

Primary Division 2018-2019 Round 1 Solutions

- P1.1.** Grace and Noah play a two-person game in which the winner gains 2 points and the loser loses 1 point.
If Grace won exactly 4 games and Noah had a final score of 6 points, how many games did they play?

Solution

For the 4 games that Grace won she gets 2 points for each and Noah loses one point for each, so he loses 4 points.

To make his final score up to 6 Noah needs to make up the 4 points on the games he lost and also get a further 6 points. So Noah needs 10 points which he can do if he wins 5 games.
So in all $4 + 5 = 9$ games were played.

- P1.2.** Early on a very hot day, a greengrocer places 20 kilograms of courgettes on display outside his shop. At that moment, the courgettes are 99% water. It turns out to be the hottest day of the year, and as a result, the courgettes dry out a bit. At the end of the day, the greengrocer has not sold a single courgette, and the courgettes are only 98% water. What weight of courgettes does he have at the end of the day?

Solution

In the morning, the 20 kilograms of courgettes are 99% water. So the non-water part of the courgettes has a mass of 1% of 20 kilograms which is 0.2 kilograms.

At the end of the day, the courgettes are 98% water. The remaining 2% is still the 0.2 kilograms of non-water material (which does not change when the water evaporates). If 2% equals 0.2 kilograms, then 100% equals 50×0.2 kilograms which is 10 kilograms.

So, at the end of the day, the greengrocer has 10 kilograms of courgettes left,

- P1.3.** On a coastline there are three lighthouses.
The first light shines for 3 seconds, then is off for 3 seconds.
The second light shines for 4 seconds, then is off for 4 seconds.
The third light shines for 5 seconds, then is off for 5 seconds.
All three lights have just come on together.

When is the first time that all three lights will be off?

When is the next time that all three lights will come on at the same moment?

Solution

The first light will be off between 3 and 6 seconds.

The second light will be off between 4 and 8 seconds.

The third light will be off between 5 and 10 seconds.

So all three will first be off after 5 seconds.

The first light comes on at multiples of 6 seconds.

The second light comes on at multiples of 8 seconds.

The third light comes on at multiples of 10 seconds.

The smallest multiple of 6, 8 and 10 is $6 \times 4 \times 5 = 120$.

So all lights next come on together after 120 seconds or 2 minutes.