A.1 . Shelby and Scotty
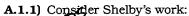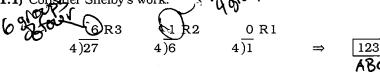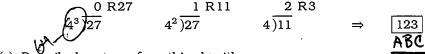
Shelby and Scotty want to express the number 27 in base 4. However, they used very different methods to do this. Let's check them out.

A.1.1) Consider Shelby's work:

$$\begin{array}{cccc} 6\ R3 & 1\ R2 & 0\ R1 \\ 4\overline{)27} & 4\overline{)6} & 4\overline{)1} & \Rightarrow \quad \boxed{123} \\ & & & \underline{ABC} \end{array}$$

(a) Describe how to perform this algorithm.

(b) Provide an additional relevant and revealing example demonstrating that you understand the algorithm.

A.1.2) Consider Scotty's work:

$$\begin{array}{cccc} 0\ R27 & 1\ R11 & 2\ R3 \\ 4^3\overline{)27} & 4^2\overline{)27} & 4\overline{)11} & \Rightarrow \quad \boxed{123} \\ & & & \underline{ABC} \end{array}$$

(a) Describe how to perform this algorithm.

(b) Provide an additional relevant and revealing example demonstrating that you understand the algorithm.

A.1.3) Create an illustration (or series of illustrations) based on the 27 marks below that models Shelby's method for changing bases.

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Further, explain why Shelby's method works.

A.1.4) Create an illustration (or series of illustrations) based on the 27 marks below that models Scotty's method for changing bases.

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Further, explain why Scotty's method works.