Lesson 3-2 – Introduction to Decimals

**Objectives:**

- Students will divide positive integers from the multiplication table without remainders, as evidenced by them passing one-minute quizzes.
- Students will graphically represent base-10 fractions, as evidenced by them completing a warm-up worksheet where they do so.
- Students will add base-10 fractions, as evidenced by them completing a warm-up worksheet where they do so.
- Students will write base-10 fractions in expanded form, and then as decimals, as evidenced by them completing a homework assignment where they do so.

**Student Materials on Desk Corner:**

- Homework #3-1
- Homework Checker
- Warm-up & Notes Checker

**Student Materials for Class:**

- Homework Log
- Binder Paper
- Pencils

**Teacher Materials:**

- "Minute Quiz 3-2" for each student
- "Warm-up 3-2" for each student
- "Unit Calendar" transparency
- "Homework #3-2" handout for each student

**Homework:**

- Finish Homework #3-2
- Continue 1 hour of ALEKS

| Time | Activity |
|---|---|
| 10 min | **MINUTE QUIZ, WARM-UP, AND ATTENDANCE**<br><br>**Minute Quiz and Warm-up**<br>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 **warm-ups** so that students can work on them 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.<br><br>**Attendance, Collect HW, and Warm-up Check**<br>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**. |
| 30 min | **LESSON**<br><br>Put up the unit calendar transparency and show students where they are in the unit. Then, teach the lesson using the notes. Once students are finished, stamp their warm-up & notes checkers. |
| 10 min | **CLASSWORK**<br><br>Give students the homework assignment as their classwork. They must do problems 1, 5, 8 before they may work on ALEKS. |
| 30 min | **ALEKS**<br><br>When students finish their classwork, they should continue with **ALEKS**. Use this student work time to **return graded homework**. |

Numeracy
Minute Quiz 3-2 A

Name:
Date: Period:

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

| | | |
|---|---|---|
| 48 ÷ 8 = | 35 ÷ 7 = | 54 ÷ 9 = |
| 48 ÷ 12 = | 33 ÷ 11 = | 10 ÷ 2 = |
| 55 ÷ 11 = | 8 ÷ 2 = | 30 ÷ 6 = |
| 18 ÷ 3 = | 5 ÷ 1 = | 15 ÷ 5 = |

Numeracy
Minute Quiz 3-2 A

Name:
Date: Period:

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

| | | |
|---|---|---|
| 48 ÷ 8 = | 35 ÷ 7 = | 54 ÷ 9 = |
| 48 ÷ 12 = | 33 ÷ 11 = | 10 ÷ 2 = |
| 55 ÷ 11 = | 8 ÷ 2 = | 30 ÷ 6 = |
| 18 ÷ 3 = | 5 ÷ 1 = | 15 ÷ 5 = |

Numeracy
Minute Quiz 3-2 A

Name:
Date: Period:

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

| | | |
|---|---|---|
| 48 ÷ 8 = | 35 ÷ 7 = | 54 ÷ 9 = |
| 48 ÷ 12 = | 33 ÷ 11 = | 10 ÷ 2 = |
| 55 ÷ 11 = | 8 ÷ 2 = | 30 ÷ 6 = |
| 18 ÷ 3 = | 5 ÷ 1 = | 15 ÷ 5 = |

Numeracy
Minute Quiz 3-2 B

Name:
Date: Period:

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

| | | |
|---|---|---|
| 4 ÷ 2 = | 16 ÷ 4 = | 8 ÷ 4 = |
| 10 ÷ 10 = | 6 ÷ 6 = | 10 ÷ 10 = |
| 36 ÷ 6 = | 3 ÷ 1 = | 18 ÷ 9 = |
| 36 ÷ 6 = | 9 ÷ 9 = | 7 ÷ 7 = |

Numeracy
Minute Quiz 3-2 B

Name:
Date: Period:

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

| | | |
|---|---|---|
| 4 ÷ 2 = | 16 ÷ 4 = | 8 ÷ 4 = |
| 10 ÷ 10 = | 6 ÷ 6 = | 10 ÷ 10 = |
| 36 ÷ 6 = | 3 ÷ 1 = | 18 ÷ 9 = |
| 36 ÷ 6 = | 9 ÷ 9 = | 7 ÷ 7 = |

Numeracy
Minute Quiz 3-2 B

Name:
Date: Period:

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

| | | |
|---|---|---|
| 4 ÷ 2 = | 16 ÷ 4 = | 8 ÷ 4 = |
| 10 ÷ 10 = | 6 ÷ 6 = | 10 ÷ 10 = |
| 36 ÷ 6 = | 3 ÷ 1 = | 18 ÷ 9 = |
| 36 ÷ 6 = | 9 ÷ 9 = | 7 ÷ 7 = |

