

Objectives:

- Students will divide positive integers from the multiplication table without remainders, as evidenced by them passing one-minute quizzes.
- Students will shift the decimal point of decimal numbers to the left and to the right, as evidenced by them completing a warm-up worksheet where they do so.
- Students will discover how to multiply and divide decimals by powers of 10 by shifting the decimal point, as evidenced by them completing an in-class activity where they do so.
- Students will multiply and divide decimals and whole numbers by powers of 10 by shifting the decimal point, as evidenced by them completing a homework assignment where they do so.

Student Materials on Desk Corner:

- Homework #3-15
- Homework Checker
- Warm-up & Notes Checker

Student Materials for Class:

- Homework Log
- Binder Paper
- Pencils

Teacher Materials:

- “Minute Quiz 3-16” for each student
- “Handouts 3-16” for each student with warm-up and homework on one side and students' lecture notes on the other side.
- Transparency with students' “Notes 3-16”
- Paper with teacher's “Notes 3-16”

Homework:

- Homework #3-16
- 1 hour of ALEKS due today (end of the grading period)

Time	Activity
10 min	<p style="text-align: center;">MINUTE QUIZ, WARM-UPS, AND ATTENDANCE</p> <p>Minute Quiz and Warm-up When the bell rings, quickly go around and put the minute quiz on each student’s desk, face down. Then, start everyone on the quiz at the same time and give everyone one minute. While students are working on the quiz, pass out the handouts worksheet so that students can work on the warm-up once they’re done with the minute quiz. After the minute is over, have a student collect the minute quizzes and give them to the teacher's aide (TA) to grade.</p> <p>Attendance, Collect HW, and Warm-up Check While students work on the warm-up, take attendance and have the TA collect homework & stamp homework checkers. At the end of the allotted time, go around and stamp the students’ warm-up & notes checkers.</p>
25 min	<p style="text-align: center;">LESSON</p> <p>Introduction Put up the unit calendar transparency and show students where they are in the unit. Remind students that we’ve been talking about the four operations: addition, subtraction, multiplication, and division. Last week, we learned how to add, subtract, and multiply decimals. Today, we will learn how to divide decimals.</p> <p>Notes Teach the lesson using the notes. Afterwards, stamp students' warm-up & notes checkers.</p>
35 min	<p style="text-align: center;">CLASSWORK & ALEKS</p> <p>Give students the homework assignment as their classwork. They must do problems 1, 3, 5 before they may work on ALEKS. Remind students that when returning the laptops, they must first get them checked by you or the TA. Use this student work time to return graded homework.</p>
5 min	<p style="text-align: center;">CLEAN UP</p>

Lesson 3-16 – Multiplying and Dividing by Powers of 10

	Students check the laptops with the teacher or the TA before putting them away. Then, they pack up, sit in their seats, and wait to be dismissed.
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Solve the following division problems. You have exactly one minute!

$90 \div 10 =$

$2 \div 2 =$

$144 \div 12 =$

$21 \div 3 =$

$6 \div 2 =$

$81 \div 9 =$

$8 \div 2 =$

$28 \div 7 =$

$20 \div 5 =$

$3 \div 3 =$

$84 \div 7 =$

$77 \div 7 =$

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$3 \div 3 =$

$84 \div 7 =$

$77 \div 7 =$

Solve the following division problems. You have exactly one minute!

$10 \div 10 =$

$84 \div 12 =$

$110 \div 11 =$

$28 \div 4 =$

$60 \div 10 =$

$32 \div 4 =$

$24 \div 4 =$

$3 \div 1 =$

$45 \div 5 =$

$18 \div 3 =$

$36 \div 4 =$

$28 \div 4 =$

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$45 \div 5 =$

$18 \div 3 =$

$36 \div 4 =$

$28 \div 4 =$

Solve the following division problems. You have exactly one minute!

$55 \div 5 =$

$20 \div 4 =$

$12 \div 6 =$

$32 \div 4 =$

$45 \div 5 =$

$40 \div 4 =$

$8 \div 2 =$

$70 \div 7 =$

$110 \div 11 =$

$40 \div 4 =$

$8 \div 1 =$

$36 \div 6 =$

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$8 \div 2 =$

$70 \div 7 =$

$110 \div 11 =$

$40 \div 4 =$

$8 \div 1 =$

$36 \div 6 =$

For each problem, shift (move) the decimal point to the left or right.

Number	Shift By	Answer
9.3	2 right	930.
8.203	3 left	0.008203
0.023	1 right	
4.2	3 right	
7.246	2 left	
9.0	1 right	
793.8	4 left	
0.3	1 right	
56.78	2 left	
1.234	2 left	

Number	Shift By	Answer
2.718	3 right	
1.001	2 right	
68.359	1 left	
0.102	1 left	
82.392	4 right	
9	1 left	
6.57	2 right	
0.0034	3 right	
3.14159	4 right	
25.8	2 left	

For each problem, multiply or divide the decimal by the power of 10 by shifting the decimal point to the left or the right.

1) $2.718 \cdot 100$

2) $17.5 \div 10$

3) $3.1415 \cdot 1000$

4) $5.068 \div 100$

5) $19 \cdot 100$

6) $0.0315 \div 10$

7) $0.00123 \cdot 10000$

8) $94 \div 100$

9) $17.203 \cdot 10$

10) $1.821 \div 1000$

11) $7 \cdot 100$

12) $41.2 \div 10000$

Introduction

The number and its powers (, , , , etc.) are very important in . For example:

- We have digits in our number system: , , , , , , , , .
- The system (which you use in science to measure everything) is based on . For example, there are millimeters in a centimeter, centimeters in a meter, and meters in a kilometer.
- In many Olympics events, is a .
- In Algebra 2, are assumed to be .
- We have and .
- Mr. Wong wishes he could sleep in until 10.

