Mathematics Assessment Project

Formative Assessment Lesson Materials

Repeating Decimals

MARS Shell Center
University of Nottingham & UC Berkeley
Alpha Version

Please Note:

These materials are still at the alpha trial stage. Please check with the Nottingham team before releasing any of this material outside of the core project team.

If you encounter errors or other issues in this version, please send details to the MAP team c/o map.feedback@mathshell.org.

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Repeating Decimals

Mathematical goals

This lesson unit is intended to help you assess how well students are able to:

- Translate between decimal and fraction notation, particularly when the decimals are repeating.
- Create and solve simple linear equations to find the fractional equivalent of a repeating decimal.
- Understanding the effect of multiplying a decimal by a power of 10.

Common Core State Standards

This lesson asks students to select and apply mathematical content from across the grades, including aspects of the following *content standards*:

8.NS: Know that there are numbers that are not rational, and approximate them by rational numbers.
8.EE: Analyze and solve linear equations.

This lesson involves a range of *mathematical practices* from the standards, with emphasis on:

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
6. Attend to precision.

Introduction

The unit is structured in the following way:

- Before the lesson, students attempt the *Repeating Decimals* task individually. You then review their work, and create questions for students to answer in order to improve their solutions.
- A whole class introduction is used to introduce students to some of the patterns in repeating decimals and a method for converting such decimals to fractions.
- Students work collaboratively in small groups on a matching task that requires them to translate between fractions, decimals, and equations.
- In a whole-class discussion, students compare and evaluate the methods they have seen and used.
- In the final part of the lesson, students review their initial solutions, and then complete a different *Repeating Decimals* task.

Materials required

- Each individual student will need a copy of the task sheets *Repeating Decimals, Repeating Decimals (Revisited)*, and *Fraction Conversion Challenge.* They will also need a calculator, a mini-whiteboard, pen, and wipe.
- Each small group of students will need Card Sets A: *Decimals*, B: *Equations*, C: *Fractions*, a large sheet of paper for making a poster, and a glue stick.
- There is a projector resource to remind students of the instructions for the group activity.

Time needed

Approximately fifteen minutes before the lesson, a one-hour lesson and twenty minutes in a follow-up lesson (or for homework.) Timings given are only approximate. Exact timings will depend on the needs of your class.

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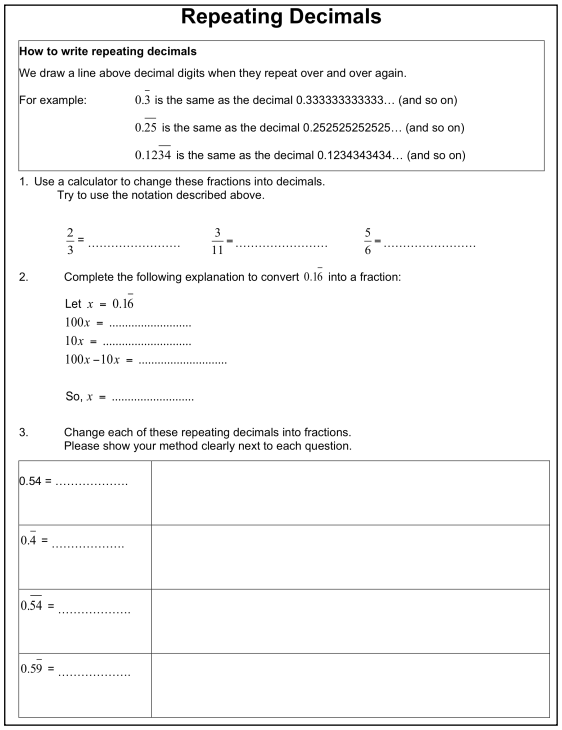
Before the lesson

Assessment task: *Repeating Decimals* (15 minutes)

Have the students do this task, in class or for homework, a day or more before the lesson. This will give you an opportunity to assess their work, and to find out the kinds of difficulties students have with the task. You will then be able to target your help more effectively in the follow-up lesson.



Repeating Decimals

How to write repeating decimals

We draw a line above decimal digits when they repeat over and over again.

For example: $0.\bar{3}$ is the same as the decimal 0.333333333333… (and so on)

$0.\overline{25}$ is the same as the decimal 0.252525252525… (and so on)

$0.12\overline{34}$ is the same as the decimal 0.1234343434… (and so on)

1. Use a calculator to change these fractions into decimals.
   Try to use the notation described above.

   $\frac{2}{3}$ = …… $\frac{3}{11}$ = …… $\frac{5}{6}$ = ……

2. Complete the following explanation to convert $0.1\bar{6}$ into a fraction:

   Let $x = 0.1\bar{6}$

   $100x$ = ……

   $10x$ = ……

   $100x - 10x$ = ……

   So, x = ……

3. Change each of these repeating decimals into fractions.
   Please show your method clearly next to each question.

0.54 = ……	
$0.\bar{4}$ = ……	
$0.\overline{54}$ = ……	
$0.\bar{5}9$ = ……	

Give each student a mini-whiteboard and a copy of the *Repeating Decimals* task. Introduce the task briefly with a question and answer session using mini-whiteboards. This introduction should help you check that students understand the repeating decimals notation.

