

The Smart Calculator

Exploring Patterns

Ho and Jane were working together on a math assignment. They were using a calculator to find the products shown below. Jane noticed that the first factor of each set of products was the same. She wondered if there was a way to use the calculator to find the products without entering the first factor each time. Ho said that he knew of a way to use the **M+** and the **MR** keys to tell the calculator to remember the first factor and then use the factor again. Can you help Jane figure out how Ho used these keys? Explain why your key sequence works. Then use your key sequence to complete the assignment. Describe the pattern you see in each problem.

○	1. $16 \times 1 =$ _____	2. $1,089 \times 1 =$ _____
	$16 \times 10 =$ _____	$1,089 \times 2 =$ _____
	$16 \times 100 =$ _____	$1,089 \times 3 =$ _____
	$16 \times 1,000 =$ _____	$1,089 \times 4 =$ _____
○	3. $10,989 \times 9 =$ _____	4. $9 \times 1,089 =$ _____
	$10,989 \times 8 =$ _____	$9 \times 10,989 =$ _____
	$10,989 \times 7 =$ _____	$9 \times 109,989 =$ _____
	$10,989 \times 6 =$ _____	$9 \times 1,099,989 =$ _____
○	5. $8 \times 9 =$ _____	6. $15,873 \times 7 =$ _____
	$8 \times 99 =$ _____	$15,873 \times 14 =$ _____
	$8 \times 999 =$ _____	$15,873 \times 21 =$ _____
	$8 \times 9,999 =$ _____	$15,873 \times 28 =$ _____

Thinking Cap



Use the pattern you found in each problem to give the next two products. Use the calculator to check your answers.

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Exploring Patterns

Topic: Number Patterns

Objective: To use the calculator to discover and extend patterns.

NCTM Standards: Communication, Patterns, and Functions

Using the Activity:

Students discover how to use the **M+** and the **MR** keys to find products that form patterns.

- The **M+** key can be used to enter the first factor into the memory of the calculator.
- The **MR** key can be used to recall the first factor and to find other products.

Example For the first product in problem 1, $16 \text{ M+ } 1 \text{ =}$ 16. For the second product, $\text{X } 10 = 160$. Continue using a similar key sequence to find all of the products. Note: The **MC** key should be used to clear the memory before a new first factor is entered.

Assessment Encourage students to check their final products to be sure they see a pattern.

Answers

See example for key sequence. **1.** 16; 160; 1,600; 16,000. The first two digits are 1 and 6. Each product has one more 0 at the end than the previous product. **2.** 1,089; 2,178; 3,267; 4,356. The first digits are the whole numbers in order starting with 1, the second digits are whole numbers in order starting with 0, the third digits are whole numbers starting at 8 and going backwards, and the last digits are whole numbers starting at 9 and going backwards. **3.** 98,901; 87,912; 76,923; 65,934. The first digits are whole numbers starting with 9 and going backwards, the second digits are whole numbers starting with 8 and going backwards, the third digits are all 9s, the fourth digits are whole numbers in order starting with 0, and the last digits are whole numbers in order starting with 1. **4.** 9,801; 98,901; 989,901; 9,899,901. The first digits are all 9s, the second digits are all 8s, the next to last digits are all 0s, and the last digits are all 1s. Each product has one more 9 after the 8 than the previous product. **5.** 72; 792; 7,992; 79,992. The first digits are all 7s and the last digits are all 2s. Each product has one more 9 after the 7 than the previous product. **6.** 111,111; 222,222; 333,333; 444,444. The first product is all 1s, the second all 2s, the third all 3s, and the fourth all 4s.

Thinking Cap

As an extension, students continue the pattern they found in each problem. They can use the key sequence they discovered to check their answers.