Name _____ Date _____

Multiply by Multiples of Ten

The distance from the Earth to the sun is 90,000,000 (rounded to the nearest ten million) miles. The number 90,000,000 is written here in standard form. We can use exponents to write this number in shorter form.

$$90{,}000{,}000 = 9 \times 10{,}000{,}000 = 9 \times 10^7$$

9×10^7 means to multiply $9 \times 10 \times 10 \times 10 \times 10 \times 10 \times 10 \times 10$.

1. **A.** Use your calculator to multiply $9 \times 10 \times 10 \times 10 \times 10 \times 10 \times 10 \times 10$. Write the number you see in the calculator's display.

   B. How many zeros do you see in this number? Use what you have learned about powers of ten to explain why.

2. Complete the table. Identify any patterns you see.

Shorter Form Using Exponents	Expanded Form	Product
9×10^1	9×10	90
9×10^2	$9 \times 10 \times 10$	
9×10^3		9000
	$9 \times 10 \times 10 \times 10 \times 10$	
9×10^5		
		9,000,000
	$9 \times 10 \times 10 \times 10 \times 10 \times 10 \times 10 \times 10 \times 10$	

***Student Activity Book* - Page 135**

Name _____ Date _____

✓ Check-In: Questions 3-4

3. Luis made a table to show the estimated distance each planet is from the sun. He forgot to complete some of this table. Use what you know about writing numbers in expanded form and in shorter form using exponents to complete the table.

Planet	Approximate Distance from the Sun (miles)	Distance from the Sun Expanded Form	Distance from the Sun Using Exponents
Mercury	40,000,000	$4 \times 10 \times 10 \times 10 \times 10 \times 10 \times 10 \times 10 =$	
Venus	70,000,000		7×10^7
Earth	90,000,000	$9 \times 10 \times 10 \times 10 \times 10 \times 10 \times 10 \times 10 =$	
Mars	100,000,000		
Jupiter	500,000,000		5×10^8
Saturn	900,000,000		
Uranus	2,000,000,000		2×10^9
Neptune	3,000,000,000		

4. The NASA Apollo missions included six manned spacecraft landings on the moon. The average distance between the earth and the moon is about 200,000 miles.

   A. How many total miles were traveled to complete the six manned landings? Show or tell how you found your answer.

   B. Round your answer to the nearest million. Write the number in standard form, expanded form, and in shorter form using an exponent.

***Student Activity Book* - Page 136**

Student Activity Book

Multiply by Multiples of Ten
Questions 1–4 (SAB pp. 135–136)

1. **A.*** 90,000,000

   B.* There are seven zeros. Possible response: Since you multiply by 10 seven times you will have seven zeros in the answer—one for each ten.)

2.*

Shorter Form Using Exponents	Expanded Form	Product
9×10^1	9×10	90
9×10^2	$9 \times 10 \times 10$	**900**
9×10^3	**$9 \times 10 \times 10 \times 10$**	9000
9×10^4	$9 \times 10 \times 10 \times 10 \times 10$	**90,000**
9×10^5	**$9 \times 10 \times 10 \times 10 \times 10 \times 10$**	**900,000**
9×10^6	**$9 \times 10 \times 10 \times 10 \times 10 \times 10 \times 10$**	9,000,000
9×10^7	$9 \times 10 \times 10 \times 10 \times 10 \times 10 \times 10 \times 10$	**90,000,000**

3.*

Planet	Approximate Distance from the Sun (miles)	Distance from the Sun Expanded Form	Distance from the Sun Using Exponents
Mercury	40,000,000	$4 \times 10 \times 10 \times 10 \times 10 \times 10 \times 10 \times 10 =$	**4×10^7**
Venus	70,000,000	**$7 \times 10 \times 10 \times 10 \times 10 \times 10 \times 10 \times 10 =$**	7×10^7
Earth	90,000,000	$9 \times 10 \times 10 \times 10 \times 10 \times 10 \times 10 \times 10 =$	**9×10^7**
Mars	100,000,000	**$1 \times 10 \times 10 \times 10 \times 10 \times 10 \times 10 \times 10 \times 10$**	**1×10^8**
Jupiter	500,000,000	**$5 \times 10 \times 10 \times 10 \times 10 \times 10 \times 10 \times 10 \times 10$**	5×10^8
Saturn	900,000,000	**$9 \times 10 \times 10 \times 10 \times 10 \times 10 \times 10 \times 10 \times 10$**	**9×10^8**
Uranus	2,000,000,000	**$2 \times 10 \times 10 \times 10 \times 10 \times 10 \times 10 \times 10 \times 10 \times 10$**	2×10^9
Neptune	3,000,000,000	**$3 \times 10 \times 10 \times 10 \times 10 \times 10 \times 10 \times 10 \times 10 \times 10$**	**3×10^9**

4. **A.** 2,400,000 miles; Possible response: I multiplied $6 \times 200{,}000 = 1{,}200{,}000$ and then I doubled that since they had to travel both ways 1,200,000 doubled is 2,400,000 miles.

   B. 2,000,000, $2 \times 10 \times 10 \times 10 \times 10 \times 10 \times 10 \times 10 = 2{,}000{,}000$; 2×10^6

*** Answers and/or discussion are included in the lesson.**