

Error Patterns and Algorithms.

name: _____

For each problem, analyze what the student is doing, do the next 2 computations *the way the student would do them*, and then explain.

Addition examples:

1.
$$\begin{array}{r} 346 \\ +572 \\ \hline 819 \end{array}$$

$$\begin{array}{r} 764 \\ +135 \\ \hline 899 \end{array}$$

$$\begin{array}{r} 782 \\ +819 \\ \hline 1115 \end{array}$$

$$\begin{array}{r} 625 \\ +837 \\ \hline 1912 \end{array}$$

$$\begin{array}{r} 749 \\ +825 \\ \hline \end{array}$$

$$\begin{array}{r} 362 \\ +854 \\ \hline \end{array}$$

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

2.
$$\begin{array}{r} 467 \\ +395 \\ \hline \end{array}$$

$$\begin{array}{r} 743 \\ +191 \\ \hline \end{array}$$

$$\begin{array}{r} 621 \\ +145 \\ \hline \end{array}$$

$$\begin{array}{r} 781 \\ +465 \\ \hline \end{array}$$

$$\begin{array}{r} 934 \\ +189 \\ \hline \end{array}$$

 $767 \rightarrow 857 \rightarrow 862$ $843 \rightarrow 933 \rightarrow 934$ $721 \rightarrow 761 \rightarrow 766$

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

3.
$$\begin{array}{r} 74 \\ +13 \\ \hline 87 \end{array}$$

$$\begin{array}{r} 65 \\ +49 \\ \hline 1014 \end{array}$$

$$\begin{array}{r} 38 \\ +16 \\ \hline 414 \end{array}$$

$$\begin{array}{r} 276 \\ +193 \\ \hline 3169 \end{array}$$

$$\begin{array}{r} 74 \\ +68 \\ \hline \end{array}$$

$$\begin{array}{r} 781 \\ +465 \\ \hline \end{array}$$

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

$$\begin{array}{r}
 4. \quad \begin{array}{r} 523 \\ + 678 \\ \hline 1201 \end{array} \quad \begin{array}{r} 658 \\ + 391 \\ \hline 1049 \end{array} \quad \begin{array}{r} 792 \\ + 186 \\ \hline 978 \end{array} \quad \begin{array}{r} 459 \\ + 183 \\ \hline 642 \end{array} \quad \begin{array}{r} 934 \\ + 189 \\ \hline \end{array} \quad \begin{array}{r} 781 \\ + 465 \\ \hline \end{array}
 \end{array}$$

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

$$\begin{array}{r}
 5. \quad \begin{array}{r} 468 \\ + 394 \\ \hline 7513 \end{array} \quad \begin{array}{r} 783 \\ + 572 \\ \hline 266 \end{array} \quad \begin{array}{r} 849 \\ + 387 \\ \hline 1317 \end{array} \quad \begin{array}{r} 434 \\ + 189 \\ \hline \end{array} \quad \begin{array}{r} 783 \\ + 659 \\ \hline \end{array}
 \end{array}$$

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

Subtraction Examples:

$$\begin{array}{r}
 6. \quad \begin{array}{r} 356 \\ - 179 \\ \hline 200 \\ - 23 \\ \hline 177 \end{array} \quad \begin{array}{r} 412 \\ - 172 \\ \hline 300 \\ - 60 \\ \hline 240 \end{array} \quad \begin{array}{r} 32 \\ - 18 \\ \hline 20 \\ - 6 \\ \hline 14 \end{array} \quad \begin{array}{r} 439 \\ - 145 \\ \hline 304 \\ - 10 \\ \hline 294 \end{array} \quad \begin{array}{r} 434 \\ - 189 \\ \hline \end{array} \quad \begin{array}{r} 627 \\ - 264 \\ \hline \end{array}
 \end{array}$$