> *On your whiteboards, write the following using repeating decimals notation:*
>
> *0.3333333333…*
>
> *0.1222222222…*
>
> *0.1212121212…*
>
> *0.1232323232…*
>
> *0.1231231231…*

Now explain what you are asking students to do.

> *Spend fifteen minutes on your own, answering these questions as carefully as you can. Show all your work so that I can understand your reasoning. There will be a lesson on this material [tomorrow] that will help you improve your work.*

Students should work on the task without the aid of a calculator.

It is important that students are allowed to answer the questions without assistance, as far as possible. If students are struggling to get started then ask questions that help them understand what is required, but make sure you do not do the task for them.

When all students have made a reasonable attempt at the task, tell them that they will have time to revisit and revise their solutions later.

Assessing students' responses

Collect students' responses to the task. Make some notes on what their work reveals about their current levels of understanding, and their problem solving strategies.

We suggest that you do not score students' work. The research shows that this will be counterproductive, as it will encourage students to compare scores, and distract their attention from what they can do to improve their mathematics.

Instead, help students to make further progress by summarizing their difficulties as a list of questions. Some suggestions for these are given the *Common Issues* table. We suggest that you make a list of your own questions, based on your students' work, using the ideas on the following page. You may choose to write questions on each student's work. If you do not have time to do this, select a few questions that will be of help to the majority of students. These can be written on the board at the beginning of the lesson.

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Common issues:	**Suggested questions and prompts:**
Student does not relate fraction notation to division (Q1)	• *How can you write* $\frac{2}{3}$ *as a division?* • *If you divide two bars of chocolate equally between three people, how much will each person get?*
Student is not aware of the 'bar' notation for showing repeating decimals For example: The student copies from the calculator screen all the repeating digits (Q1).	• *Look at the pattern for* $\frac{2}{3}$*. How can we write this using the 'bar' notation?*
Student does not understand the effect of multiplying decimals by powers of ten (Q2)	• *What do you get when you multiply 0.4 by 10? By 100? By 1000?* • *Try multiplying other decimal numbers by powers of ten using your calculator. Try to explain what happens.*
Student has difficulty with algebraic notation (Q2 and Q3)	• *If x = 0.1666666…* • *What do we get if we multiply x by 10?* • *What if we multiply x by 100?* • *How much bigger is your second answer?* • *Can you write this as an equation?* • *What is the purpose of the subtraction?* • *What is the result of subtracting 10x from 100x / subtractiing x from 100x / subtracting x from 10x? Which one of these sums will help you represent the repeating decimal as a fraction?*
Student completes the task successfully	• *Can you write any repeating decimal as a fraction? Make up a hard example to convince me.* • *Are there any decimals that cannot be written as fractions? Can you think of any examples?*

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Suggested lesson outline

Introduction: *Fraction Conversion Challenge* (20 minutes)

Give each student a copy of the *Fraction Conversion Challenge* sheet.

Fraction Conversion Challenge

$\frac{1}{2}=$	$\frac{2}{2}=$							
$\frac{1}{3}=$	$\frac{2}{3}=$	$\frac{3}{3}=$						
$\frac{1}{4}=$	$\frac{2}{4}=$	$\frac{3}{4}=$	$\frac{4}{4}=$					
$\frac{1}{5}=$	$\frac{2}{5}=$	$\frac{3}{5}=$	$\frac{4}{5}=$	$\frac{5}{5}=$				
$\frac{1}{6}=$	$\frac{2}{6}=$	$\frac{3}{6}=$	$\frac{4}{6}=$	$\frac{5}{6}=$	$\frac{6}{6}=$			
$\frac{1}{7}=$	$\frac{2}{7}=$	$\frac{3}{7}=$	$\frac{4}{7}=$	$\frac{5}{7}=$	$\frac{6}{7}=$	$\frac{7}{7}=$		
$\frac{1}{8}=$	$\frac{2}{8}=$	$\frac{3}{8}=$	$\frac{4}{8}=$	$\frac{5}{8}=$	$\frac{6}{8}=$	$\frac{7}{8}=$	$\frac{8}{8}=$	
$\frac{1}{9}=$	$\frac{2}{9}=$	$\frac{3}{9}=$	$\frac{4}{9}=$	$\frac{5}{9}=$	$\frac{6}{9}=$	$\frac{7}{9}=$	$\frac{8}{9}=$	$\frac{9}{9}=$

> *I am going to give you just 5 minutes to change these fractions into decimals.*
>
> *Do as many as you can.*
>
> *Some you may be able to do mentally, and for some you may need to do some working out on paper.*
>
> *You may see some patterns that will help you!*

Students will probably be able to do many of these mentally:

$$\frac{2}{2}=1 \quad \frac{3}{3}=1 \quad \frac{4}{4}=1 \quad \frac{5}{5}=1 \text{ and so on.}$$

$$\frac{1}{2}=0.5 \quad \frac{2}{4}=0.5 \quad \frac{3}{6}=0.5 \text{ and so on}$$

$$\frac{1}{5}=0.2 \quad \frac{2}{5}=0.4 \quad \frac{3}{5}=0.6 \text{ and so on}$$

After five minutes collect some of their answers on the board and ask for explanations.

