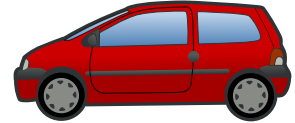




Problem of the Week

Problem D and Solution

The Deals are Red Hot



Problem

An automobile dealer purchased two cars. The dealer then sold the cars, the first at a profit of 40% and the second at a profit of 60%. The total profit on the sale of the two cars was 54% and a total of \$88 704 was received from the sale of the two cars. What did the dealer originally pay for each of the two cars?

Solution

Solution 1

Let a represent what the dealer paid for the first car and b represent what was paid for the second car.

The profit on the sale of the first car was 40% or $0.4a$. The first car was sold for $a + 0.4a = 1.4a$. The profit on the sale of the second car was 60% or $0.6b$. The second car was sold for $b + 0.6b = 1.6b$. The total selling price of the two cars was \$88 704 so

$$1.4a + 1.6b = 88\,704$$

Multiplying by 5: $7a + 8b = 443\,520$ (1)

The dealer bought both cars for a total of $(a + b)$. The profit on the sale of the two cars was 54% or $0.54(a + b)$. The two cars sold for $(a + b) + 0.54(a + b) = 1.54(a + b)$. But the total selling price was \$88 704 so

$$1.54(a + b) = 88\,704$$

$$a + b = 88\,704 \div 1.54$$

$$a + b = 57\,600$$
 (2)

Solving the system of equations using elimination:

$$7a + 8b = 443\,520$$
 (1)

Multiplying (2) by 7: $7a + 7b = 403\,200$ (3)

Subtracting (3) from (1): $b = 40\,320$

Since $b = 40\,320$ and $a + b = 57\,600$, then $a = 17\,280$ follows.

The dealer paid \$17 280 for the first car and \$40 320 for the second car.





Solution 2

Let a represent what the dealer paid for the first car and b represent what was paid for the second car.

The profit on the sale of the first car was 40% or $0.4a$. The first car was sold for $a + 0.4a = 1.4a$. The profit on the sale of the second car was 60% or $0.6b$. The second car was sold for $b + 0.6b = 1.6b$. The total selling price of the two cars was \$88 704 so:

$$1.4a + 1.6b = 88\,704$$

Multiplying by 5: $7a + 8b = 443\,520$ (1)

The dealer bought both cars for a total of $(a + b)$. The profit on the sale of the two cars was 54% or $0.54(a + b)$. The total profit is the sum of the profit from the sale of each car so:

$$0.54(a + b) = 0.4a + 0.6b$$

$$0.54a + 0.54b = 0.4a + 0.6b$$

$$0.14a = 0.06b$$

Multiplying by 50: $7a = 3b$ (2)

Substituting $3b$ for $7a$ in (1), $3b + 8b = 443\,520$ or $11b = 443\,520$ and $b = 40\,320$ follows.

Substituting $b = 40\,320$ in (2), $7a = 120\,960$ and $a = 17\,280$ follows.

The first car cost \$17 280 and the second car cost \$40 320.

