INTERMEDIATE ALGEBRA

GPS # 13   3.4 COMPOUND INEQUALITIES   NAME: Parul Patel

Useful Definitions:
Intersection of A and B: $A \cap B = \{x|x$ is an element of A and x is an element of $B\}$
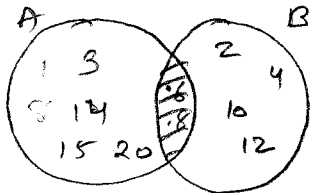Union of A and B: $A \cup B = \{x|x$ is an element of A or x is an element of $B\}$
Compound Inequality: Two inequalities connected by and or or.

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no
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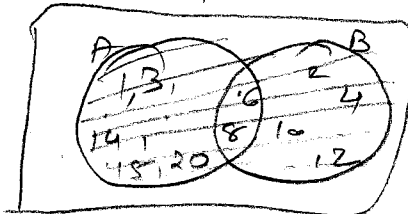1. Let $A = \{1,3,6,8,14,15,20\}$ and $B = \{2,4,6,8,10,12\}$ union
intersect, and   A (or) B   /16 '

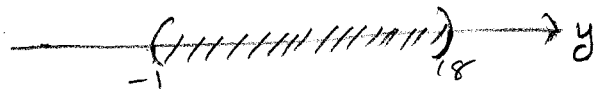a) $A \cap B = \{6,8\}$ b) $A \cup B = \{1,2,3,4,6,8,10,12,14,15,20\}$

For each of the following compound inequalities, decide whether intersection or union should be used. Then give the solution set in both interval notation and graph form.

2. a) $y - 3 < 15$ and $y + 2 > 1$

$y < 15 + 3 \quad \cap \quad y > 1 - 2$
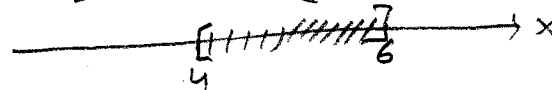$y < 18 \quad \cap \quad y > -1$

Sol. set $\{y \mid -1 < y < 18\}$
interval notation $(-1, 18)$

b) $-x + 6 \leq 2$ and $4 + x \leq 10$

$-x \leq 2 - 6 \cap \quad x \leq 10 - 4$
$-x \leq -4 \quad \cap \quad x \leq 6$
$x \geq 4 \quad \cap \quad x \leq 6$

Sol. set $\{x \mid 4 \leq x \leq 6\}$
interval notation $[4, 6]$

3. a) $-2x \leq -4$ or $-10x \geq 0$

$x \geq \frac{-4}{-2} \quad \cup \quad x \leq 0$
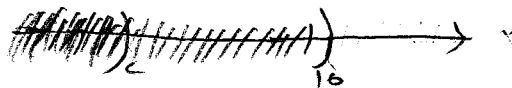$x \geq 2 \quad \cup \quad x \leq 0$

Sol. Set $\{x \mid x \geq 2 \text{ or } x \leq 0\}$

Int. not. $(-\infty, 0] \cup [2, \infty)$

b) $x < 2$ or $x < 10$

$x < 2 \cup x < 10$

Sol. Set $\{x \mid x < 2 \text{ or } x < 10\}$
or
Sol. set $\{x \mid x < 10\}$
Int. not. $(-\infty, 2) \cup (-\infty, 10)$
Int. Not $(-\infty, 10)$