

Questions from Wing Kit (18.09.13)

Four children decided to find out their total mass. As they did not want their friends to know their individual mass, the children decided to weigh themselves 3 persons at a time. Although the children tried **all possible ways of grouping themselves into threes** for weighing, only four different readings were repeatedly recorded on the weighing scale.

99.5 kg , 108.1 kg , 111.7 kg , 116.3 kg

Find the combined mass of the heaviest child and the lightest child.

Solution:

Light-----Heaviest

A B C D

4 possible mass combinations:

$$B+C+D \rightarrow 116.3\text{kg (Heaviest)}$$

$$A+C+D \rightarrow 111.7\text{kg}$$

$$A+B+D \rightarrow 108.1\text{kg}$$

$$A+B+C \rightarrow 99.5\text{kg (Lightest)}$$

Sum of all 4 combinations:

$$3A + 3B + 3C + 3D \rightarrow 435.6\text{kg}$$

$$3A + 3B + 3C \rightarrow 99.5 \times 3 = 298.5\text{kg}$$

$$3D \rightarrow 435.6\text{kg} - 298.5\text{kg} = 137.1\text{kg}$$

$$1D \rightarrow 137.1\text{kg} \div 3 = 45.7\text{kg}$$

$$3B + 3C + 3D \rightarrow 116.3\text{kg} \times 3 = 348.9\text{kg}$$

$$3A \rightarrow 435.6\text{kg} - 348.9\text{kg} = 86.7\text{kg}$$

$$1A \rightarrow 86.7\text{kg} \div 3 = 28.9\text{kg}$$

$$1A + 1D \rightarrow 28.9\text{kg} + 45.7\text{kg} = 74.6\text{kg}$$

Ans: The heaviest child and the lightest child weigh a total of **74.6kg**.