

1. This problem came down to basically asking how many ♡ does each of the other suit represent.

$$\spadesuit = 4 \times \heartsuit$$

$$\diamondsuit = 3 \times \spadesuit = 3 \times (4 \times \heartsuit) = 12 \times \heartsuit$$

$$2 \times \clubsuit = \diamondsuit = 12 \times \heartsuit \text{ so } \clubsuit = 6 \times \heartsuit$$

Now we can find the solutions to (a), (b), and (c):

$$(a) \diamondsuit + \spadesuit = 12 \times \heartsuit + 4 \times \heartsuit = \boxed{16} \times \heartsuit$$

$$(b) \diamondsuit - \clubsuit = 12 \times \heartsuit - 6 \times \heartsuit = \boxed{6} \times \heartsuit$$

$$(c) \clubsuit + \spadesuit - \heartsuit = 6 \times \heartsuit + 4 \times \heartsuit - \heartsuit = \boxed{9} \times \heartsuit$$

2. We have to guess and check one statement to be true at a time.

If Ethan's statement was true then Anthony's and Troy's statements were false so we go off of what Ethan said. This means Troy did not get the perfect score since Anthony is wrong. However, Troy said "I did not get the perfect score." This means Troy's statement is true, a contradiction since only one statement was true.

If Troy's statement was true then Anthony's and Ethan's statements were false. However, Ethan said "What Anthony said was wrong" meaning what Anthony said is actually true. This contradicts there being only one true statement.

This means Anthony must be the only person telling the truth and we can check this. Troy must have gotten the perfect score. Ethan's statement being false means Anthony was telling the truth and Troy's statement being false means $\boxed{\text{Troy}}$ got the perfect score.

3. This problem is just like #2. However instead of going through all 4 scenarios I will only go through the correct one and show that it is correct. The rest is up to you to use your logic to test the other ones.

Jack was the one telling the truth. This means that $\boxed{\text{Kevin}}$ kicked the ball. This shows Ashkaan to be wrong since Jack did not kick the ball and Kevin to be wrong since he said he did not kick it. Roddur is also wrong since he said Jack is not telling the truth.

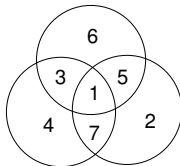
4. $\boxed{\text{Orange}}$

5. Each student has joined two clubs and each club has two of the three friends. Since Anthony did not join the math club, he joined the science and music clubs. Since Troy did not join the music club, he joined the science and math clubs. This means Ethan must have joined the math and music clubs since the science club already has two of the three friends.

$\boxed{\text{Anthony: Science and Music, Ethan: Math and Music, Troy: Math and Science}}$

6. The question asks for the **SLOGAN** written on the t-shirt that Jack is wearing. $\boxed{\text{"Love Me and Math"}}$

7. $\boxed{\text{Nicholas, Matthew, Brandon, Albert}}$



- 8.