Properties of Operations with Numbers

1. The standard multiplication algorithm taught in (American) schools is illustrated below with an example. Explain why the algorithm works and determine the properties of numbers that are used. (In particular, be sure to explain why the 693 is shifted.)

\[
\begin{array}{c}
231 \\
\times 32 \\
\hline
462 \\
693 \\
\hline
7392
\end{array}
\]

2. Suppose that you are teaching the standard algorithm for division of fractions to children. (That is, \( \frac{a}{b} \div \frac{c}{d} = \frac{a}{b} \cdot \frac{d}{c} \).) Suppose a student in the class approaches you with the method illustrated below.

\[
\begin{array}{c}
8 \\
15 \\
\hline
2 \\
5 \\
\hline
4 \\
3
\end{array}
\]

(a) Is this method correct? Explain.

(b) What would you say to that child about the correctness and usefulness of her method?