

Division Error Patterns and Algorithms.

Below is the work of 3 fictional students. All of them are consistent in their work. Some of them (at least 1) are making consistent errors. That means, if there is the opportunity in the problem for them to make their ideosyncratic error, they will make it. Some of them (at least 1) have alternate algorithms that they are using (that yield the correct result in a reasonable way that is different from the standard algorithm). Try to get inside the head of each student and see if you can figure out what they are doing and why.

- Your task is to figure out what each student is doing and to do the same thing they would on the last two problems in each set.
- You then need to explain what they did in words: *what are they doing* and *why: is it an error or an alternate algorithm?* Try to use place value language to *describe why* their work is consistently in error or consistently works.

1.

$$\begin{array}{r} \\ 5 \overline{) 254} \\ \underline{250} \\ 4 \end{array}$$

$$\begin{array}{r} \\ 9 \overline{) 4560} \\ \underline{45} \\ 60 \\ \underline{54} \\ 6 \end{array}$$

$$\begin{array}{r} \\ 8 \overline{) 5840} \\ \underline{5600} \\ 240 \\ \underline{240} \\ 0 \end{array}$$

$$\begin{array}{r} \\ 7 \overline{) 2149} \\ \underline{2100} \\ 49 \\ \underline{49} \\ 0 \end{array}$$

$$6 \overline{) 4818}$$

$$7 \overline{) 3525}$$

Explain the pattern, and why it works or doesn't work.

$$2 \overline{) 88} \begin{array}{r} 44 \\ \underline{8} \\ 8 \\ \underline{8} \\ 0 \end{array}$$

$$4 \overline{) 164} \begin{array}{r} 41 \\ \underline{16} \\ 4 \\ \underline{4} \\ 0 \end{array}$$

$$3 \overline{) 228} \begin{array}{r} 76 \\ \underline{21} \\ 18 \\ \underline{18} \\ 0 \end{array}$$

$$5 \overline{) 465} \begin{array}{r} 93 \\ \underline{45} \\ 15 \\ \underline{15} \\ 0 \end{array}$$

$$3 \overline{) 75}$$

$$6 \overline{) 516}$$

Explain the pattern, and why it works or doesn't work.

3.

6
. 12
. 24
48

$$\begin{array}{r} 140R3 \\ 6 \overline{) 843} \\ \underline{600} \quad 100 \\ 243 \\ \underline{240} \quad 40 \\ 3 \end{array}$$

$$\begin{array}{r} 342R2 \\ 8 \overline{) 2738} \\ \underline{1600} \quad 200 \\ 1138 \quad 100 \\ \underline{800} \\ 338 \quad 40 \\ \underline{320} \\ 18 \quad 2 \\ \underline{16} \\ 2 \end{array}$$

$$\begin{array}{r} 524R10 \\ 14 \overline{) 7346} \\ \underline{5600} \quad 400 \\ 1746 \\ \underline{1400} \quad 100 \\ 346 \\ \underline{280} \quad 20 \\ 66 \\ \underline{56} \quad 4 \\ 10 \end{array}$$

$$\begin{array}{r} 281R22 \\ 26 \overline{) 7328} \\ \underline{5200} \quad 200 \\ 2128 \\ \underline{2080} \quad 80 \\ 48 \\ \underline{26} \quad 1 \\ 22 \end{array}$$

$$24 \overline{) 5132}$$

$$7 \overline{) 4391}$$

Explain the pattern, and why it works or doesn't work.

4. On the back of this page, show how to use long division to solve $2085 \div 3$. Tell how each step corresponds to the manipulative process.