Name _____ Date _____

2-5 Powers of Ten (pages 61–63)

You can find the product of a number and a power of ten by using the following patterns.

Notice that the digits of the original decimal and the product are the same. The difference is the position of the decimal point. The exponent on 10 tells you the number of places to move the decimal point to the right.	**Decimal**		**Power of Ten**	**Product**
	12.3	×	10^0 (or 1) =	12.3
	12.3	×	10^1 (or 10) =	123
	12.3	×	10^2 (or 100) =	1,230
	12.3	×	10^3 (or 1,000) =	12,300
You can use a similar pattern when you multiply by a power of 10 that is less than 1. Since you are multiplying by a power of 10 that is less than one, the product is less than the original decimal. The decimal point moves to the left.	**Decimal**		**Power of Ten**	**Product**
	12.3×		0.1 $\left(\text{or } \frac{1}{10^1}\right)$ =	1.23
	12.3	×	0.01 $\left(\text{or } \frac{1}{10^2}\right)$ =	0.123
	12.3	×	0.001 $\left(\text{or } \frac{1}{10^3}\right)$ =	0.0123

EXAMPLES

A Multiply 0.548 and 10^3 mentally.

The power is three, so move the decimal point three places to the right.

$0.548 \times 10^3 = 548$

B Multiply 2,504 and 0.01 mentally.

The power is $\frac{1}{10^2}$, so move the decimal point two places to the left.

$2{,}504 \times 0.01 = 25.04$

Try These Together

Multiply mentally.

1. 3.14×10^5

HINT: Move the decimal point to the right.

2. 0.21×0.001

HINT: Move the decimal point to the left.

PRACTICE

Multiply mentally.

3. 0.2×10

4. 1.856×10^3

5. 1.2×100

6. 0.34×10^2

7. 2.68×0.1

8. 57.8×0.01

9. 658×0.01

10. 25.23×10^2

11. Computers The microprocessors used in computers are incredibly small. The outer surface of the microprocessor is made from a silicon layer that is only 4.0×0.0001 inch thick. Write this number in standard form.

12. **Standardized Test Practice** The moon revolves around Earth at an average speed of 3.7×10^3 kilometers per hour. Write this number in standard form.

A 3,700,000 km/hr **B** 37,000 km/hr **C** 3,700 km/hr **D** 370,000 km/hr

Answers: **1.** 314,000 **2.** 0.00021 **3.** 2 **4.** 1,856 **5.** 120 **6.** 34 **7.** 0.268 **8.** 0.578 **9.** 6.58 **10.** 2,523 **11.** 0.0004 inch **12.** C