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

$$\begin{array}{r}
 7. \quad \begin{array}{r} 742 \\ -359 \\ \hline 417 \end{array} \quad \begin{array}{r} 826 \\ -352 \\ \hline 534 \end{array} \quad \begin{array}{r} 692 \\ -438 \\ \hline 266 \end{array} \quad \begin{array}{r} 835 \\ -254 \\ \hline \end{array} \quad \begin{array}{r} 914 \\ -527 \\ \hline \end{array}
 \end{array}$$

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

$$\begin{array}{r}
 8. \quad \begin{array}{r} 5 \\ \cancel{8}02 \\ -259 \\ \hline 353 \end{array} \quad \begin{array}{r} 210 \\ \cancel{3}87 \\ -129 \\ \hline 188 \end{array} \quad \begin{array}{r} 3 \\ \cancel{4}05 \\ -137 \\ \hline 278 \end{array} \quad \begin{array}{r} 803 \\ -269 \\ \hline \end{array} \quad \begin{array}{r} 501 \\ -135 \\ \hline \end{array}
 \end{array}$$

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

$$\begin{array}{r}
 9. \quad \begin{array}{r} 518 \\ \cancel{2}8 \\ -54 \\ \hline 204 \end{array} \quad \begin{array}{r} 613 \\ \cancel{1}73 \\ -29 \\ \hline 144 \end{array} \quad \begin{array}{r} 519 \\ \cancel{1}89 \\ -36 \\ \hline 1213 \end{array} \quad \begin{array}{r} 377 \\ \cancel{3}87 \\ -54 \\ \hline 3213 \end{array} \quad \begin{array}{r} 294 \\ -62 \\ \hline \end{array} \quad \begin{array}{r} 254 \\ -39 \\ \hline \end{array}
 \end{array}$$

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

$$\begin{array}{r}
 10 \quad 743 \\
 \underline{-152} \\
 643 \\
 \quad 593 \\
 \quad \underline{\textcircled{591}}
 \end{array}
 \quad
 \begin{array}{r}
 74 \\
 \underline{-18} \\
 64 \\
 \quad \underline{\textcircled{56}}
 \end{array}
 \quad
 \begin{array}{r}
 439 \\
 \underline{-125} \\
 339 \\
 \quad 319 \\
 \quad \underline{\textcircled{314}}
 \end{array}
 \quad
 \begin{array}{r}
 231 \\
 \underline{-86} \\
 151 \\
 \quad \underline{\textcircled{145}}
 \end{array}
 \quad
 \begin{array}{r}
 627 \\
 \underline{-264}
 \end{array}
 \quad
 \begin{array}{r}
 425 \\
 \underline{-187}
 \end{array}$$

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

$$\begin{array}{r}
 11. \quad 143 \\
 \underline{-30} \\
 110
 \end{array}
 \quad
 \begin{array}{r}
 647 \\
 \underline{-143} \\
 504
 \end{array}
 \quad
 \begin{array}{r}
 372 \\
 \underline{-130} \\
 240
 \end{array}
 \quad
 \begin{array}{r}
 306 \\
 \underline{-102} \\
 204
 \end{array}
 \quad
 \begin{array}{r}
 454 \\
 \underline{-120}
 \end{array}
 \quad
 \begin{array}{r}
 326 \\
 \underline{-204}
 \end{array}$$

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

Multiplication

$$\begin{array}{r}
 12. \quad \begin{array}{r} 1 \\ 48 \\ \times 32 \\ \hline 96 \\ 1240 \\ \hline 1536 \end{array}
 \quad
 \begin{array}{r} 2 \quad 4 \\ 4 \quad 37 \\ \times 56 \\ \hline 2622 \\ 20550 \\ \hline 24472 \end{array}
 \quad
 \begin{array}{r} 2 \quad 2 \\ 6 \quad 33 \\ \times 548 \\ \hline 5064 \\ 24220 \\ 305500 \\ \hline 346884 \end{array}
 \quad
 \begin{array}{r} 364 \\ \times 78 \\ \hline \end{array}
 \end{array}$$

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