Numeracy
Minute Quiz 3-2 C

Name:
Date: Period:

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

| | | |
|---|---|---|
| 4 ÷ 4 = | 12 ÷ 12 = | 50 ÷ 10 = |
| 8 ÷ 8 = | 40 ÷ 10 = | 48 ÷ 8 = |
| 10 ÷ 2 = | 40 ÷ 10 = | 9 ÷ 9 = |
| 15 ÷ 3 = | 15 ÷ 5 = | 16 ÷ 8 = |

Numeracy
Minute Quiz 3-2 C

Name:
Date: Period:

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

| | | |
|---|---|---|
| 4 ÷ 4 = | 12 ÷ 12 = | 50 ÷ 10 = |
| 8 ÷ 8 = | 40 ÷ 10 = | 48 ÷ 8 = |
| 10 ÷ 2 = | 40 ÷ 10 = | 9 ÷ 9 = |
| 15 ÷ 3 = | 15 ÷ 5 = | 16 ÷ 8 = |

Numeracy
Minute Quiz 3-2 C

Name:
Date: Period:

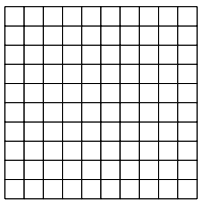
**Solve the following division problems. You have exactly one minute!**

| | | |
|---|---|---|
| 4 ÷ 4 = | 12 ÷ 12 = | 50 ÷ 10 = |
| 8 ÷ 8 = | 40 ÷ 10 = | 48 ÷ 8 = |
| 10 ÷ 2 = | 40 ÷ 10 = | 9 ÷ 9 = |
| 15 ÷ 3 = | 15 ÷ 5 = | 16 ÷ 8 = |

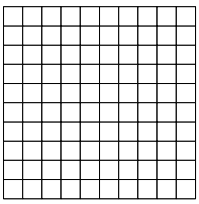
Numeracy
Warm-up 3-2

Name:
Date: Period:

1) Shade in $\frac{6}{10}$ of the following square:



2) Shade in $\frac{87}{100}$ of the following square:



Ex) Turn $\frac{2}{10} + \frac{3}{100}$ into a single fraction.

$$\frac{٢}{١٠} + \frac{٣}{١٠٠} = \frac{٢ \cdot ١٠}{١٠ \cdot ١٠} + \frac{٣}{١٠٠} = \frac{٢٠}{١٠٠} + \frac{٣}{١٠٠} = \boxed{\frac{٢٣}{١٠٠}}$$

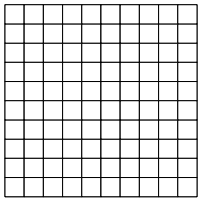
3) Turn $\frac{5}{10} + \frac{7}{100}$ into a single fraction.

4) Turn $\frac{3}{10} + \frac{4}{100} + \frac{7}{1000}$ into a single fraction.

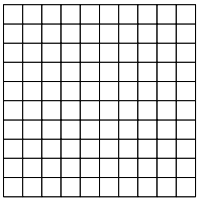
Numeracy
Warm-up 3-2

Name:
Date: Period:

1) Shade in $\frac{6}{10}$ of the following square:



2) Shade in $\frac{87}{100}$ of the following square:



Ex) Turn $\frac{2}{10} + \frac{3}{100}$ into a single fraction.

$$\frac{2}{10} + \frac{3}{100} = \frac{2 \cdot 10}{10 \cdot 10} + \frac{3}{100} = \frac{20}{100} + \frac{3}{100} = \boxed{\frac{23}{100}}$$

3) Turn $\frac{5}{10} + \frac{7}{100}$ into a single fraction.

4) Turn $\frac{3}{10} + \frac{4}{100} + \frac{7}{1000}$ into a single fraction.

Introduction to Decimals

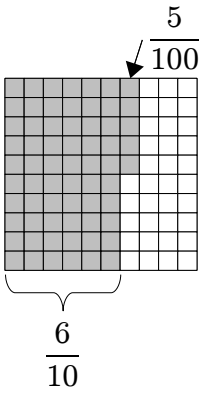
## Base-10 Fractions

**Base-10 fractions** are fractions that have denominators of 10, 100, 1000, and so on.

Ex: $\frac{9}{10}$, $\frac{63}{100}$, $\frac{237}{1000}$, and $\frac{5937}{10000}$ are base-10 fractions.

