

Multiplying and Dividing by Powers of 10

Lesson 6-1

DATE

TIME

Multiplying by Powers of 10



1 When you multiply a number by a power of 10, do you expect the product to be greater than or less than the start number? Why? **Sample answer: It will be greater than the start number. Multiplying by a number greater than 1 gives a product greater than the start number.**

2 Use a calculator to complete the table. Look for patterns in how the decimal point moves. *Note:* You may need to place a zero in the tenths place to show the location of the decimal point for whole numbers. For example, write 453.0 instead of 453 to show the decimal point.

Start Number	× Power of 10	Result in Standard Notation	Movement of Decimal Point	
			Direction	Number of Places
4.53	× 10 ¹	45.3	Right	1
4.53	× 10 ²	453.0	Right	2
4.53	× 10 ³	4,530.0	Right	3
4.53	× 10 ⁴	45,300.0	Right	4
4.53	× 10 ⁵	453,000.0	Right	5
4.53	× 10 ⁶	4,530,000.0	Right	6

3 a. Look at your results in the table above. Compare the power of 10 in each row to the movement of the decimal point. What do you notice? **Sample answer: The decimal point always moves to the right. The number of places it moves is the same as the exponent in the power of 10.**

b. Use the patterns you noticed to write a rule for multiplying any decimal by a power of 10. **Sample answer: To multiply a decimal by a power of 10, move the decimal point to the right. The exponent tells you how many places to move it. You may have to write extra zeros.**

4 If you *divided* a start number by a power of 10, would you expect the quotient to be greater than or less than the start number? Why? **Sample answer: It will be less than the start number. Dividing by a number greater than 1 gives a quotient less than the dividend.**

Multiplying and Dividing by Powers of 10 (continued)

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Dividing by Powers of 10

- 5 Use a calculator to complete the table. Look for patterns in how the decimal point moves.

Start Number	÷ Power of 10	Result in Standard Notation	Movement of Decimal Point	
			Direction	Number of Places
67.2	÷ 10^1	6.72	Left	1
67.2	÷ 10^2	0.672	Left	2
67.2	÷ 10^3	0.0672	Left	3
67.2	÷ 10^4	0.00672	Left	4
67.2	÷ 10^5	0.000672	Left	5
67.2	÷ 10^6	0.0000672	Left	6

- 6 a. Look at your results in the table above. Compare the power of 10 in each row to the movement of the decimal point. What do you notice? **Sample answer:** The decimal point always moves to the left. The number of places it moves is the same as the exponent in the power of 10.

- b. Use the patterns you noticed to write a rule for dividing any decimal by a power of 10. **Sample answer:** To divide a decimal by a power of 10, move the decimal point to the left. The exponent tells you how many places to move it. You might have to write extra zeros.

Applying Rules for Multiplying and Dividing by Powers of 10

Use the rules you discovered to multiply and divide in Problems 7–12. Do not use a calculator.

- 7 $5.8 \times 10^2 =$ 580
- 8 $2.8 \div 10^2 =$ 0.028
- 9 $673.9 \div 10^2 =$ 6.739
- 10 $23.7 \times 10^2 =$ 2,370
- 11 $3.1 \times 10^4 =$ 31,000
- 12 $49.2 \div 10^4 =$ 0.00492

- 13 Explain the placement of the decimal point in your answer for Problem 7.

Sample answer: The decimal point moved two places to the right because multiplying by 10^2 is like multiplying by 10 twice. Each time a number is multiplied by 10, the digits shift a place to the left and the decimal point shifts right.