

Lesson 111: Three statements of equality

1. There were 26 nickels, dimes, and quarters in all, and their value was \$2.25.

	#	Value
How many coins of each type	Nickels	N
were there if there were	Dimes	D
10 times as many nickels as	Quarters	Q
quarters?		

$$\begin{cases} N + D + Q = 26 \\ 5N + 10D + 25Q = 225 \end{cases}$$

→ $N = 10Q$

$$\begin{cases} 11Q + D = 26 \\ 50Q + 10D + 25Q = 225 \end{cases}$$

$$\begin{cases} 11Q + D = 26 \Rightarrow D = 26 - 11Q \\ 75Q + 10D = 225 \end{cases}$$

$$\begin{aligned} 75Q + 10(26 - 11Q) &= 225 \\ 75Q + 260 - 110Q &= 225 \\ -35Q &= -35 \end{aligned}$$

$Q = 1 \quad N = 10 \quad D = 15$

2. The total number of blues, greens, and yellows in a pot was 7. The blues weighed 1 pound each, the greens weighed 4 pounds each, and the yellows weighed 5 pounds each. The total weight was 25 pounds. There is 1 more yellow than green.

$$\begin{cases} B + G + Y = 7 \\ B + 4G + 5Y = 25 \\ Y = G + 1 \end{cases}$$

$$\begin{cases} -B - 2G = -6 \\ B + 9G = 20 \end{cases}$$

$$\begin{cases} B + G + G + 1 = 7 \\ B + 4G + 5(G + 1) = 25 \\ (B + 2G = 6) - 1 \\ B + 9G = 20 \end{cases}$$

$$\begin{aligned} 7G &= 14 \\ G &= 2 \\ Y &= 3 \\ B &= 2 \end{aligned}$$