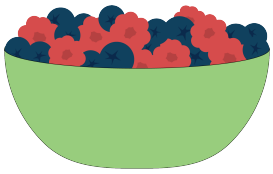

Problem of the Week
Problem E and Solution
Fruit Bowl

Problem

A bowl contains raspberries and blueberries. Natacha added 10 more raspberries to the bowl, then determined that $\frac{3}{10}$ of the berries in the bowl were raspberries. Jing then added 20 more blueberries to the bowl, then determined that $\frac{1}{4}$ of the berries in the bowl were raspberries.

What fraction of the original berries in the bowl were raspberries?

Solution

Let r represent the number of raspberries originally in the bowl, and let b represent the number of blueberries originally in the bowl.

After Natacha added 10 more raspberries, there were $r + 10$ raspberries and b blueberries. Since $\frac{3}{10}$ of the berries in the bowl were raspberries,

$$\begin{aligned} \frac{r+10}{r+10+b} &= \frac{3}{10} \\ 10r + 100 &= 3r + 30 + 3b \\ 7r - 3b + 70 &= 0 \end{aligned} \tag{1}$$

After Jing added 20 more blueberries, there were $r + 10$ raspberries and $b + 20$ blueberries. Since $\frac{1}{4}$ of the berries in the bowl were raspberries,

$$\begin{aligned} \frac{r+10}{r+10+b+20} &= \frac{1}{4} \\ 4r + 40 &= r + b + 30 \\ 3r + 10 &= b \end{aligned} \tag{2}$$

Substituting equation (2) into equation (1),

$$\begin{aligned} 7r - 3(3r + 10) + 70 &= 0 \\ 7r - 9r - 30 + 70 &= 0 \\ -2r + 40 &= 0 \\ r &= 20 \end{aligned}$$

Then $b = 3(20) + 10 = 70$. Therefore, there were originally 20 raspberries and 70 blueberries in the bowl. Thus, the fraction of the original berries in the bowl that were raspberries is $\frac{20}{20+70} = \frac{20}{90} = \frac{2}{9}$.