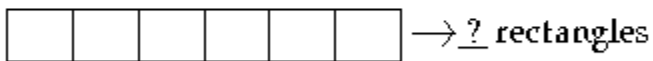
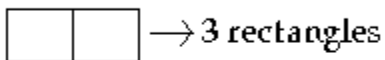
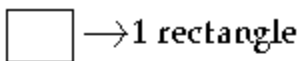


MA 21 Exam 1 review

Solve the problem using inductive reasoning.

1) How many rectangles are there in the last two figures?



Find $n(A)$ for the set.

2) $A = \{x | x \in \mathbb{N} \text{ and } 14 \leq x \leq 24\}$

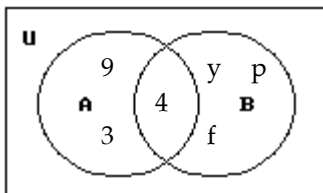
Determine whether the sets are equal, equivalent, both, or neither.

3) $\{1/10, 2/10, 3/10\}$ and $\{.1, .2, .3\}$

4) Determine the number of subsets of $\{1, 2, 3, \dots, 8\}$

5) Use the Venn diagram to find the requested set

Find $A' \cap B'$.



6) Let $U = \{q, r, s, t, u, v, w, x, y, z\}$

$A = \{q, s, u, w, y\}$

$B = \{q, s, y, z\}$

$C = \{v, w, x, y, z\}$. List the elements in the set.

$A \cap (B \cup C)$

7) A local television station sends out questionnaires to determine if viewers would rather see a documentary, an interview show, or reruns of a game show. There were 300 responses with the following results:

90 were interested in an interview show and a documentary, but not reruns.

12 were interested in an interview show and reruns but not a documentary

42 were interested in reruns but not an interview show.

72 were interested in an interview show but not a documentary.

30 were interested in a documentary and reruns.

18 were interested in an interview show and reruns.

24 were interested in none of the three.

How many are interested in exactly one kind of show?

Use Venn diagrams to determine whether the following statements are equal for all sets A and B.

8) $A' \cap B'$, $A \cup B$

9) $(A \cup B)'$, $(A' \cap B)'$

Show that the set is infinite by placing it in a one-to-one correspondence with a proper subset of itself. Be sure to show the pairing of the general terms in the sets.

10) $\{6, 8, 10, 12, \dots\}$

11) $\left\{\frac{4}{9}, \frac{5}{9}, \frac{6}{9}, \frac{7}{9}, \dots\right\}$

Show that the set has cardinal number \aleph_0 by establishing a one-to-one correspondence between the set of counting numbers and the given set. Be sure to show the pairing of the general terms in the sets.

12) $\left\{\frac{1}{4}, \frac{1}{5}, \frac{1}{6}, \frac{1}{7}, \dots\right\}$

List all subsets or determine the number of subsets as requested.

13) Determine the number of subsets of $\{1, 2, 3, \dots, 6\}$

14) Determine the number of subsets of $\{\text{mom, dad, son, daughter}\}$

If the statement is true for all sets A and B, answer "true." If it is not true for all sets A and B, answer "false." Assume that $A \neq \emptyset$, $U \neq \emptyset$, and $A \subset U$.

15) $\emptyset \subset \emptyset$

16) If $B \subset A$, then $B \subseteq A$.

17) $U \subset U$

TRUE/FALSE. Write 'T' if the statement is true and 'F' if the statement is false.

Let $A = \{1, 3, 5, 7\}$

$B = \{5, 6, 7, 8\}$

$C = \{5, 8\}$

$D = \{2, 5, 8\}$

$U = \{1, 2, 3, 4, 5, 6, 7, 8\}$.

Determine whether the statement is true or false.

18) $A \neq \{7, 5, 3, 1\}$

19) $C \subset D$

Use \subseteq , $\not\subseteq$, \subset , or both \subset and \subseteq to make a true statement.

20) $\{0\}$ _____ \emptyset

21) $\{a, b\}$ _____ $\{z, a, y, b, x, c\}$

22) $\{x \mid x \in \mathbb{N} \text{ and } x > 9\}$ _____ $\{x \mid x \in \mathbb{N} \text{ and } 1 < x \leq 9\}$

Write the set in set-builder notation.

