A VENN DIAGRAM RELATED QUESTION AND SOLUTION   **3/5/23   Professor   Ebou Janha**

From a survey in a university **70 students** were questioned on their preferences on three subjects, **Programming**, **Web development** and **Management**.

20 students like **programming (P)**
25 students like **Management (M)**
25 students like **web development (W)**
**9** students like **Web development** and **Management**
8 Like **Programming** and **Web development**
6 Like Programming and **Management**
21 don't like any of the subjects

Using a Venn Diagram find the following

1. How many students like programming only?
2. How many students like Management only?
3. How many students like web development only?
4. How many students like all the three subjects?
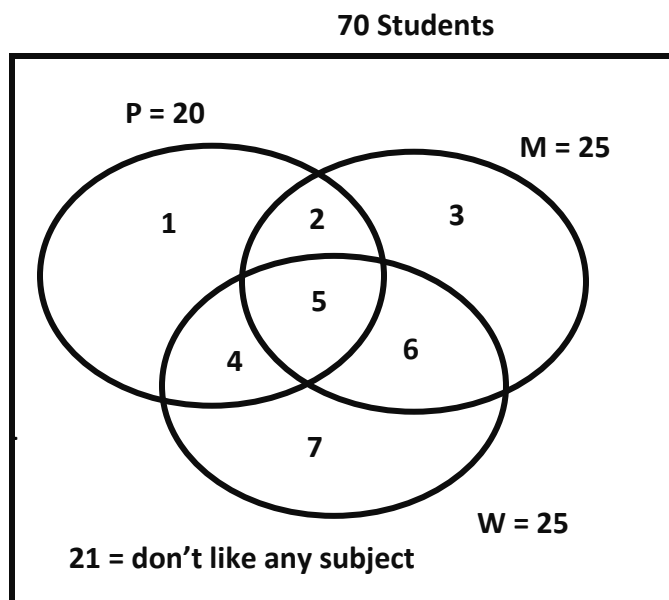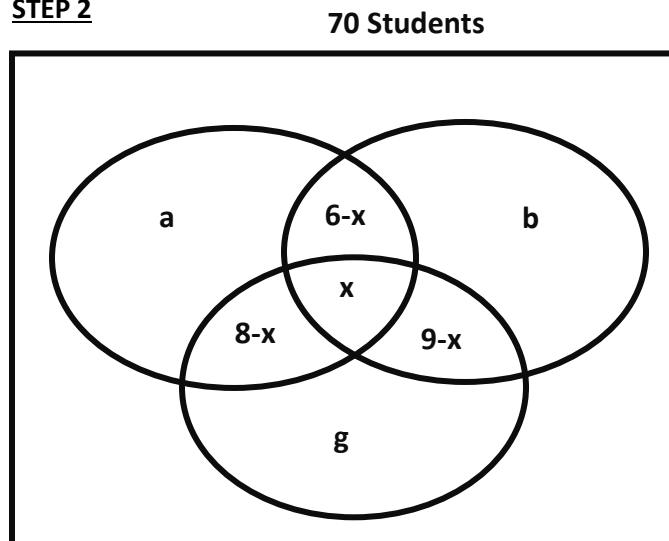5. How many students like exactly 2 subjects?
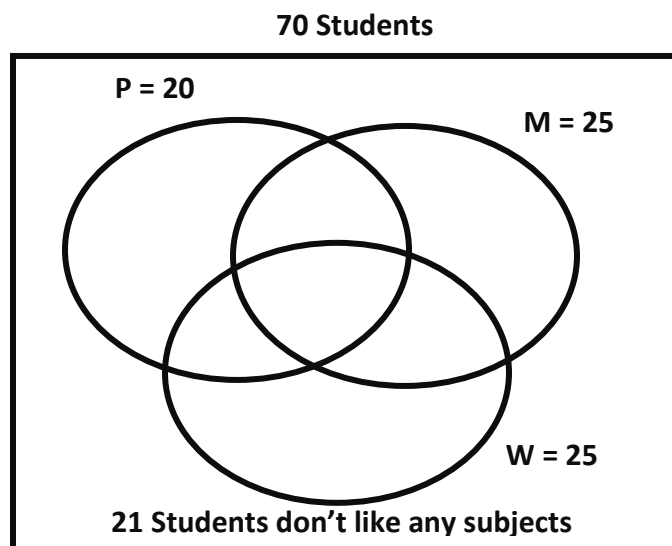
70 Students

Refer to page 2 for the solution

SOLUTION

STEP 1

First of all, you need to determine the correct values of each of the numbers.

