) ________________

   33) \(9 \notin \{x \mid x \text{ is an even counting number}\}\)  
   33) ________________
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.

34) \( \{6, 8, 10\} \, \_\, \_\, \{5, 6, 7, 8, 10\} \)
   A) \( \subseteq \) B) \( \not\subseteq \)

35) \( \{5, 23, 28\} \, \_\, \_\, \{6, 23, 28, 38\} \)
   A) \( \not\subseteq \) B) \( \subseteq \)

36) \( \emptyset \, \_\, \emptyset \)
   A) \( \subseteq \) B) \( \not\subseteq \)

37) \( \{x \mid x \text{ is a counting number larger than } 5\} \, \_\, \{7, 8, 9, \ldots\} \)
   A) \( \not\subseteq \) B) \( \subseteq \)

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

Determine whether the statement is true or false.

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

38) \( C \subseteq D \)
39) \( \emptyset \subseteq A \)
40) \( \{5\} \subseteq D \)

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

Find the number of subsets of the set.

41) \( \{6, 7, 8\} \)
   A) 3 B) 7 C) 6 D) 8

42) \( \{x \mid x \text{ is an even number between } 13 \text{ and } 27\} \)
   A) 128 B) 40 C) 6 D) 64

Find the number of proper subsets of the set.

43) \( \{3, 4, 5\} \)
   A) 6 B) 2 C) 5 D) 7

44) \( \{x \mid x \text{ is a day of the week}\} \)
   A) 127 B) 256 C) 64 D) 128

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

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

45) \( Q = \{2, 4, b, d\} \)
45) ______________
MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Solve the problem.

48) List all possible subsets of the set \{m, n\}.
   A) \{m\}, \{n\}  
   B) \{m\}, \{n\}, \emptyset  
   C) \{m\}, \{n\}, \{m, n\}, \emptyset  
   D) \{m\}, \{n\}, \{m, n\}

49) A committee is to be formed. Possible candidates for the committee are Eric, Frances, Greg, and Jose. Denoting these four people by e, f, g, j, list all possible committees of two people (ie list all possible subsets of size two).
   A) \{e, f\}, \{e, g\}, \{f, g\}, \{g, j\}  
   B) \{e, f\}, \{e, g\}, \{e, j\}, \{f, j\}, \{g, j\}  
   C) \{e, f\}, \{e, g\}, \{e, j\}, \{f, g\}, \{f, i\}, \{g, j\}, \{f, e\}, \{g, e\}  
   D) \{e, f\}, \{e, g\}, \{e, j\}, \{f, g\}, \{f, j\}, \{g, j\}

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

List the elements in the set.
Let \(U = \{q, r, s, t, u, v, w, x, y, z\}\)
   \(A = \{q, s, u, w, y\}\)  
   \(B = \{q, s, y, z\}\)  
   \(C = \{v, w, x, y, z\}\).

50) \(A \cup C\) 
51) \(A \cap B'\) 
52) \((A \cup B)'\) 
53) \(C - A\) 
54) \((A' \cup C) \cap B'\) 
55) \(B \cap (A - C)\)

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

Tell whether the statement is true or false.

56) \((11, 9) = (9, 11)\)
   A) True  
   B) False
Find the Cartesian product.

57) \( A = \{12, 9, 10\} \)
\( B = \{14, 4\} \)
Find \( A \times B \).

A) \( \{(14, 12), (14, 9), (14, 10), (4, 12), (4, 9), (4, 10)\} \)
B) \( \{(12, 14), (12, 4), (9, 14), (9, 4), (10, 14), (10, 4)\} \)
C) \( \{(12, 14), (9, 4)\} \)
D) \( \{(12, 14), (9, 10), (10, 14)\} \)

58) \( A = \{0\} \)
\( B = \{11, 21, 31\} \)
Find \( B \times A \).

A) \( \{(11, 0), (21, 0), (31, 0)\} \)
B) \( \{0\} \)
C) \( \{0, 0, 0\} \)
D) \( \{(0, 11), (0, 21), (0, 31)\} \)

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

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

59) Let \( U = \{c, d, g, h, k, u, q\} \)
\( A = \{d, h, g, q\} \)
\( B = \{c, d, h, u\} \)

60) Let \( U = \{1, 2, 3, 4, 5, 6, 7, 8\} \)
\( A = \{3, 6, 8\} \)
\( B = \{4, 6\} \)
\( C = \{1, 6, 7, 8\} \)
Find the cardinal number of the set.

61) The numbers in the Venn Diagram below represent cardinalities.

Find \( n(A \cup B) \).

Find \( n(A' \cap B' \cap C) \).

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

Solve the problem.

63) Mrs. Bollo’s second grade class of thirty students conducted a pet ownership survey. Results of the survey indicate that 8 students own a cat, 15 students own a dog, and 5 students own both a cat and a dog. How many of the students surveyed own only a cat?

A) 3  B) 15  C) 8  D) 18

64) A local television station sent out questionnaires to determine if viewers would rather see a documentary, an interview show, or reruns of a game show. There were 850 responses with the following results:

255 were interested in an interview show and a documentary, but not reruns.
34 were interested in an interview show and reruns but not a documentary.
119 were interested in reruns but not an interview show.
204 were interested in an interview show but not a documentary.
85 were interested in a documentary and reruns.
51 were interested in an interview show and reruns.
68 were interested in none of the three.

How many are interested in exactly one kind of show?

A) 388  B) 418  C) 398  D) 408
1) A
2) B
3) B
4) 4
5) 13
6) 12
7) 8
8) 10 \times 12 = 11 \times 13 - 23
9) D
10) B
11) C
12) D
13) D
14) A
15) D
16) B
17) 4 + 3 + 2 + 1 = 10 segments
   6 + 5 + 4 + 3 + 2 + 1 = 21 segments
18) 5 + 4 + 3 + 2 + 1 = 15 games
   6 + 5 + 4 + 3 + 2 + 1 = 21 games
19) C
20) A
21) 9
22) B
23) [4, 5, 6]
24) [-5, -10, -15, ...]
25) \emptyset
26) Infinite
27) Finite
28) n(A) = 2701
29) n(A) = 12
30) n(A) = 38
31) False
32) True
33) True
34) A
35) A
36) A
37) A
38) True
39) True
40) True
41) D
42) A
43) D
44) A
45) [1, 5, a, c, e]
46) [1, 2, 4, 5, e]
Answer Key
Testname: EXAM 1 REVIEW PROBLEMS

47) U
48) C
49) D
50) \{q, s, u, v, w, x, y, z\}
51) \{u, w\}
52) \{r, t, v, x\}
53) \{v, x, z\}
54) \{r, t, v, w, x\}
55) \{q, s\}
56) B
57) B
58) A
59)

60)

61) 48
62) 14
63) A
64) D