

2013-2014 Primary Solutions Round II

P2.1.

Three friends went out to the park for a picnic. Amy brought 3 sandwiches and Rory brought 5. Cathy, who had forgotten to bring any, offered 80p for an equal share. They cut up the sandwiches and shared them equally between the three of them.

Afterwards, Amy suggested splitting the 80p into 30p for herself and 50p for Rory since she had brought 3 and Rory had brought 5. Was this fair? Explain your reasoning.

Solution

Eight sandwiches shared equally between the three friends meant each got $2\frac{2}{3}$ sandwiches.

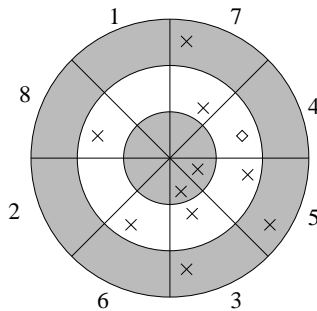
Cathy would get $\frac{1}{3}$ of a sandwich from Amy $2\frac{1}{3}$ of a sandwiches from Rory.

As $2\frac{2}{3}$ sandwiches is $\frac{8}{3}$ sandwiches, each $\frac{1}{3}$ is valued at 10p.

So the 80 pence should be split into 10p for Amy and 70p for Rory.

So the suggested split was unfair.

P2.2.



A target, like the one shown, is used by the local archery club for all kinds of competitions. The outer ring scores the number shown, the white ring doubles the outside number and the smallest ring trebles the number. For example, an arrow landing in the diamond would score $2 \times 4 = 8$.

A few nights ago Doreen, Edward, Fred, Gina and Helen set themselves this task:

Each person was to have two arrows.

With the first one, a 'double' had to be scored.

The second arrow had to score less than the first.

The total of the scores for the two arrows had to be a prime number.

All the competitors were successful and the crosses in the drawing above show where the arrows landed.

Two of the competitors had the same total. Apart from that, their totals were in 'alphabetical' order, with Doreen having the highest total. What was Gina's total score?

Solution

The diagram shows 'doubles': 6, 10, 12, 14 and 16 and 'others': 3, 5, 7, 9 and 15.

Prime numbers up to 31 are: 2, 3, 5, 7, 11, 13, 17, 19, 23, 29, and 31.

If we take the first double as 6 then there is only one choice that gives a prime number where the second shot is less than the first i.e. $6 + 5 = 11$.

Then look at the 'double' 12 with 7 or 5 but the 5 has already been used so it must be the 7: $12 + 7 = 19$

The only double that the 15 can go with is the 16: $16 + 15 = 31$

That leaves 10 and 14 with 3 and 9 where the possible totals are: 13, 19, 17 or 23. We know that two of the totals are the same so it must be 19: $10 + 9 = 19$

Last one must be: $14 + 3 = 17$.

	First shot	Second shot	Total
Doreen	16	15	31
Edward			19
Fred			19
Gina	14	3	17
Helen	6	5	11

We can complete the totals but not the scores because we do not know which one is Edward's and Fred's but we do know that Gina scored 17.

P2.3.

Each of the three girls, Fiona, Susan and Linda, has two jobs. One of the six jobs is a journalist. Using the information below find out who has which jobs.

- The dancer danced with the hairdresser's boyfriend.
- Fiona played squash with Susan and the model.
- Susan borrowed some money from the violinist.
- The model bought some flowers from the florist.
- The dancer was fond of the model's brother.
- Both the hairdresser and the violinist like to go to concerts with Linda.

Solution

Number the statements:

1. The dancer danced with the hairdresser's boyfriend.
2. Fiona played squash with Susan and the model.
3. Susan borrowed a fiver from the violinist.
4. The model bought some flowers from the florist.
5. The dancer was fond of the model's brother.
6. Both the hairdresser and the violinist like to go to concerts with Linda.

From 2: Neither Fiona nor Susan are the model i.e. Linda must be the model.

From 6: Linda is not the hairdresser or the violinist and the hairdresser is not the violinist.

From 3: Susan is not the violinist so Fiona must be the violinist. Also, this means that Fiona cannot be the hairdresser i.e. Susan must be the hairdresser.

From 4 and 5: The model (Linda) is not the florist or the dancer which means Linda must be the journalist.

From 1: The hairdresser (Susan) cannot be the dancer so she must be the florist which means Fiona is the dancer.

	Dancer	Hairdresser	Model	Violinist	Florist	Journalist
Fiona	Y	N	N	Y	N	N
Susan	N	Y	N	N	Y	N
Linda	N	N	Y	N	N	Y

So, Fiona is the dancer and violinist; Susan is the hairdresser and florist and Linda is the model and journalist.