1 Represents the students who like programming only
2 Represents the students who like programming and management
3 Represents the students who like management only
4 Represents the students who like programming and web development
5 Represents the student who like all the three subjects
6 Represents the students who like management and web development
7 Represents those who like web development only

70 Students

P = 20 **M = 25**

1   2   3

5

4   6

7

W = 25

21 = don't like any subject

STEP 2

70 Students

a   6-x   b

x

8-x   9-x

g

First, we are going to determine the value of X which represents the number of students who like all the three subjects.

To do that we will find the values of **a, b** and **g**

Then solve for X.

Refer to page 3 for STEP 3

70 Students

P = 20

M = 25

a

6-x

b

x

8-x

9-x

g

W = 25
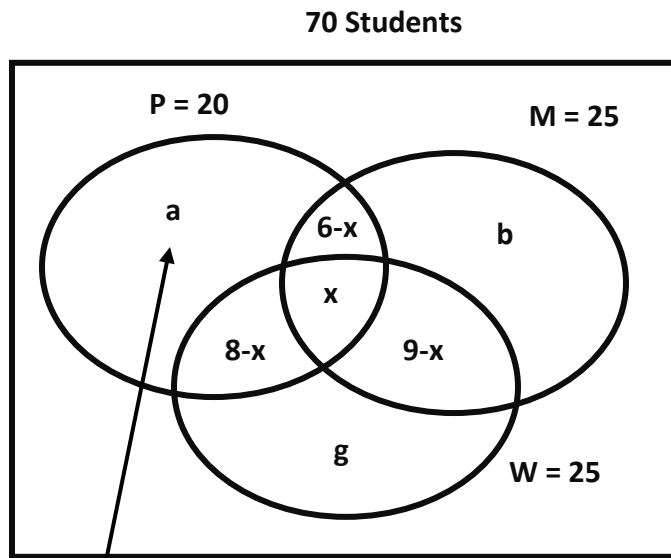
a = the students who like **P** only

b = the students who like **M** only

g = the students who like **W** only

STEP 3

We find the value of **a**

a + 8 - x + x + 6 -x = 20

a + 14 - x = 20

a - x = 20 - 14

a - x = 6

a = 6 + x

STEP 4   We find the value of **g**

g + 8 - x + x + 9 - x = 25

g + 17 - x = 25

g - x = 25 - 17

g - x = 8

g = 8 + x

STEP 5   We find the value of **b**

b + 9 - x + x + 6 - x = 25

b + 15 - x = 25

b - x = 25 - 15

b - x = 10

b = 10 + x

STEP 6

Now add all the elements including the value of those who don't like any of the subjects (**21**) and solve for **X.**

