

Review for Test

*Defn's
Complement
Disjoint Set
Universal Set
Symbols: $\cup, \cap, \setminus, \{ \}$
 \subseteq "is a subset of"*

1. Carlos surveyed 50 students about their favorite subjects in school. He recorded his results.

Favorite Subject	Number of Students
mathematics	18
science	15
neither mathematics nor science	20

Write the following using set notation.

Determine how many students like:

- a) mathematics and science.
- b) Only math
- c) Science but not math.

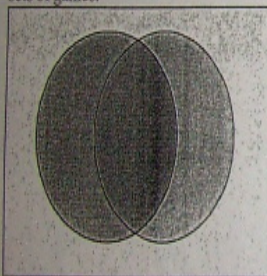
2. Mrs. Lam's physics class is visiting the local amusement park. She has 32 students. Of these students, 20 plan to ride the roller coaster and 15 plan to ride the vertical drop. There are 8 students who do not plan to ride either attraction.

Determine how many students plan to ride both the roller coaster and the vertical drop.

3. Given the following situation:
- the universal set $U = \{\text{positive integers less than } 20\}$
 - $X = \{4, 5, 6, 7, 8\}$
 - $P = \{\text{prime numbers of } U\}$
 - $O = \{\text{odd numbers of } U\}$

Determine $n(X \cap P)$.

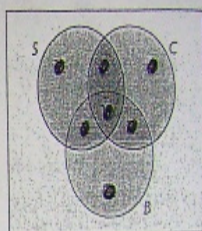
4. Games that use a board include chess, Clue, checkers, Go, Scrabble, and Monopoly. Games that use cards include Hearts, Monopoly, Snap, and Clue. Draw a Venn diagram to represent these two sets of games.



5. Using your answer in question #4, determine the union and intersection of these two sets.

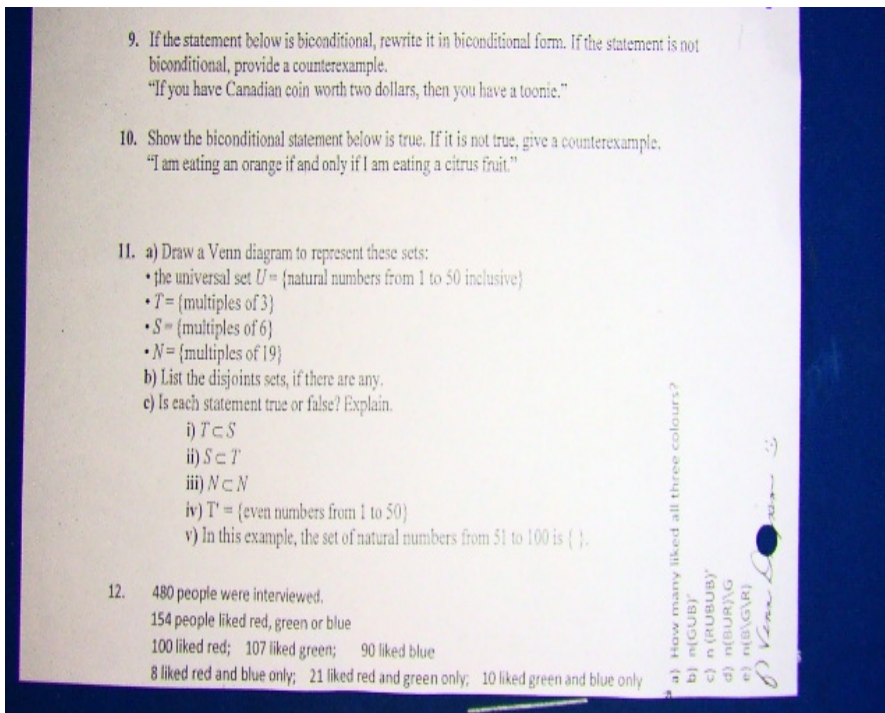
6. Grade 12 students were surveyed about their extra curricular activities.

- 58% belonged to a sports team (S)
- 63% belonged to a band (B)
- 47% belonged to a school club (C)
- 24% belonged to a sports team and a band or choir
- 21% belonged to a sports team and a school club
- 36% belonged to a band or choir and a school club
- 19% engaged in all three activities



Write each of your answer in set notation.

