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FRACTIONS

2004B 14. **(C)** If there are initially B blue marbles in the bag, after red marbles are added, then the total number of marbles in the bag must be $3B$. Then after the yellow marbles are added, the number of marbles in the bag must be $5B$. Finally, adding B blue marbles to the bag gives $2B$ blue marbles out of $6B$ total marbles. Thus $1/3$ of the marbles are blue.

OR

Just before the number of blue marbles is doubled, the ratio of blue marbles to non-blue marbles is 1 to 4. Doubling the number of blue marbles makes the ratio 2 to 4, so $1/3$ of the marbles are blue.

2009B

15. **Answer (E):** Let x be the weight of the bucket and let y be the weight of the water in a full bucket. Then we are given that $x + \frac{2}{3}y = a$ and $x + \frac{1}{2}y = b$. Hence $\frac{1}{6}y = a - b$, so $y = 6a - 6b$. Thus $x = b - \frac{1}{2}(6a - 6b) = -3a + 4b$. Finally, $x + y = 3a - 2b$.

OR

The difference between a kg and b kg is the weight of water that would fill $\frac{1}{6}$ of a bucket. So the weight of water that would fill $\frac{1}{2}$ of a bucket is $3(a - b)$. Therefore the weight of a bucket filled with water is $b + 3(a - b) = 3a - 2b$.