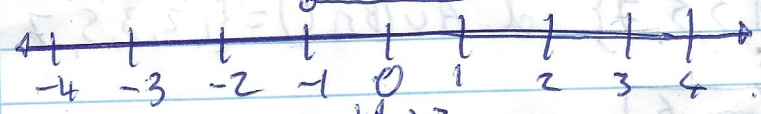
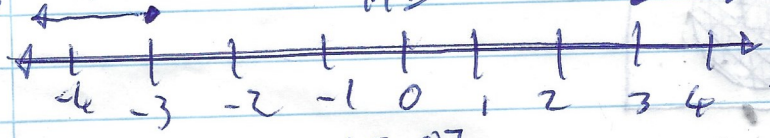
1a. $(-1, 4)$



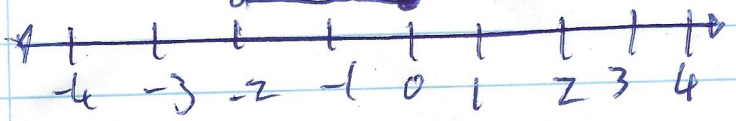
between $x = -1$ and $x = 4$ $(-1 < x < 4)$

1b $|x| \geq 3$



x is bigger than or equal to 3 or smaller than or equal to -3 $(-3 \leqslant x \geqslant 3)$

1c $(-2, 0]$



x is more than -2 and less than or equal to 0 $(-2 < x \leqslant 0)$

2. A. -3 is not part of the set as it is a neg number

B. 0.5 is not part of the set as 0.5 is not an integer

C. 5 is part of the set as $5 \geqslant 5$

D. -1 is not part of the set as -1 is not in the interval.

3a $-1 \in \mathbb{Z}$ is true because -1 is in $\mathbb{Z}$

b $\mathbb{Z} \cap \mathbb{R}^+ = \mathbb{R}^+$ is true because $\mathbb{R}^+$ is any real (positive) number within $\mathbb{Z}$

B. $\frac{8}{2} \in \mathbb{Z}$ is true because $\frac{8}{2} = 4$ and 4 is an integer

C. $3.1459 \notin \mathbb{Q}$ 2 options:

- ~~Because it is not a rational number~~
- If the number is just 3.1459 then it is a rational number as it has an end ∴ making the statement false.

d. $\mathbb{N} \cap \mathbb{Z} = \mathbb{Z}$ is false because natural numbers must be positive and integers include negative numbers.

e. See above

f. $\mathbb{R}^- \cup \mathbb{R}^+ = \mathbb{R}$ is false as 0 is neither positive or negative.

g. $\mathbb{Z} \subset \mathbb{R}$ is true as all whole numbers are included in $\mathbb{R}$

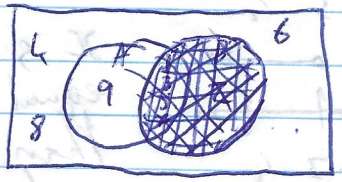
h. $2\frac{1}{2} \in \mathbb{Q}$ is true as $2\frac{1}{2} = \frac{5}{2}$ which is a rational number

4. $A = \{1, 3, 5, 7, 9\}$ $B = \{1, 2, 3, 5, 7\}$ $C = \{2, 4, 6, 8\}$

a. $A \cap B = \{1, 3, 5, 7\}$ b. $A \cup C = \{1, 2, 3, 4, 5, 6, 7, 8, 9\}$

c. $A \cap (B \cup C) = \{1, 3, 5, 7\}$ d. $A \cup (B \cap C) = \{1, 2, 3, 5, 7, 9\}$

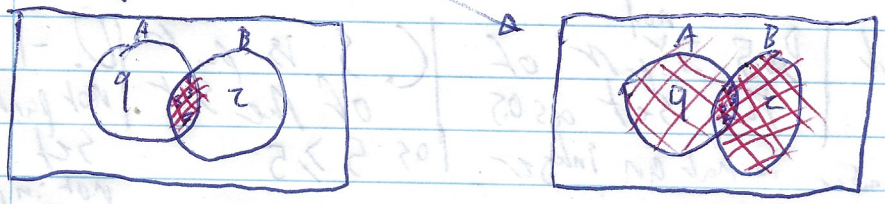
5. $\overline{A \cup B}$



$\{9, 4, 6, 8\}$
↳ $A \cup B$

$\overline{A \cup B} = \{1, 3, 2, 5, 7\}$

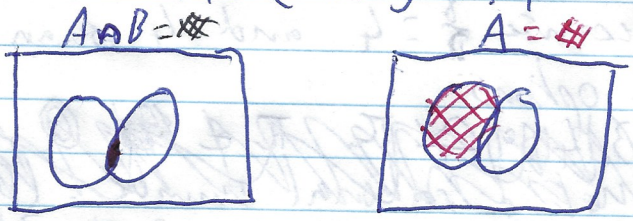
6. $\overline{A \cup B} \neq \overline{A} \cup \overline{B}$



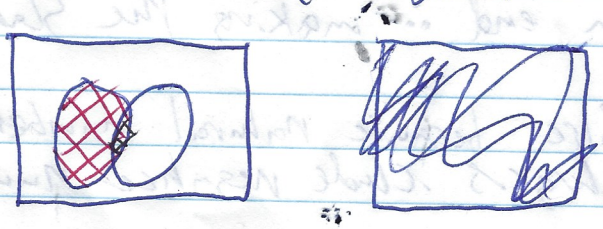
marked section is Section to be marked out.

7. $A \cap E = A$ and $A \cup E = E$

prove $A \cup (A \cap B) = A$ Absorbtion law



$A \cup (A \cap B) = A$



marked section is area being looked at

$(A \cap E) \cup (A \cap B)$ - identity
$A \cap (B \cup E)$ - Distributive
$A \cap E$ - identity
$= A$ - identity

8. $A = \{1, 2, 3\}$ $B = \{4, 5, 6, 7\}$ which are ~~three~~ functions

a. $r: A \to B$, $r: 1 \to 4$, $r: 2 \to 4$ $r: 3 \to 5$ is a function, all input have

b. $s: A \to B$, $s: 1 \to 5$, $s: 1 \to 4$, $s: 2 \to 7$, $s: 3 \to 6$ ~~is a function, all its have outs~~

c. $t: A \to B$, $t: 1 \to 4$, $t: 2 \to 5$ is not a function as not all input have an output

b. continued: is not a function as