Today, we will discover how it is to and by .

Multiplying and Dividing by Powers of 10

$$1.23456 \xrightarrow{\text{shift right by 1}}$$

$$1.23456 \cdot 10 =$$

$$1.23456 \xrightarrow{\text{shift right by 2}}$$

$$1.23456 \cdot 100 =$$

$$1.23456 \xrightarrow{\text{shift right by 3}}$$

$$1.23456 \cdot 1000 =$$

$$1.23456 \xrightarrow{\text{shift right by 4}}$$

$$1.23456 \cdot 10000 =$$

$$1.23456 \xrightarrow{\text{shift right by 5}}$$

$$1.23456 \cdot 100000 =$$

$$45678.9 \xrightarrow{\text{shift left by 1}}$$

$$45678.9 \div 10 =$$

$$45678.9 \xrightarrow{\text{shift left by 2}}$$

$$45678.9 \div 100 =$$

$$45678.9 \xrightarrow{\text{shift left by 3}}$$

$$45678.9 \div 1000 =$$

$$45678.9 \xrightarrow{\text{shift left by 4}}$$

$$45678.9 \div 10000 =$$

$$45678.9 \xrightarrow{\text{shift left by 5}}$$

$$45678.9 \div 100000 =$$

Do you see the trick?

- When , the number of decimal places that we is equal to the number of in the .
- When , the number of decimal places that we is equal to the number of in the .

So, instead of multiplying and dividing the long way, we can just .

Examples

$$\text{Ex: } 39.273 \cdot 100 =$$

$$\text{Ex: } 1.7 \cdot 1000 =$$

$$\text{Ex: } 825.1 \div 1000 =$$

$$\text{Ex: } 4.23 \div 10 =$$

Introduction

The number **10** and its powers (**10**, **100**, **1000**, **10000**, etc.) are very important in **real life**. For example:

- We have **ten** digits in our number system: **0, 1, 2, 3, 4, 5, 6, 7, 8, 9**.
- The **metric** system (which you use in science to measure everything) is based on **powers of 10**. For example, there are **10** millimeters in a centimeter, **100** centimeters in a meter, and **1000** meters in a kilometer.
- In many Olympics events, **10** is a **perfect score**.
- In Algebra 2, **logarithms** are assumed to be **base-10**.
- We have **10 fingers** and **10 toes**.
- Mr. Wong wishes he could sleep in until 10.

Today, we will discover how **easy** it is to **multiply** and **divide** by **powers of 10**.

Multiplying and Dividing by Powers of 10

$$1.23456 \xrightarrow{\text{shift right by 1}} \mathbf{12.3456}$$

$$1.23456 \cdot 10 = \mathbf{12.3456}$$

$$1.23456 \xrightarrow{\text{shift right by 2}} \mathbf{123.456}$$

$$1.23456 \cdot 100 = \mathbf{123.456}$$

$$1.23456 \xrightarrow{\text{shift right by 3}} \mathbf{1234.56}$$

$$1.23456 \cdot 1000 = \mathbf{1234.56}$$

$$1.23456 \xrightarrow{\text{shift right by 4}} \mathbf{12345.6}$$

$$1.23456 \cdot 10000 = \mathbf{12345.6}$$

$$1.23456 \xrightarrow{\text{shift right by 5}} \mathbf{123456.}$$

$$1.23456 \cdot 100000 = \mathbf{123456.}$$

$$45678.9 \xrightarrow{\text{shift left by 1}} \mathbf{4567.89}$$

$$45678.9 \div 10 = \mathbf{4567.89}$$

$$45678.9 \xrightarrow{\text{shift left by 2}} \mathbf{456.789}$$

$$45678.9 \div 100 = \mathbf{456.789}$$

$$45678.9 \xrightarrow{\text{shift left by 3}} \mathbf{45.6789}$$

$$45678.9 \div 1000 = \mathbf{45.6789}$$

$$45678.9 \xrightarrow{\text{shift left by 4}} \mathbf{4.56789}$$

$$45678.9 \div 10000 = \mathbf{4.56789}$$

$$45678.9 \xrightarrow{\text{shift left by 5}} \mathbf{0.456789}$$

$$45678.9 \div 100000 = \mathbf{0.456789}$$

Do you see the trick?

- When **multiplying**, the number of decimal places that we **shift to the right** is equal to the number of **zeros** in the **power of 10**.
- When **dividing**, the number of decimal places that we **shift to the left** is equal to the number of **zeros** in the **power of 10**.

So, instead of multiplying and dividing the long way, we can just **shift the decimal point**.

Examples

Ex: $39.273 \cdot 100 = \mathbf{3927.3}$

Ex: $1.7 \cdot 1000 = \mathbf{1700}$

Ex: $825.1 \div 1000 = \mathbf{0.8251}$

Ex: $4.23 \div 100 = \mathbf{0.0423}$

$$1.23456 \cdot 10$$

$$1.23456 \cdot 100$$

$$1.23456 \cdot 1000$$

$$1.23456 \cdot 10000$$

$$1.23456 \cdot 100000$$

$$45678.9 \div 10$$

$$45678.9 \div 100$$

$$45678.9 \div 1000$$

$$45678.9 \div 10000$$

$$45678.9 \div 100000$$