23) $\{49, 56, 63, 70, \dots, 119\}$

Identify the set as finite or infinite.

24) The set of even whole numbers less than 50

25) $\{x \mid x \text{ is a fraction between } 32 \text{ and } 33\}$

Complete the magic (addition) square.

26) Use each number 14, 15, 16, 17, 18, 19, 20, 21, and 22 once.

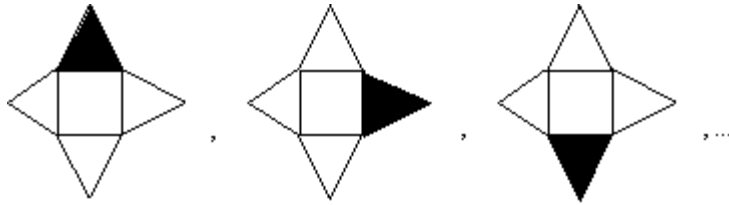
21		17
14	18	
	20	15

Use inductive reasoning to predict the next line in the pattern.

- 27) $(6 \times 1) \times (2 \times 1) = 12$
- $(6 \times 10) \times (2 \times 2) = 240$
- $(6 \times 100) \times (2 \times 3) = 3600$

Draw the next figure in the pattern.

28)



Determine whether the sets are equal, equivalent, both, or neither.

29) $\{L, M, N, O\}$ and $\{l, m, n, o\}$

30) $\{56, 97, 29\}$ and $\{97, 29, 56\}$

Answer Key

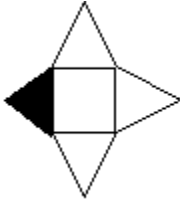
- 1) Answer: $6 + 5 + 4 + 3 + 2 + 1 = 21$ rectangles
 $10 + 9 + 8 + 7 + 6 + 5 + 4 + 3 + 2 + 1 = 55$ rectangles
- 2) Answer: 11
- 3) Answer: Both
- 4) Answer: 256
- 5) Answer: \emptyset
- 6) Answer: {q, s, w, y}
- 7) Answer: 144
- 8) Answer: not equal
- 9) Answer: not equal
- 10) Answer: { 6, 8, 10, 12, ..., $2n + 4$, ... }
- $\downarrow \quad \downarrow \quad \downarrow \quad \downarrow \quad \downarrow$
 { 8, 10, 12, 14, ..., $2n + 6$, ... }
- 11) Answer: $\left\{ \frac{4}{9}, \frac{5}{9}, \frac{6}{9}, \frac{7}{9}, \dots, \frac{n+3}{9} \right\}$
- $\downarrow \quad \downarrow \quad \downarrow \quad \downarrow \quad \downarrow$
 $\left\{ \frac{5}{9}, \frac{6}{9}, \frac{7}{9}, \frac{8}{9}, \dots, \frac{n+4}{9} \right\}$
- 12) Answer: { 1, 2, 3, 4, ..., n, ... }
- $\downarrow \quad \downarrow \quad \downarrow \quad \downarrow \quad \downarrow$
 $\left\{ \frac{1}{4}, \frac{1}{5}, \frac{1}{6}, \frac{1}{7}, \dots, \frac{1}{n+3}, \dots \right\}$
- 13) Answer: 64
- 14) Answer: 16
- 15) Answer: True
- 16) Answer: True
- 17) Answer: False
- 18) Answer: FALSE
- 19) Answer: TRUE
- 20) Answer: $\not\subseteq$
- 21) Answer: \subset and \subseteq
- 22) Answer: $\not\subseteq$
- 23) Answer: {x | x is a multiple of 7 between 42 and 126}
- 24) Answer: Finite
- 25) Answer: Infinite
- 26) Answer:

21	16	17
14	18	22
19	20	15

- 27) Answer: $(6 \times 1000) \times (2 \times 4) = 48,000$

Answer Key

28) Answer:



29) Answer: Equivalent

30) Answer: Both