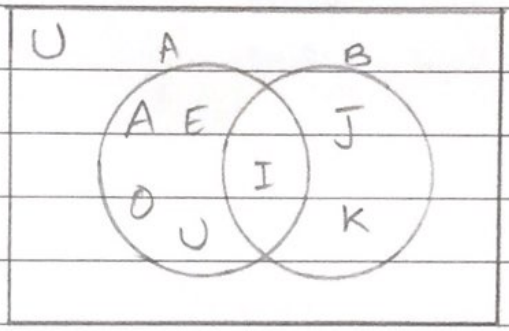
NAME: AREEBA SIDDIQUI ID# 13252

QUESTION 1: a) VENN DIAGRAM:

GIVEN SETS: $A = \{A, E, I, O, U\}$ and $B = \{I, J, K\}$

$U = \{A, B, C, D, \ldots Z\}$



b) EQUAL SETS:-

Two sets are called equal if they have exactly the same elements.

Example:

{vowels in the English alphabet} = {a, e, i, o, u}

On the other hands, the sets {1, 3, 5} and {1, 2, 3} are not equal, because they have different elements. This is written as

$\{1, 3, 5\} \neq \{1, 2, 3\}$

The order in which the elements are written between the curly brackets does not matter at all. For example.

$\{A, B, C, D, E\} = \{C, E, A, B, D\} = \{E, C, A, D, B\}$

If element is listed more than once, it is only counted once. for example.

$\{x, y, y\} = \{x, y\}$

The sets $\{x, y, y\}$ has only two elements x and y. The second mention of y is unnecessary repitition and can be ignored.

- FINITE AND INFINITE SETS:

Finite set:- In Mathematics, a finite set is a set that has a finite number of elements.

Example:-

{Whole Numbers b/w 4000 and 4005} = {4001, 4002, 4003, 4004}

INFINITE:- A set is said to be an infinite set whose elements cannot be listed if it has unlimited (i-e uncountable) by the natural number n is called Inifinite set.

A set which is not finite is called infinite set.

Example :- i) {even whole numbers} = {0, 2, 4, 6, 8, ...}

ii) {whole numbers greater than 3000} = {3001, 3002, 3003, ...}

Both sets are infinite because no matter how many elements we list. There are always more elements in set that are not on our list.

- SUBSET :- Subset of a set.

Sets of things are often further sub divided. For example, owls are a particular type of birds so every owl is also a bird. we express this in the language of sets by saying that the set of owls is a subset of birds.

A set S is called subset of another set T. if every element of S is an element of T. This is written as:

$S \subseteq T$ (Read this as 'S' is a subset of 'T')

if $A = \{2, 4, 6\}$ and $B = \{0, 1, 2, 3, 4, 5, 6\}$

then $A \subseteq B$.

B/c every element of A is an element of B

The sentance 'S' is not subset of 'T' is written as

$S \not\subseteq T$

This means that at least one element of S is not an element of T

{Birds} $\not\subseteq$ {flying creatures}.

Question 2: a) There are four basic rules to solve an equation:

Rule 1: An equal quantity may be added to both sides of an equation.

Rule 2:- An equal quantity may be subtracted from both sides of an equation.

Rule 3:- An equal quantity may multiply both sides of an equation.

Rule 4:- An equal, non-zero quantity may divide both sides of an equation.

b) i) $8(x-1) + 17(x-3) = 4(4x-9) + 4$

Solution:-

R.W
17
×3
51

$$8x - 8 + 17x - 51 = 16x - 36 + 4$$

$$8x + 17x - 51 - 8 = 16x - 36 + 4$$

$$25x - 59 = 16x - 32$$

$$25x - 16x = 59 - 32$$

$$9x = 27$$

dividing 9 on B.S

$$\frac{9x}{9} = \frac{27}{9}^{3} \Rightarrow \boxed{x = 3}$$

Rechecking the answer of (i).

putting the value of x in the equation.

$\Rightarrow 8(3-1)+17(3-3)=(4(4(3)-9)+4)$

$\Rightarrow 24-8+51-51 = 4(12-9)+4$

$\Rightarrow 16 = 4(3)+4 \Rightarrow 16 = 12+4$

$\Rightarrow 16 = 16$ L.H.S = R.H.S

Hence proved $\boxed{x=3}$

ii) $15(x-1)+4(x+3) = 2(7+x)$

Sol:- $15x-15+4x+12 = 14+2x$

$\Rightarrow 15x+4x-15+12 = 2x+14$

$\Rightarrow 19x-3 = 2x+14$

$\Rightarrow 19x-2x = 14+3$

$\Rightarrow 17x = 17$

dividing 17 on Both sides

$\frac{17x}{17} = \frac{17}{17}$ 1

$\Rightarrow \boxed{x=1}$ Answer

Now rechecking our Answer by putting $x=1$ in eq.

$15(1-1)+4(1+3) = 2(7+1)$

$15(0)+4(4) = 2(8)$

$0+16 = 16$

$16 = 16$ hence proved $x=1$

Question 3: Simultaneous Equation

i) $7x + 2y = 47$ ... (1)

$5x - 4y = 1$ ... (2)

We are solving the above simultaneous equation by Elimination method.

Now, multiply equation (1) by 2 because we will make the magnitude of the coefficients of y the same in both equations.

Now equation (1) becomes:

$$2(7x + 2y) = 2 \times 47$$

$$14x + 4y = 94 \quad -(3)$$

If we know add Equation (2) & (3), we will find that the terms involving y disappear:

$$5x - 4y = 1 \quad -(2)$$

$$+ \quad 14x + 4y = 94 \quad -(3)$$

$$19x = 95 \quad -(4)$$

and so, dividing 19 in equation (4) on B.S

$$\frac{19x}{19} = \frac{95}{19}^{5} \Rightarrow \boxed{x = 5}$$

Now that we have a value for x we can substitute this equation (2) in order to find y.

(4)

Substituting x

$$5x - 4y = 1$$

$$5(5) - 4y = 1$$

$$25 - 4y = 1$$

$$25 - 1 = 4y$$

$$24 = 4y$$

or $4y = 24$

dividing 4 on B.S

$$\frac{4y}{4} = \frac{24^{6}}{4}$$

$$\boxed{y = 6}$$ Answer