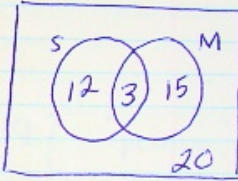
- a) What percent of students only belong to a band?
 - b) What percent of students belong to band or sports but not a school club?
 - c) What percent of students belong to only a school club?
 - d) What percent of students belong to only one sports team?
7. Write the converse of the conditional statement below.
"If you work in a hospital, then you are a doctor."
 8. If the statement below is biconditional, rewrite it in biconditional form. If the statement is not biconditional, provide a counterexample.
"If you have insomnia, then you cannot sleep at night."



Review For Test

1. a) $n(M \cap S) = 3$
 b) $n(M \setminus S) = 15$
 c) $n(S \setminus M) = 12$

M $18 - 3 = 15$
 S $15 - 3 = 12$

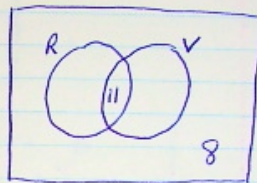


50 - 20
30 students

$\begin{array}{r} 18 \\ + 15 \\ \hline 33 \end{array}$ $33 - 30 = 3$

2. 32 students

20 roller coaster
15 vertical drop
8 neither



$$n(R \cap V) = 11$$

3. $U = \{1, 2, 3, \dots, 18, 19, 20\}$

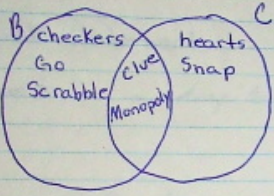
$X = \{4, 5, 6, 7, 8\}$

$P = \{2, 3, 5, 7, 11, 13, 17, 19\}$ "prime"

$O = \{1, 3, 5, 7, 9, 11, 13, 15, 17, 19\}$ "odd"

$n(X \cap P) = 2$

4.



5. $(B \cup C) = \{ \text{checkers, go, scrabble, clue, Monopoly, } \}$
 $\{ \text{hearts, snap.} \}$

