Problem of the Week
Grade 7 and 8

Made To Order Math
Solution

Problem

A fast food restaurant sells three items: pitas, baked potato chips and bottled water. The price of an item does not change regardless of the quantity purchased. Purchasing a pita, a bag of baked potato chips and a bottled water costs \$6.00. For \$9.50 you can buy two pitas, a bag of baked potato chips and a bottled water. A pita and a bottled water can be purchased for \$4.70. Cyril Dorder, known by his friends as "Cy", purchases three pitas, two bags of baked potato chips and a bottled water. What will lunch cost Cy Dorder?

Solution 1

In this solution we will present a logical, non-algebraic approach to solving the problem. The subscriber is also encouraged to look at Solution 2, an algebraic approach to solving the problem.

For \$6.00 you get a pita, a bag of potato chips and a bottle of water. For \$9.50 you get the same items plus a second pita. The difference in the two prices is the cost of one pita. Therefore, one pita costs $\$9.50 - \$6.00 = \$3.50$.

For \$4.70 you get a pita and a bottle of water and we know that a pita costs \$3.50. The difference must be the cost of a bottle of water so a bottle of water costs $\$4.70 - \$3.50 = \$1.20$.

Finally we know that a pita costs \$3.50, a bottle of water costs \$1.20 and all three items cost \$6.00. The difference between the cost of all three items and the cost of two of the items must be the cost of the third item so the cost of a bag of potato chips is
$\$6.00 - \$3.50 - \$1.20 = \$1.30$.

Once we know the cost of the three items individually we can determine the cost of Cyril's order. Three pitas cost $3 \times \$3.50 = \$10.50$, two bags of potato chips cost $2 \times \$1.30 = \$2.60$, and a bottle of water costs \$1.20. The total cost is the sum of the three totals,
$\$10.50 + \$2.60 + \$1.20 = \$14.30$.

$\therefore$ **the cost of Cy Dorder's lunch is** \$14.30**.**

Solution 2 is on the next page.

Problem

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Solution 2

In this solution we will present an algebraic approach to solving the problem.

Let p represent the cost of one pita.
Let b represent the cost of one bag of baked potato chips.
Let w represent the cost of one bottle of water.

A pita, a bag of baked potato chips and a bottled water cost \$6.00 so $p + b + w = \$6.00$. (1)
Two pitas, a bag of potato chips and a bottled water cost \$9.50 so $2p + b + w = \$9.50$. (2)
A pita and a bottled water can be purchased for \$4.70 so $p + w = \$4.70$. (3)

We will use equations (1) and (2) to solve for p.

$$\begin{aligned} 2p + b + w &= \$9.50 \quad (2) \\ p + b + w &= \$6.00 \quad (1) \end{aligned}$$

Subtracting (1) from (2), we obtain $p = \$3.50$.

We will use equations (1) and (3) to solve for b.

$$\begin{aligned} p + b + w &= \$6.00 \quad (1) \\ p + w &= \$4.70 \quad (3) \end{aligned}$$

Subtracting (3) from (1), we obtain $b = \$1.30$.

We can now substitute $p = \$3.50$ and $b = \$1.30$ into equation (1) to find w.

$$\begin{aligned} p + b + w &= \$6.00 \quad (1) \\ \$3.50 + \$1.30 + w &= \$6.00 \\ \$4.80 + w &= \$6.00 \\ w &= \$6.00 - \$4.80 \\ w &= \$1.20 \end{aligned}$$

Cy Dorder wants three pitas, two bags of baked potato chips and a bottle of water. This translates to the algebraic expression $3p + 2b + w$ which we need to evaluate when $p = \$3.50$, $b = \$1.30$ and $w = \$1.20$.

Evaluating, we obtain $3p+2b+w = 3(\$3.50)+2(\$1.30)+(\$1.20) = \$10.50+\$2.60+\$1.20 = \$14.30$.

$\therefore$ **the cost of Cy Dorder's lunch is** \$14.30**.**