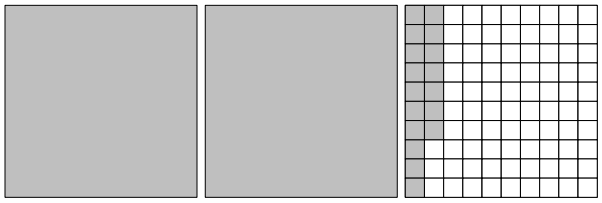
We can write base-10 fractions as smaller base-10 fractions (that is, in **expanded form**).

Ex: $\frac{65}{100}$ $\leftarrow$ # of slices
$\leftarrow$ # of slices in a whole




So, $\frac{65}{100} = \frac{6}{10} + \frac{5}{100}$

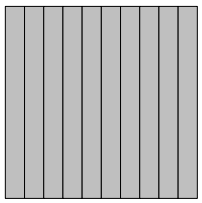
Ex: $2\frac{17}{100}$



So, $2\frac{17}{100} = 2 + \frac{1}{10} + \frac{7}{100}$

## Extending the Place-Value System

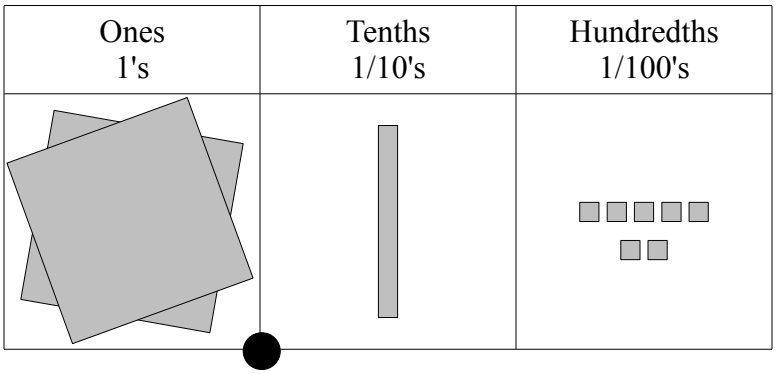
In our number system, we break a "hundred" into 10 pieces, making "tens." Then, we break a "ten" into 10 pieces, making "ones." We can keep going by breaking a "one" into 10 pieces, making "tenths." Going further, we can break a "tenth" into 10 pieces, making "hundredths."

| Hundreds<br>100's | Tens<br>10's | Ones<br>1's | Tenths<br>1/10's | Hundredths<br>1/100's |
|---|---|---|---|---|
|  |  |  |  |  |

The decimal point separates the whole pieces (ones, tens, hundreds) from the parts (tenths, hundredths).

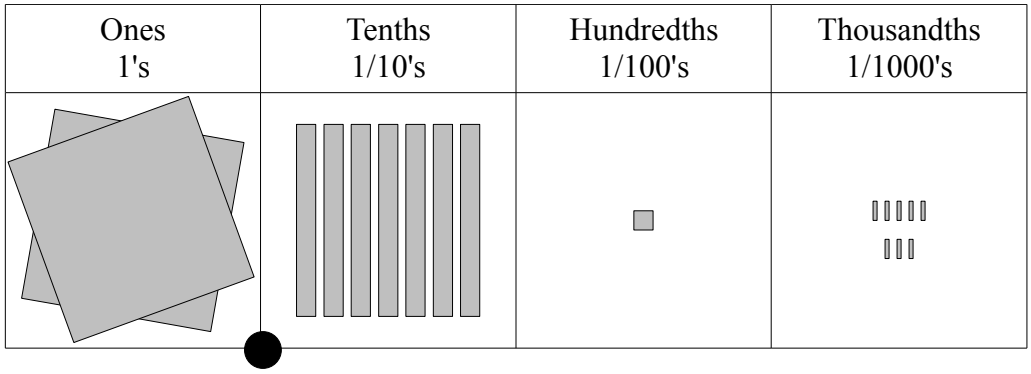
Ex: Write $2\frac{17}{100}$ as a decimal.

From earlier, we showed that $2\frac{17}{100} = 2 + \frac{1}{10} + \frac{7}{100}$.




So, $2\frac{17}{100} = \boxed{2.17}$.

Ex: Write 2.718 as a base-10 fraction.