 a = 6 + x   g = 8 + x   b = 10 + x

6 + x + 8 + x + 10 + x + 8 - x + 9 - x + x + 6 - x + 21 = 70   (Now simplify**)**
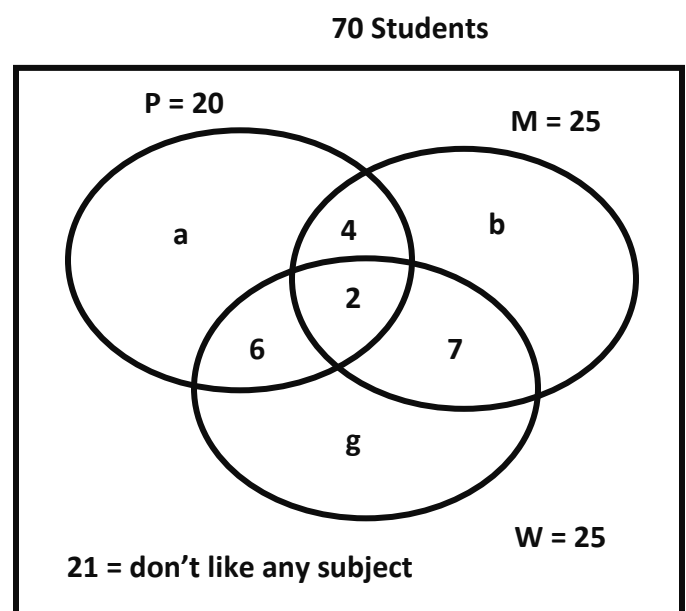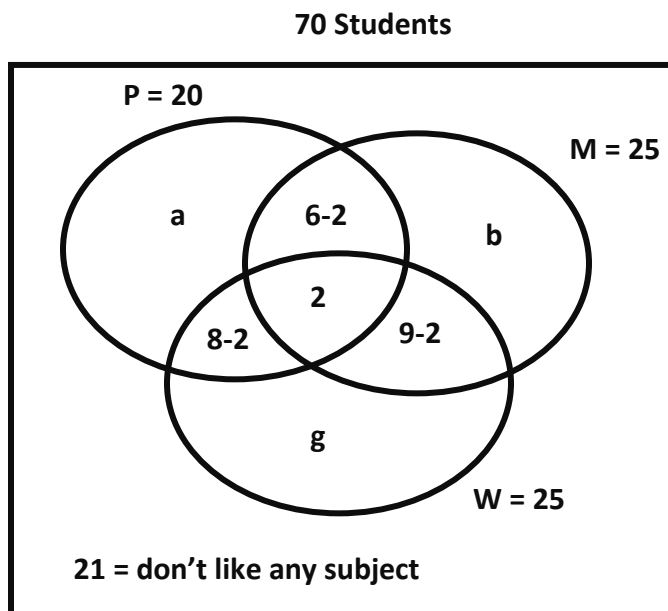
6 + 8 + 10 + 8 + 9 + 6 + 21 + x = 70

47 + 21 + x = 70

68 + x = 70

x = 70 - 68

x = 2

STEP 7

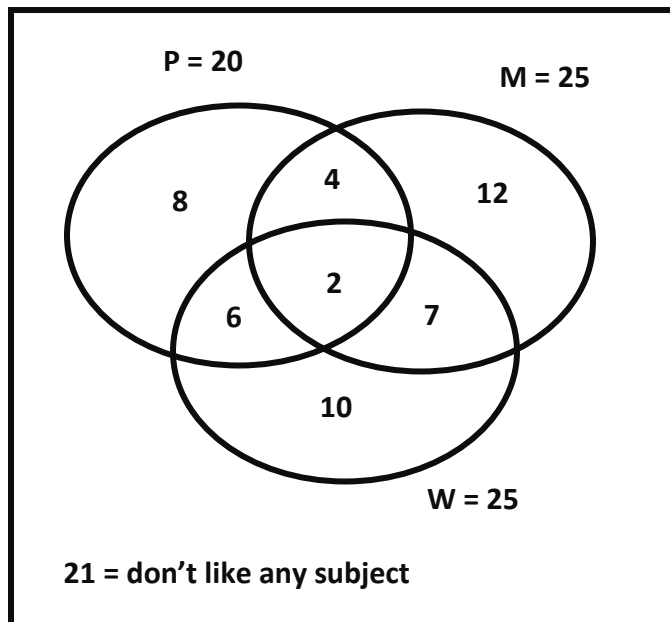Now replace **x** with **2** in the entire diagram and answer the asked questions.

70 Students

P = 20

a   6-2   M = 25

b

2

8-2   9-2

g

W = 25

21 = don't like any subject

70 Students

P = 20   M = 25

a   4   b

2

6   7

g

W = 25

21 = don't like any subject

a = 20 - (6 + 2 + 4) = 20 - 12 = 8   g = 25 - (6 + 2 + 7) = 25 - 15 = 10
b = 25 - (4 + 2 + 7) = 25 - 13 = 12

STEP 8

70 Students

P = 20

M = 25

8

4

12

2

6

7

10

W = 25

21 = don't like any subject

1. How many students like programming only? **8**
2. How many like management only? **12**
3. How many like web development only? **10**
4. How many students like all three subjects? **2**
5. How many students like exactly two subjects? 7 + 4 + 6 = **17**

I hope one finds it helpful. To enroll to my mathematics tutoring program call me at **678-531-8266**. Thanks.

Ebou Janha   **3/5/2023**