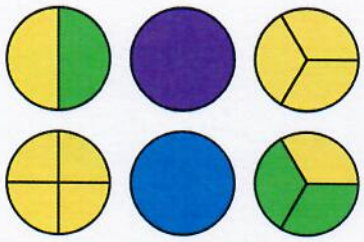
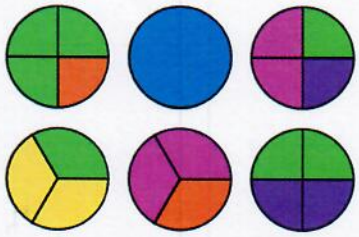
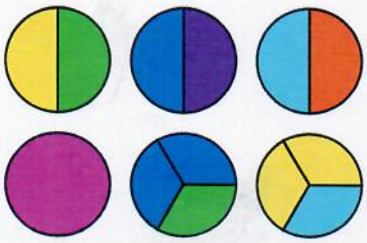
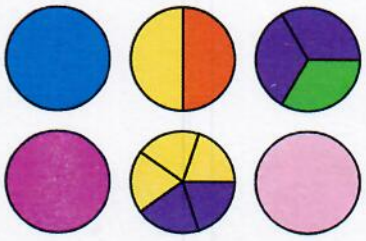
Xavi's T-shirt

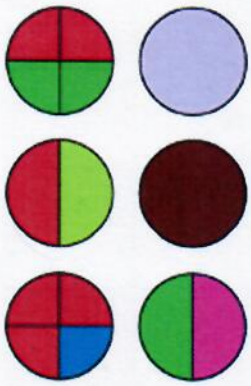
Which numbers do these circles represent?

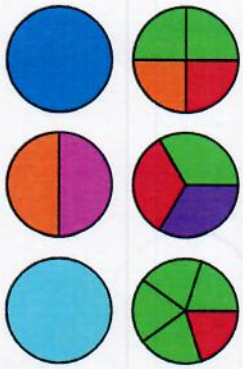
A 

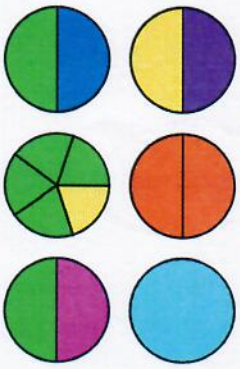
B 

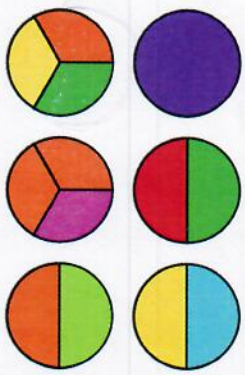
C 

D 

E 

F 

G 

H 

A. 6 7 8
16 17 18

Because there are two prime numbers in the middle column, this column is called the odd column. This also means that the two columns on the outside can be called even columns. Let's say this is a rule called 'Columns'. Each four circles in the even columns must contain 2 (as a colour) because every even number is divisible by 2 and 2 is also a prime number. Yellow is the only colour contained in all four circles of the even columns. Therefore, yellow must be 2. Then, to figure out the top right circle, you figure out what 2^3 is ($2\times2\times2$), which is 8. You can figure out the rest from there.

B. 88 89 90
98 99 100

On the considering questions sheet, you may have spotted the questions: 'Why do multiples of 9/11 appear on a diagonal line?' These questions help us out a lot on this one. If you look closely on Xavi's T-shirt, you may notice that the nine time table goes in a diagonal line from top right to bottom left. The eleven times table goes in a diagonal line from top left to bottom right. Let's say these are the '9/11' rules. Because 11 is a prime number, its colour will only cover one segment of its multiples. Because 9 is a square number, its colour will cover two segments of its multiples. These rules are being mentioned because both rules apply to the circle at the bottom of the middle column. So, to figure out that number, we need to do 9×11, which is 99. The rest can be done from there. (orange=11 Pink=3(9 covers 2 segments)).

C. 33 34 35
43 44 45

Using the '11's' rule, you can figure out that green is 11. Also, you can use the 'Columns' rule to figure out that dark blue is 2. From there, you can figure out the bottom number in the middle column by doing 2×2×11, which is 44. The rest can be done from there.

D. 61 62 63
71 72 73

Following the 'Columns' rule, we can see that the middle column is even. Also, the most common colour in this column is yellow. Therefore yellow must be 2. Following the '9's' rule, you can figure out that purple is 3. (3×3=9 (as shown in the solution for part B)). You can figure out the bottom number in the middle column by doing 2×2×2×3×3, which is 72. The rest can be figured out from there.

E. 36 37
46 47
56 57

Using the 'Columns' rule, we can say that the left column is even. Also, the most common colour in the even column is red. Therefore, red is 2. Then, using trial and error, you can figure out what dark green is. We know that dark green can't be 2 because 2 has a different colour. So, let's start with 3 and do 2×2×3×3 (top right circle). This is 36. Then, you can fill in the rest and check the answers (which all fit).

F. 59 60
69 70
79 80

Using the 'Columns' rule, you can see that the right column is even. Also, both red and green is contained in all the circles of the even column. Therefore, either could be 2. There is no other rules you can apply, so you can do trial and error. The best number to use trial and error on is the bottom right number. This is because it only has 2 colours, one which is 2. Let's start with 3 as green and 2 as red. $3\times3\times3\times3\times2=162$. ~~So~~ So, green is not 3. Let's try the other way round. $2\times2\times2\times2\times3=$ ~~48~~ 48. But, 3 is not red because the other numbers don't fit. Let's try 5 as red. $2\times2\times2\times2\times5=80$. That must be the answer as everything else fits.

G. 38 39
48 49
58 59

You might have spotted the square number in this question. We can cut the amount of numbers orange could be. It must be an odd because an even number squared is even. It must be a prime number, because if it wasn't then there would be more segments. It must be under 10, because anything above 10 squared is over 100. So, we can come to the conclusion that orange must be either 5 or 7. But, it can't be 5 because $5^2=25$, and if you work out all the circles, it would say that 35 is a prime number. So, orange must be 7. $7^2=49$. The rest can be done from there.