Examples 5 in Ratios and Rates

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0. A's weight is 14/15 of the weight of B. How heavy is B with respect to A?

1. In a class, the number of male students is 11 less than 4/5 of the total number of students in the class. The number of female students is 4/9 of the total number of the students in the class. How many students are there in the class?

2. Of the three numbers, A, B and C, the total sum is 1501. A is 85% of B, and C is 3 larger than B.
What then are the three numbers?

3. On the first day of the trip, Tom spent a quarter of the total amount of the money he had before he took the trip. On the second day, he spent 1/5 of the money he spent on the first day. Now, he has 490 dollars.
How much then did he have before he left?

Suggestions or Solutions
To The Problem 0 In Examples 5

0. A's weight is 14/15 of the weight of B.

How heavy is B with respect to A?

Assuming A is the weight of A, and B is the weight of B, we get A = $\frac{14}{15}$B $\Rightarrow$ $\frac{15}{14}$A = $\frac{15}{14}$ x $\frac{14}{15}$B = B0.

Thus, we get B = $\frac{15}{14}$A.

Therefore, B's weight is $\frac{15}{14}$ of the weight of A.

Suggestions or Solutions
To The Problem 1 In Examples 5

1. In a class, the number of male students is 11 less than 4/5 of the total number of students in the class. The number of female students is 4/9 of the total number of the students in the class. How many students are there in the class?

Assuming T is the total number of students, M is the number of male students, and F is the number of female students. What then are we after in this problem?

It is T, and we know T = M + F, so we want to get M and F first, so that we can get T.

Thus to begin with, since the number of male students is 4 less than 4/5 of the total, we get M = $\frac{4}{5}$T – 11.

Next, the number of female students is $\frac{4}{9}$ of the total.

So we get F = $\frac{4}{9}$T.

So we get T = M + F = $\frac{4}{5}$T – 11 + $\frac{4}{9}$T.

Thus, we get T = $\frac{4}{5}$T – 11 + $\frac{4}{9}$T $\Rightarrow$ ($\frac{4}{5}$+$\frac{4}{9}$ – 1)T = 11… (1)

And we get $\frac{4}{5}$+$\frac{4}{9}$ – 1 = $\frac{4}{5}$x$\frac{9}{9}$+ $\frac{5}{5}$x$\frac{4}{9}$ – $\frac{9}{5}$x$\frac{5}{9}$

= $\frac{36+20-45}{45}=\frac{11}{45}$.

So from (1), we get ($\frac{4}{5}$+$\frac{4}{9}$ – 1)T = $\frac{11}{45}$T =11 $\Rightarrow$ T = 45.

Suggestions or Solutions
To The Problem 2 In Examples 5

2. Of the three numbers, A, B and C, the total sum is 288. Suppose A is 85% of B, and C is 3 larger than B. What then are the three numbers then?

The total sum is 288, so we get $A + B + C = 288$.
A is 85% of B, so we get $A = 0.85B$.
And C is 3 larger than B, so we get $C – B = 3$.

Now, we have $A + B + C = 288$.
And looking at $A = 0.85B$ and $C – B = 3$, we can put the equation above in terms of B, and can get B, first.

Then first, we have $A = 0.85B$, and we can get
$C – B = 3 \Rightarrow C = B + 3$.
So we get $A + B + C = 288$
$\Rightarrow 0.85B + B + B + 3 = 2.85B + 3 = 288 \Rightarrow 2.85B = 285$.
$\Rightarrow B = 100 \Rightarrow A = 0.85B = 0.85 \times 100 = 85$,
and $C = B + 3 = 103$.

Suggestions or Solutions
To The Problem 3 In Examples 5

3. On the first day of the trip, Tom spent 1/4 of the total amount of the money he has before he took the trip. On the second day, he spent 1/5 of the money he spent on the first day. Now, he has 490 dollars.
How much then did he have before he left?

Suppose T is the amount of money Tom had before he left, F is the amount of money spent on the first day, and S is the amount of money spent on the second day.
What then are we after?

We are after T.
And we can say that T is made up of F, S, and 500 dollars.
Thus, we have T = F + S + 490.
So if we put the equation above in terms of T, we can get T.
On the first day of the trip, Tom spent a quarter of T.
So we get F = $\frac{1}{4}$T

On the second day, he spent $\frac{1}{5}$ of F.

So we get S = $\frac{1}{5}$F = $\frac{1}{5}$ x $\frac{1}{4}$ x T = $\frac{1}{20}$T

Thus, we get T = F + S + 490 = $\frac{1}{4}$T + $\frac{1}{20}$T + 490.

$\frac{1}{4}$T + $\frac{1}{20}$T = $\frac{5+1}{20}$T = $\frac{3}{10}$T

So we get T = $\frac{3}{10}$T + 490 $\Rightarrow$ $\frac{7}{10}$T = 490 $\Rightarrow$ T = 700.