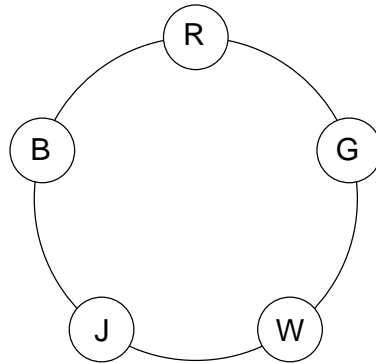


PRIMARY ROUND 1 solutions

P1.1.

Five people, Robin, Gerry, Willow, Jack and Bella, sat down in that order round a table to transact a little business. Their first item of business was to elect one of their number as chairperson.

The result of the first ballot, in which none of them voted for either of their two neighbours, showed that each of them had received one vote. In the second ballot four of them voted as before, but Willow voted for Bella, who thus became chairperson. None of them was conceited enough to vote for themselves.



Who voted for Gerry in the first ballot?

Solution

First vote has two possibilities:

R voted for J
G voted for B
W voted for R
J voted for G
B voted for W

or

R voted for W
G voted for J
W voted for B
J voted for R
B voted for G

But then Willow changed her vote to Bella and so it must have been the first option above.

Then with the second vote we have:

R voted for J
G voted for B
W voted for B
J voted for G
B voted for W

So Jack voted for Gerry in the first ballot.

P1.2.

Five integers have a mean of 16. The median is 17. The mode is 21. The range of the five integers is 12. What are the five integers?

Solution

The median is the middle number, so it is 17.

The mode of 21 must occur at least twice, but only two of the numbers can be greater than 17 so it must occur exactly twice.

The range is 12, so the smallest number must be $21 - 12 = 9$.

Let the missing number be x .

The mean is 16 so

$$\frac{9 + x + 17 + 21 + 21}{5} = 16$$

$$68 + x = 80$$

$$x = 12$$

The five integers are 9, 12, 17, 21 and 21.

P1.3.

One of the highlights of the local village social life is the stage production organised by the Amateur Youth Players and the rehearsals are in full swing for *The Gondoliers*. When I called the treasurer the other day he was estimating the costs. The first scene, in case you have forgotten, shows 24 maidens of Venice making up small bunches of red and white roses. He had intended that each girl would have three red and two white roses until he realised that the red roses cost twice as much each as the white ones. He decided to give half the girls three red and two white roses each and the remainder two red and three white roses. He had cut the cost by £3. How much is a red rose?

Solution

Let the cost of a red rose be £ R and of white rose be £ W .

12 girls had three red roses and two white roses so the cost of these is £ $(36R + 24W)$.

The other 12 girls had two red roses and three white roses so the cost of these is £ $(24R + 36W)$.

Originally the cost would have been £ $(72R + 48W)$ and the new cost is £ $(60R + 60W)$.

So the saving is $(72R + 48W) - (60R + 60W) = 12R - 12W = 3$.

But $W = \frac{1}{2}R$ so

$$12R - 12\left(\frac{1}{2}R\right) = 3$$

$$6R = 3.$$

Hence the cost of a red rose is 50 pence.