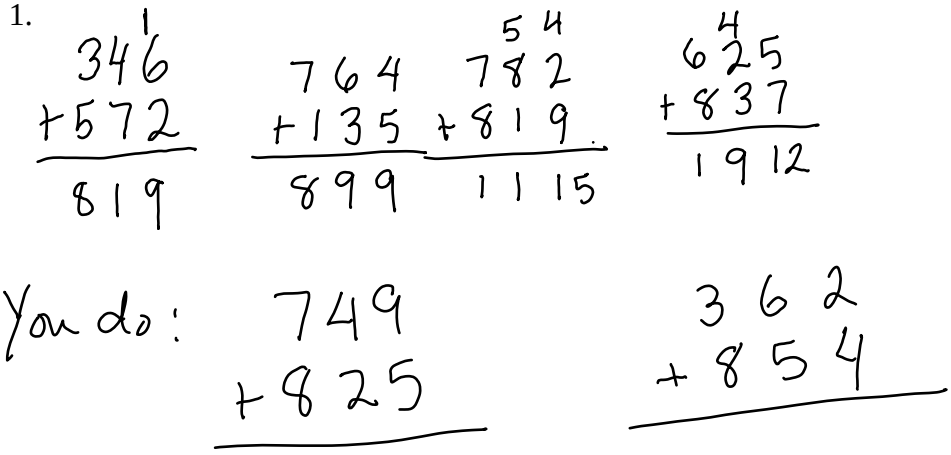
Error Patterns and Algorithms.

Below is the work of 12 fictional students. All of them are consistent in their work. Some of them 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, though in some problems they make errors and in other problems of a slightly different type they get correct answers. Some of them 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. If they are doing something right, you should do the same right thing they are doing. If they are making an error, you should make the same error they would make.
- 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.

Addition examples:

1.



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

2. $467 + 395$ → $767 \to 857 \to 862$

$743 + 191$ → $843 \to 933 \to 934$

$621 + 145$ → $721 \to 761 \to 766$

$943 + 172$ → $1043 \to 1113 \to 1115$

$781 + 465$

$932 + 189$

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

3. $74 + 13 = 87$

$65 + 49 = 1014$

$38 + 16 = 414$

$276 + 193 = 3169$

$29 + 35$

$74 + 68$

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

4.

$$\begin{array}{r} 24 \\ +30 \\ \hline 54 \end{array} \qquad \begin{array}{r} 28 \\ +9 \\ \hline 19 \end{array} \qquad \begin{array}{r} 4 \\ +18 \\ \hline 13 \end{array} \qquad \begin{array}{r} 37 \\ +4 \\ \hline 14 \end{array} \qquad \begin{array}{r} 15 \\ +23 \\ \hline 38 \end{array}$$

$$\begin{array}{r} 46 \\ +12 \\ \hline \end{array} \qquad \begin{array}{r} 38 \\ +5 \\ \hline \end{array}$$

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

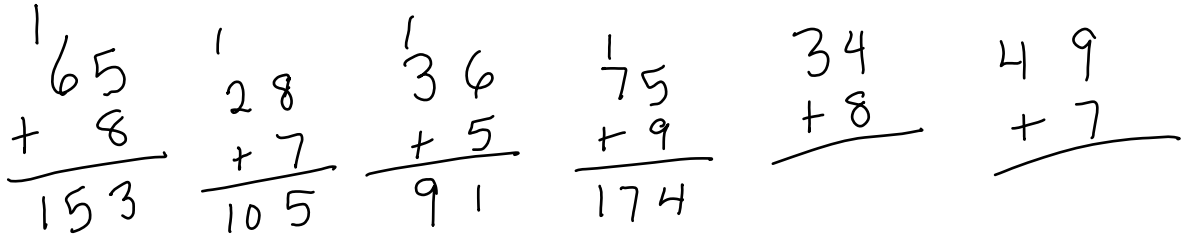
5.

$$\begin{array}{r} 523 \\ +678 \\ \hline 1291 \end{array} \qquad \begin{array}{r} 658 \\ +391 \\ \hline 1049 \end{array} \qquad \begin{array}{r} 792 \\ +186 \\ \hline 978 \end{array} \qquad \begin{array}{r} 459 \\ +183 \\ \hline 642 \end{array}$$

$$\begin{array}{r} 648 \\ +237 \\ \hline \end{array} \qquad \begin{array}{r} 486 \\ +297 \\ \hline \end{array}$$

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

6.