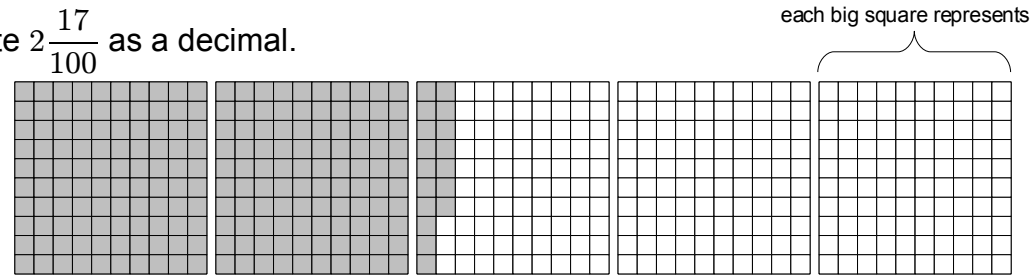

So,

$2.718 = 2 + \frac{7}{10} + \frac{1}{100} + \frac{8}{1000} = 2\frac{718}{1000}$.

Numeracy | Name:
Homework #3-2 – Intro to Decimals | Date: | Period:

**Shade in the following squares to represent each base-10 fraction. Then, write it in expanded form (that is, as smaller base-10 fractions). Afterwards, write the value of each place value, and finally write the fraction as a decimal.**

Ex) Write $2\frac{17}{100}$ as a decimal.

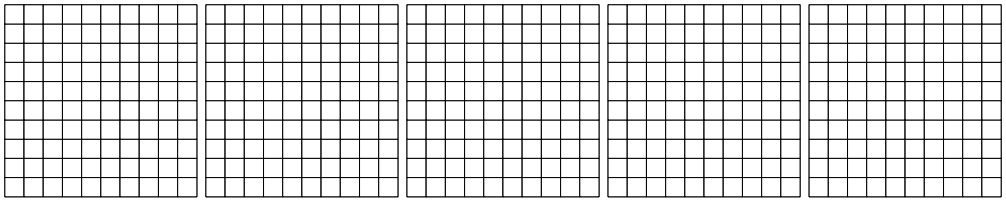



Then, $2\frac{17}{100} = 2 + \frac{1}{10} + \frac{7}{100}$

| Hundreds 100's | Tens 10's | Ones 1's | Tenths 1/10's | Hundredths 1/100's | Thousandths 1/1000's |
|---|---|---|---|---|---|
| | | 2 | 1 | 7 | |

So, $2\frac{17}{100} = \boxed{2.17}$

1) Write $\frac{53}{100}$ as a decimal.

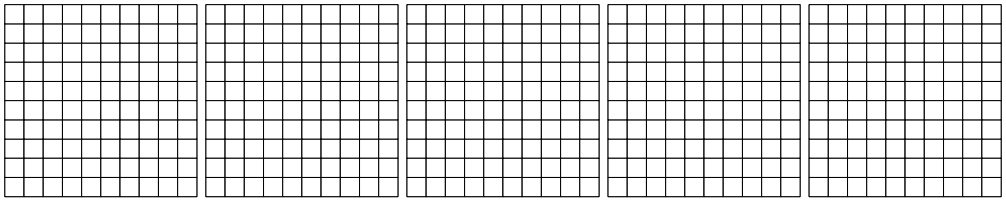


Then, $\frac{53}{100} =$

| Hundreds 100's | Tens 10's | Ones 1's | Tenths 1/10's | Hundredths 1/100's | Thousandths 1/1000's |
|---|---|---|---|---|---|
| | | | | | |

So, $\frac{53}{100} =$

2) Write $4\frac{87}{100}$ as a decimal.



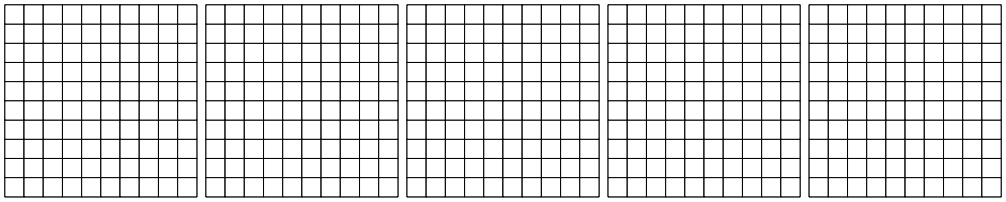
Problem continued on back...

Then, $4\frac{87}{100} =$

| Hundreds 100's | Tens 10's | Ones 1's | Tenths 1/10's | Hundredths 1/100's | Thousandths 1/1000's |
|---|---|---|---|---|---|
| | | | | | |

So, $4\frac{87}{100} =$

3) Write $1\frac{7}{10}$ as a decimal.

