
Problem of the Week

Solution One

“I paid twelve cents for the eggs I bought from the grocer,” explained the cook, “but I made him throw in two extra eggs because they were so little. That made the lot cost one cent per dozen less than the original asking price for a dozen eggs.”

How many eggs did the cook buy?

Let x denote the number of eggs the cook bought. Since x eggs cost 12 cents, we see that a single egg costs $\frac{12}{x}$ cents, while a dozen eggs cost $\frac{144}{x}$ cents. Likewise, 12 cents for $x + 2$ eggs comes to $\frac{144}{x+2}$ cents for a dozen eggs. The given information now translates into the equation:

$$\frac{144}{x} - \frac{144}{x+2} = 1.$$

We can solve this equation to get:

$$\begin{aligned}\frac{1}{x} - \frac{1}{x+2} &= \frac{1}{144} \\ \frac{x+2}{x(x+2)} - \frac{x}{x(x+2)} &= \frac{1}{144} \\ \frac{2}{x(x+2)} &= \frac{1}{144} \\ x^2 + 2x - 288 &= 0 \\ (x-16)(x+18) &= 0,\end{aligned}$$

which implies that $x = 16$.

This works! Twelve cents for sixteen eggs comes to nine cents for a dozen. Twelve cents for eighteen eggs works out to eight cents for a dozen.