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

7. Choose one of the addition *errors* in the examples above, and write about how you would help the student correct that error.

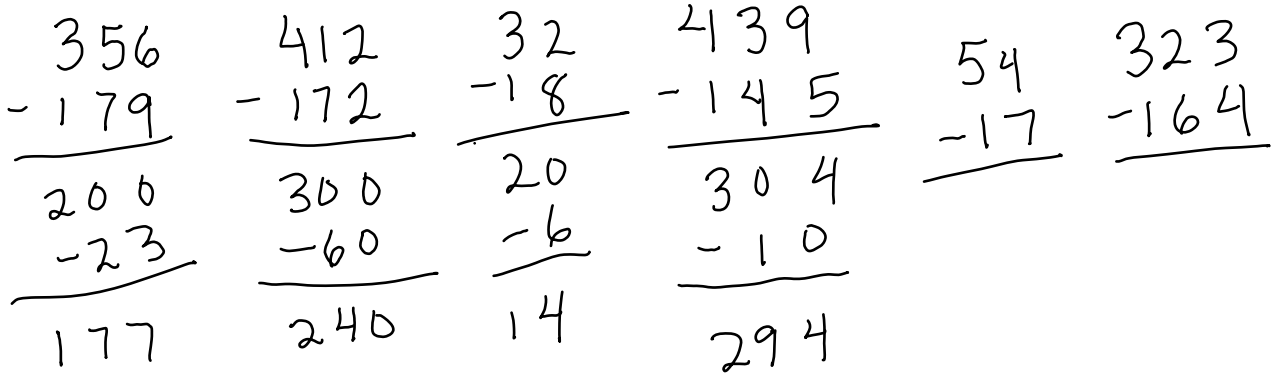
a. Which example are you focusing on?_____

b. If you were to go back to using manipulatives (such as base 10 blocks) to help the child fix his or her error, describe what that might look and sound like.

c. What else might you try to do to help the child fix his or her error? (Describe another teaching idea)

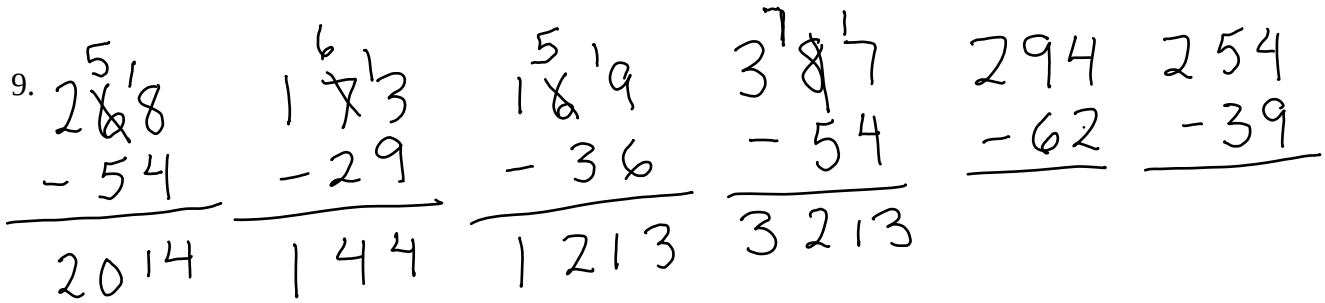
Subtraction Examples.

8.



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

9.



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

10.

548	611	341	536	416	416
−173	−135	−157	−287	−179	−174
375	536	284	259		

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

11.

70	300	60	100	80	500
−48	−193	−24	−74	−17	−324
32	217	46	36		

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

12.

743	74	439	231	82	325
−152	−18	−125	−86	−46	−167
643	64	339	151		
593	56	319	145		
591		314			

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

13.

143	647	372	306	454	326
− 30	−143	−130	−102	−134	−204
110	504	240	204		

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

14. Choose one of the *subtraction errors* in the examples above, and write about how you would help the student correct that error.

a. Which example are you focusing on?_____

b. If you were to go back to using manipulatives (such as base 10 blocks) to help the child fix his or her error, describe what that might look and sound like.

c. What else might you try to do to help the child fix his or her error? (Describe another teaching idea)