New Errata, Student Solution Manual

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We thank Lewis Atchison, Jonathan Bergknoff, and Steven Hoffenson for pointing out these errors.

page 26 Solution 1.9, part b: the matrix multiplication is wrong! This should be: The matrices of the compositions are given by matrix multiplication:

$$[S \circ T] = [S][T] = \begin{bmatrix} 0 & 0 & 1 \\ 1 & 0 & 0 \\ 0 & 1 & 0 \end{bmatrix} \quad \text{and} \quad [T \circ S] = [T][S] = \begin{bmatrix} 0 & 1 & 0 \\ 0 & 0 & 1 \\ 1 & 0 & 0 \end{bmatrix}.$$

page 55 Solution 2.1 is wrong. It should be:

(a) Row reduction gives

$$\begin{bmatrix} 1 & 1 & -1 & a \\ 1 & 0 & 2 & b \\ 1 & a & 1 & b \end{bmatrix} \rightarrow \begin{bmatrix} 1 & 1 & -1 & a \\ 0 & -1 & 3 & b-a \\ 0 & a-1 & 2 & b-a \end{bmatrix}$$

$$\rightarrow \begin{bmatrix} 1 & 0 & 2 & b \\ 0 & 1 & -3 & a-b \\ 0 & 0 & 3a-1 & a(b-a) \end{bmatrix}.$$

We will consider separately the cases $a = 1/3$ and $a \neq 1/3$. If $a = 1/3$, we get

$$\begin{bmatrix} 1 & 0 & 2 & b \\ 0 & 1 & -3 & \frac{1}{3} - b \\ 0 & 0 & 0 & \frac{1}{3}(b - \frac{1}{3}) \end{bmatrix},$$

so if $a = 1/3$ and $b = 1/3$, there are infinitely many solutions (there is no pivotal 1 in the 4th column or the 3rd column). If $a = 1/3$ and $b \neq 1/3$, then there are no solutions: by futher row reducing we can get a pivotal 1 in the 4th column.

If $a \neq 1/3$, then we can further row reduce our original matrix to get a pivotal 1 in the 3rd column. In that case the system of equations has a unique solution.

(b) We have already done all the work: the matrix of coefficients (i.e., the matrix consisting of the first three columns) is invertible if and only if $a \neq 1/3$.

84 Solution 3.7.5: The computed volume should be multiplied by 8; what we computed is just the volume in the first octant, where $x \geq 0$, $y \geq 0$, $z \geq 0$. Thus the total volume is $4\sqrt{2}$.