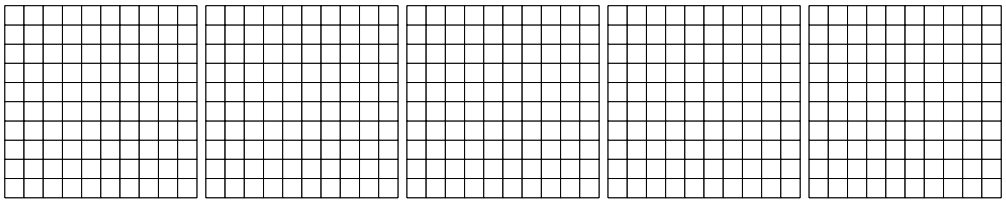


Then, $1\frac{7}{10} =$

| Hundreds 100's | Tens 10's | Ones 1's | Tenths 1/10's | Hundredths 1/100's | Thousandths 1/1000's |
|---|---|---|---|---|---|
| | | | | | |

So, $1\frac{7}{10} =$

4) Write $3\frac{7}{100}$ as a decimal.



Then, $3\frac{7}{100} =$

| Hundreds 100's | Tens 10's | Ones 1's | Tenths 1/10's | Hundredths 1/100's | Thousandths 1/1000's |
|---|---|---|---|---|---|
| | | | | | |

So, $3\frac{7}{100} =$

**Write the following fractions in expanded form. Then, write the value of each place value, and finally write the fraction as a decimal.**

Ex) Write $123\frac{45}{100}$ as a decimal.

Expanded form: $123\frac{45}{100} = 100 + 20 + 3 + \frac{4}{10} + \frac{5}{100}$

| Hundreds 100's | Tens 10's | Ones 1's | Tenths 1/10's | Hundredths 1/100's | Thousandths 1/1000's |
|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | |

So, $123\frac{45}{100} = \boxed{123.45}$

5) Write $567\frac{89}{100}$ as a decimal.

Expanded form: $567\frac{89}{100} =$

| Hundreds 100's | Tens 10's | Ones 1's | Tenths 1/10's | Hundredths 1/100's | Thousandths 1/1000's |
|---|---|---|---|---|---|
| | | | | | |

So, $567\frac{89}{100} =$

6) Write $102\frac{7}{10}$ as a decimal.

Expanded form: $102\frac{7}{10} =$

| Hundreds 100's | Tens 10's | Ones 1's | Tenths 1/10's | Hundredths 1/100's | Thousandths 1/1000's |
|---|---|---|---|---|---|
| | | | | | |

So, $102\frac{7}{10} =$

7) Write $379\frac{502}{1000}$ as a decimal.

Expanded form: $379\frac{502}{1000} =$

| Hundreds 100's | Tens 10's | Ones 1's | Tenths 1/10's | Hundredths 1/100's | Thousandths 1/1000's |
|---|---|---|---|---|---|
| | | | | | |

So, $379\frac{502}{1000} =$

**For each decimal, write the value of each place value. Then, write the fraction in expanded form, and finally as a base-10 fraction.**

Ex) Write $2.718$ as a base-10 fraction.

| Hundreds 100's | Tens 10's | Ones 1's | Tenths 1/10's | Hundredths 1/100's | Thousandths 1/1000's |
|---|---|---|---|---|---|
| | | 2 | 7 | 1 | 8 |

So,

$$2.718 = 2 + \frac{7}{10} + \frac{1}{100} + \frac{8}{1000} = 2\frac{718}{1000}.$$

8) Write $1.414$ as a base-10 fraction.

| Hundreds 100's | Tens 10's | Ones 1's | Tenths 1/10's | Hundredths 1/100's | Thousandths 1/1000's |
|---|---|---|---|---|---|
| | | | | | |

So,

$1.414 =$

9) Write $314.159$ as a base-10 fraction.

| Hundreds 100's | Tens 10's | Ones 1's | Tenths 1/10's | Hundredths 1/100's | Thousandths 1/1000's |
|---|---|---|---|---|---|
| | | | | | |

So,

$314.159 =$

10) Write $9.807$ as a base-10 fraction.

| Hundreds 100's | Tens 10's | Ones 1's | Tenths 1/10's | Hundredths 1/100's | Thousandths 1/1000's |
|---|---|---|---|---|---|
| | | | | | |

So,

$9.807 =$

11) Write $0.23$ as a base-10 fraction.

| Hundreds 100's | Tens 10's | Ones 1's | Tenths 1/10's | Hundredths 1/100's | Thousandths 1/1000's |
|---|---|---|---|---|---|
| | | | | | |

So,

$0.23 =$