F S U / UF Algebra Problem

(Solving a Literal Equation)

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PROBLEM: Given $\frac{1}{F}=\frac{1}{S}+\frac{1}{U}$, solve for S.

Solution:

First, find the LCD, which is FSU (to all the Florida Gator and Miami Hurricane fans, GO FLORIDA STATE!)

$$FSU \bullet \frac{1}{F} = FSU \bullet \frac{1}{S} + FSU \bullet \frac{1}{U}$$

In the first position, the F divides out, leaving SU.

In the second position the S divides out, leaving UF.

In the third position, the U divides out, leaving FS.

$$\cancel{F}\,SU \bullet \frac{1}{\cancel{F}} = F\,\cancel{S}\,U \bullet \frac{1}{\cancel{S}} + FS\,\cancel{U} \bullet \frac{1}{\cancel{U}}$$

$$SU = UF + FS$$

Now, in order to solve for S, you have to get all the S terms on one side of the equation. You can do that by subtracting FS from each side of the equation.

$$\begin{array}{rcl} SU & = & UF + FS \\ -FS & & -FS \\ \hline SU - FS & = & UF \end{array}$$

Now, to solve for S, you have to factor out the S on the left side of the equation:

$$SU - FS = UF$$

$$S(U - F) = UF$$

and divide both sides by $(U - F)$**:** $\dfrac{S(U - F)}{(U - F)} = \dfrac{UF}{(U - F)}$

$$S = \frac{UF}{U - F}$$

IMPORTANT NOTE: This problem is very much like my own career, in that I started (and graduated!) at FSU and then ended up (and graduated also!) at UF—except that I did NOT change colors!!

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