

Lesson 14: Multi-Step Ratio Problems

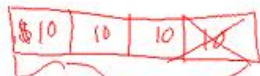
Classwork

Example 1: Bargains

Peter's Pants Palace advertises the following sale: Shirts are $\frac{1}{2}$ off the original price; pants are $\frac{1}{3}$ off the original price, and shoes are $\frac{1}{4}$ off the original price.

a. If a pair of shoes cost \$40 what is the sales price?

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The sales price is \$30.

Sub. $\frac{1}{4}$ of price

$$40 - (\frac{1}{4} \cdot 40)$$

$$40 - 10$$

$$\$30$$

$$(1 - \text{rate}) \times OP$$

$$(1 - \frac{1}{4}) \times 40$$

$$\frac{3}{4} \times 40$$

$$\$30$$

b. At Peter's Pants Palace, a pair of pants usually sells for \$33.00. What is the sale price of Peter's pants?



Sales price is \$22

$$33 - (\frac{1}{3} \cdot 33)$$

$$33 - 11$$

$$\$22$$

$$(1 - \frac{1}{3}) \times 33$$

$$\frac{2}{3} \times 33$$

$$\$22$$

Example 2: Big Al's Used Cars

A used car salesperson receives a commission of $\frac{1}{12}$ of the sales price of the car for each car he sells. What would the sales commission be on a car that sold for \$21,999?

$$\text{Commission} = \text{rate} \times \text{total sales Amount}$$

$$\text{Commission} = \frac{1}{12} \times 21,999$$

$$\text{Commission} = \$1,833.25$$

The salesperson received \$1,833.25 in commission

Example 3: Tax Time

As part of a marketing plan, some businesses mark up their prices before they advertise a sales event. Some companies use this practice as a way to entice customers into the store without sacrificing their profits.

A furniture store wants to host a sales event to improve its profit margin and to reduce its tax liability before its inventory is taxed at the end of the year.

How much profit will the business make on the sale of a couch that is marked-up by $\frac{1}{3}$ and then sold at a $\frac{1}{5}$ off discount if the original price is \$2,400?

Example 4: Born to Ride

A motorcycle dealer paid a certain price for a motorcycle and marked it up by $\frac{1}{5}$ of the price he paid. Later he sold it for

\$14,000. What is the original price?

Handwritten solution for Example 4:

Let $OP(\$x)$ be the original price. The dealer marks it up by $\frac{1}{5}$ of the price he paid. This is shown as a bar divided into six segments, each labeled $\frac{1}{5}x$. A bracket under the first five segments is labeled $\$14,000$. An arrow labeled "mark up" points to the sixth segment, which is labeled $\frac{1}{5}x$.

$$\frac{6}{5}x = \frac{14,000}{\frac{6}{5}}$$

$$x = \$11,666.67$$

Let $x =$ original price

$$\text{markup price} = (1 + \text{rate}) \cdot OP$$

$$14,000 = (1 + \frac{1}{5})x$$

$$\frac{14,000}{1\frac{1}{5}} = \frac{1\frac{1}{5}x}{1\frac{1}{5}}$$

$$x = \$11,666.67$$