$(B \cap C) = \{ \text{clue, monopoly} \}$

$n(B \cup C) = 7$

$n(B \cap C) = 2$

$$n(B \cap C) = 2$$

$$b.a) n(B \setminus C \setminus S) = 22$$

$$b) n(B \cup S \setminus C) = 59$$

$$c) n(C \setminus S \setminus B) = 9$$

$$d) n(S \cup C \cup B - (S \cap C) - (C \cap B) - (S \cap B)) = 63$$

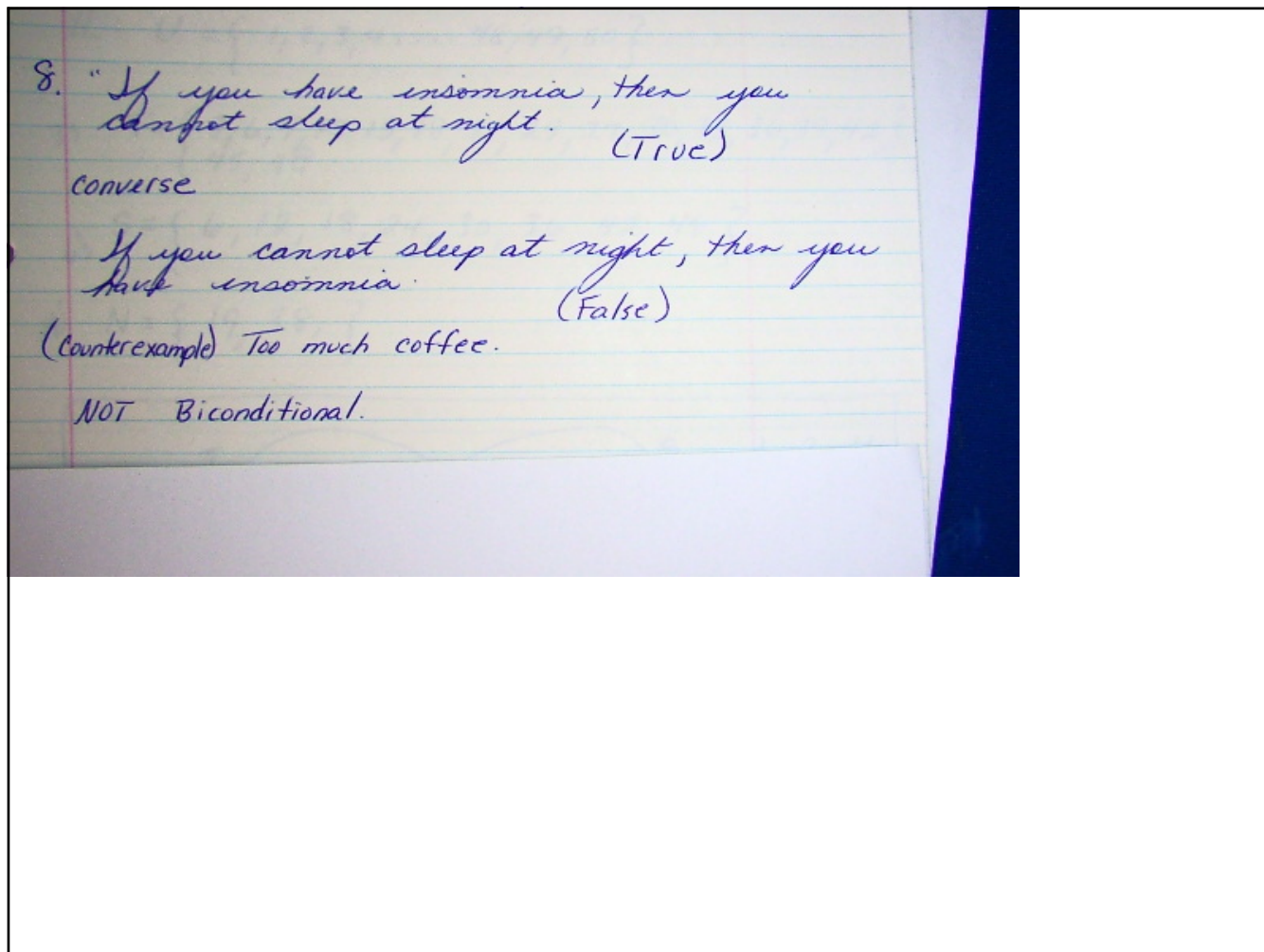
7. conditional statement

If you work in a hospital, then you are a doctor.

converse

If you are a doctor then you work in a hospital

nts



8. "If you have insomnia, then you cannot sleep at night. (True)

converse

If you cannot sleep at night, then you have insomnia. (False)

(counterexample) Too much coffee.

NOT Biconditional.

9. If you have Canadian coin worth two dollars, then you have a toonie. True

converse.

If you have a toonie, then you have a Canadian coin worth two dollars. True

You have a Canadian coin worth two dollars if and only if you have a toonie.

Biconditional statement.

10. I am eating an orange if and only if
I am eating a citrus fruit.

FALSE!

A citrus fruit could be a grapefruit.

11. $U = \{1, 2, 3, 4, \dots, 48, 49, 50\}$

35 $T = \{3, 6, 9, 12, 15, 18, 21, 24, 27, 30, 33, 36, 39, 42, 45, 48\}$

65 $S = \{6, 12, 18, 24, 30, 36, 42, 48\}$

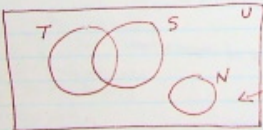
145 $N = \{19, 38, \}$

	1	2	4
	5	7	8
	10	11	13
	14	16	17
	20	22	23
	25	26	28
	29	31	32
	34	35	37
	40	41	43
	44	46	47
	49	50	

// b) Disjoint sets: T and N
 S and N

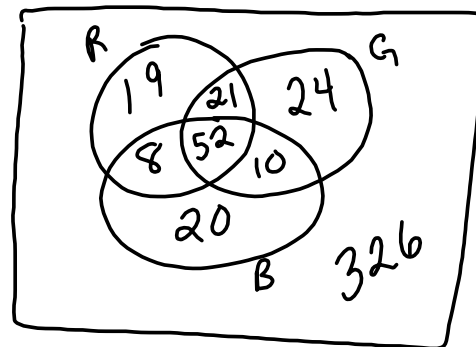
c) i) T C S False
 ii) S C T True
 iii) N C N True
 iv) $T' = \text{even \#s 1 to 50}$ False
 v) The set of natural numbers
 from 51 to 100 is $\{\}$ "Empty" True.

The Venn Diagram could also
 look like this.



N is separate
 because there
 aren't any numbers
 in the overlap
 sections of my
 first Venn
 Diagram.

12.



$$n(R \cup G \cup B) = n(R) + n(G) + n(B) -$$

$$n(R \cup G \cup B) = n(R) + n(G) + n(B) - n(R \cap G) - n(G \cap B) - n(R \cap B) + n(R \cap G \cap B)$$

$$154 = 100 + 107 + 90 - (21 + x) - (10 + x) - (8 + x) + x$$

$$154 = 297 - 21 - x - 10 - x - 8 - x + x$$

$$154 = 258 - 2x$$

$$-104 = -2x$$

$$52 = x$$