Antonine Sisters' School
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Grade: 10A
Name: _____

Supplementary
Practice 1
October 2019
N°_____

MATHEMATICS

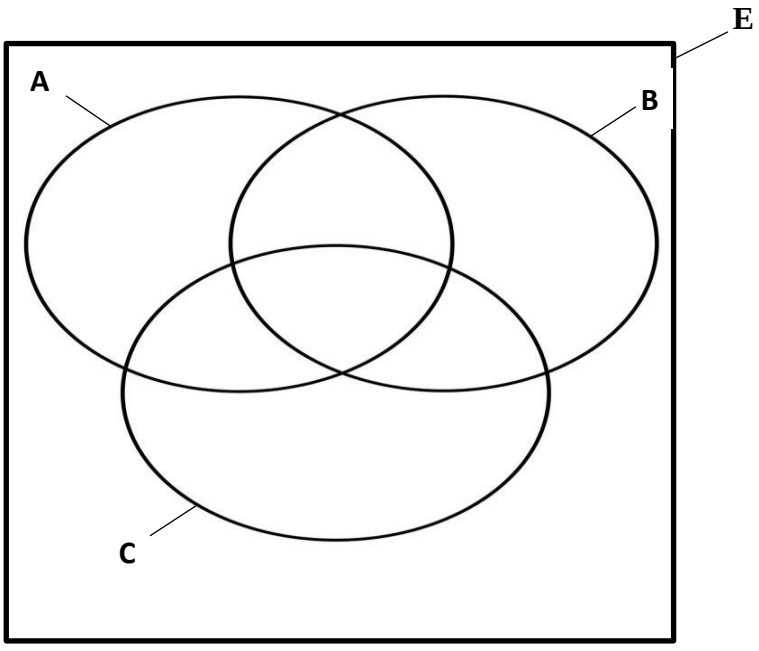
I) Complete by $\in, \notin, \subset, \not\subset$.

1) $6.3 \ldots . \mathbb{Q}$ 2) $-4^2 \ldots . \mathbb{N}^* \cap \mathbb{Z}$ 3) $\{3\pi\} \ldots . \mathbb{R}$ 4) $(-5; 8) \ldots . \mathbb{N} \times \mathbb{Z}$

II) Let $A = \{1; 3; 4; 5\}$ and $B = \{2; 5\}$.

1) Write $\mathcal{P}(B)$ in extension.
2) Copy and complete: $\text{Card}\big(\mathcal{P}(A)\big) = \ldots''' = \cdots$
3) Write $A \cap B$ and $A \cup B$ in extension.
4) Let $E = \{1; 2; 3; 4; 5; 6\}$ be the *reference* set.
   a) Write *E* in comprehension.
   b) Determine each of the following sets in extension:
   $\overline{A}$; $\overline{A} \cap B$; $\overline{B} \cup B$; $A \cap B \cap E$; $\overline{A \cup B}$
5) Copy and complete by filling the blanks using: $\in$; $\notin$; $\subset$; $\not\subset$; $=$.
   $\phi \ldots B$; $\phi \ldots \mathcal{P}(B)$; $\{\phi\} \ldots \mathcal{P}(A)$; $\{3; 4\} \ldots A$; $B \cap B \ldots B \cup B$; $A \cap B \ldots A \cup B$
6) Determine whether the following is true or false:
   $Card(A) + Card(B) - Card(A \cap B) = Card(A \cup B)$

III) 1) A represents the set of prime numbers that are less than 15.
B = $\{x \mid x \text{ is odd and } 3 \leq x < 11\}$
C = $\{4; 6; 7; 9; 11; 13\}$.
E = $\{x \mid x \in \mathbb{N} \text{ and } 1 < x \leq 13\}$ is the reference set.
   a) Write sets A, B and E in extension.
   b) Complete the Venn diagram shown below:



   c) Determine $\overline{A}$, *the complement of* A *in* E.

2) The 120 grade 12 students are distributed as follows:
58 applied to LU (Lebanese University).
15 applied to LAU (Lebanese American University).
52 applied to AUB (American University of Beirut).
8 applied to LU and AUB.
7 applied to LAU and AUB.
3 applied to all three universities.

a) Represent the above data in a Venn diagram.
b) How many students did **not** apply to any of the three universities?
c) How many students applied to AUB or LAU?
d) How many students applied to LU only?

IV) *The questions are independent.*

1) Calculate: $\left|\sqrt{5}-4\right|-|2(6-9)|+\left|2^{-1}+\sqrt{5}\right|$
2) State whether the interval $[-3;5[$ is included in the interval $]-4;5\,]$. Justify your answer.
3) Write in the form of an interval, if possible.
$$]-\infty;9[\ \cap\ ]-1;11]$$
4) Calculate the center, amplitude and radius of the interval $[-4;2]$.
5) Write the intersection as an interval: $[-4;2]\cap\,]-3;5[$.
6) Write the union as an interval: $]-\infty;3]\cup\,]3;\ +\infty[$.
7) Determine the set in extension: $]-8;2]\cap\mathbb{N}^*$.
8) Fill in the blank: $]-\infty;4]\cup\,]4;6[\cup\,]6;\ +\infty[=\mathbb{R}-\{\dots\}$.
9) Compare: $|4-x|$ and $4+|x|$.

V) Express without absolute value. Represent your answer in a table.

1) $A=|3-x|$
2) $B=2x+|3x+5|$

VI) Solve in $\mathbb{R}$ and graph the solution on a graduated axis.

1) $3+|4-3x|<10$ 2) $\left|\frac{x}{3}\right|\leq 2$ 3) $5-|x|=-3+|x|$ 4) $1+3|x|<7$

5) $\frac{|x|}{2}\geq 1$ 6) $-|x-2|\leq -3$ 7) $|2-x|=|x-2|$ 8) $|2x|+4>5-|2x|$

VII) Determine whether each of the following is true or false.

1) $-|5-2x|=-5+2x$ 2) If $x^2+9=0$, then $x=-3$ or $x=3$
3) $|x|=-x$ is possible. 4) $|4x^2+1|=4x^2+1$

VIII) Determine the domain of definition for each expression.

1) $\frac{\sqrt{|x|+2}}{|x|-2}$ 2) $\sqrt{4-6x}+\frac{3|x|}{|4+x|-3}$ 3) $\frac{5}{\sqrt{5+3x}}$

IX) Which of the following are impossible? Which are true for all real numbers?

1) $|x+2|\leq -2$ 2) $|3-4x|\geq -3$ 3) $|x|+5=0$ 4) $x^2+1>0$
5) $|-5-x|+4x^2<-1$ 6) $\frac{|7x|+1}{3x^2+1}=0$

---------- **END OF PRACTICE 1** ----------