Problem of the Week
Problem C and Solution
Meal Deal

Problem

Jessica and Callista go the local burger joint. They both want to buy the meal deal. Jessica has $\frac{3}{4}$ of the money needed to buy the meal deal and Callista has half of the money needed to buy the meal deal. If the meal deal was $3$ cheaper, then together they would have exactly enough money to buy two of the meal deals.

What is the original price of the meal deal?

Solution

Solution 1:
Suppose that the cost of the meal deal, in dollars, is $C$. Then Jessica has $\frac{3}{4}C$ and Callista has $\frac{1}{2}C$. Combining their money, together Jessica and Callista have

$$\frac{3}{4}C + \frac{1}{2}C = \frac{3}{4}C + \frac{2}{4}C = \frac{5}{4}C$$

If the meal deal was $3$ cheaper, then the cost to buy one meal deal would be $C - 3$. If the cost of one meal deal was $C - 3$, then the cost to buy two meal deals at this price would be $2(C - 3) = (C - 3) + (C - 3) = 2C - 6$.

Combined, Jessica and Callista would have enough money to buy exactly two meal deals at this reduced price. Thus, $2C - 6 = \frac{5}{4}C$.

Solving for $C$,

$$2C - 6 = \frac{5}{4}C$$

$$2C - \frac{5}{4}C = 6$$

$$\frac{8}{4}C - \frac{5}{4}C = 6$$

$$\frac{3}{4}C = 6$$

$$3C = 24$$

$$C = 8$$

Therefore, the original price of the meal deal is $8$. 
Solution 2:

Since the new price of the meal deal is $3 cheaper than the original price, then the original price must be more than $3. We will use systematic trial and error to figure out the original price.

Suppose the original price of the meal deal was $6. Then the reduced price would be $3. Also, Jessica has \( \frac{3}{4} \times 6 = \$4.50 \) and Callista has \( \frac{1}{2} \times 6 = \$3 \), and in total they have \( \$4.50 + \$3 = \$7.50 \). With \$7.50\), they could buy exactly \( 7.50 \div 3 = 2.5 \) meal deals at a price of \$3 each.

Suppose the original price of the meal deal was $12. Then the reduced price would be $9. Also, Jessica has \( \frac{3}{4} \times 12 = \$9 \) and Callista has \( \frac{1}{2} \times 12 = \$6 \), and in total they have \( \$9 + \$6 = \$15 \). With \$15\), they could buy \( 15 \div 9 \approx 1.67 \) meal deals at a price of \$9 each.

We can see that the original price of the meal deal lies somewhere between \$6 and \$12.

Let’s suppose the original price of the meal deal was $8. Then the reduced price would be $5. Also, Jessica has \( \frac{3}{4} \times 8 = \$6 \) and Callista has \( \frac{1}{2} \times 8 = \$4 \), and in total they have \( \$6 + \$4 = \$10 \). With \$10\), they could buy exactly \( 10 \div 5 = 2 \) meal deals at a price of \$5 each.

Thus, we can see that the original price of the meal deal is \$8.\)