Then, give out calculators.

> *Using these calculators, try to finish the sheet.*
>
> *Write down all the patterns you can see in the table.*

Some students may not realize that they can easily convert fractions to decimals by division. You may need to point out that sometimes the calculator rounds decimals, so some digits may be different.

As students complete the sheet, encourage them to discuss their answers with a partner.

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Patterns in the Table

Invite students to discuss the patterns that emerge, particularly focusing on the patterns in the repeating decimals.

Look at the pattern in the thirds.
0.3333333…

Do the threes in this pattern go on forever? How can you be sure?

What does the pattern for two thirds and three thirds look like?

Students may like to do the division by hand, 1 ÷ 3, and see how the carry digits repeat. Ensure that all students are now aware of the 'bar' notation for showing repeating decimals:

Look at the pattern in the sixths.
0.16666… or 0.16666....7 (if the calculator rounds the number)

Is a sixth a repeating decimal?

How can we write this in our notation?

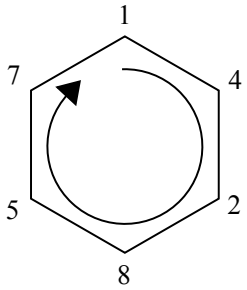
Check that they know how to show: $0.1\overline{6}$

Students may also notice a pattern in the sevenths, however calculators with smaller screens may make it difficult for students to notice a pattern. Working out some by hand will resolve this.

What patterns about the sevenths?
0.142857142…; 0.285714285…; 0.428571428…; …

How can we write these in our notation?

Check that students can show these as: $0.\overline{142857}$, $0.\overline{285714}$, $0.\overline{428571}$



The patterns in the sevenths could lead to a very interesting discussion. Digits repeat in a cycle of six numbers, each number starting at a different place and opposite digits add to nine (see diagram). The relationship between complementary fractions may be seen, for example, by adding: 0.142857… + 0.857142…= 0.999999…= 1

Now look at the ninths:
0.111111…; 0.222222…; 0.333333…; 0.444444…;

How does this pattern continue? What happens with nine ninths?

This leads to a very important idea. Many students will argue that $0.\overline{9}$ is less than one. The above pattern is one argument that it is equal to one. A second argument follows. This is also important as it also shows a method for converting repeating decimals to fractions – one that is used in the collaborative group activity.

Write the number $0.\overline{9}$ on the board.

We are trying to find out what number $0.\overline{9}$ *really is.*

Suppose $x = 0.\overline{9}$

So what is $10x - x$ *?* [$9.\overline{9} - 0.\overline{9} = 9$]

So if $10x - x = 9$ *what is the value of x?* [$9x = 9$ *so* $x = 1$]

Students may not believe this argument of course. The argument is useful as it may be generalized to convert any repeating decimal to a fraction.

Converting a Repeating Decimal to a Fraction

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Give each student a mini-whiteboard, pen, and wipe.

Write the following expression on the board:

$$x = 0.1\overline{7}$$

Explain to students that to figure out the fractional value of this decimal they could perform the following subtractions:

$$10x - x \quad \text{or} \quad 100x - x \quad \text{or} \quad 100x - 10x$$

Students are to figure out which expression is the best one to use, and then use it to work out the fractional value for the decimal.

Allow students a few minutes to think about this task individually, and then they should discuss it with a partner before asking one or two students for an explanation. Try not to correct any answers, but encourage students to challenge each other's answer.

What is the purpose of the subtraction? [To eliminate the repeating part of the number]

Which of these expressions would you use? [$100x - 10x$ *]*

What made you decide to use this expression?

Why do the other two expressions not work?

Collaborative activity: *Matching, Decimals, Equations, and Fractions* (20 minutes)

Ask students to work in small groups of two or three.

Give each group copies of the three card sets: A: *Decimals*, B: *Equations*, and C: *Fractions* along with a large sheet of paper and a glue stick for making a poster. Giving out all the cards at once allows students to develop their own strategies. Trials of this lesson have shown that some students start the activity by using division to convert a fraction to a decimal. The blank fraction and equation cards encourage students to use algebra to convert a repeating decimal to a fraction.

You could display the slide with these instructions to remind students of how to work together.

You are now going to work together matching cards.

Take turns to find a matching pair. Each time you do this explain your thinking clearly and carefully.

If you think there is no suitable card that matches, write one of your own.

There are some blank cards for doing this.

When you have agreed on three cards that go together, stick them side-by-side on your large sheet of paper.

Write your reasoning on the poster. Show clearly how you know that the matching is correct.

While students work in small groups you have two tasks: to note their different approaches to the task, and to support their reasoning.

Listen and watch students carefully and note different student approaches to the task. Do students struggle to multiply decimals by 10 or 100? Do students understand the purpose of subtraction on the *Equation* cards? Try not to make suggestions that move students towards a particular approach to the task. Instead, ask questions that help students to clarify their thinking. If the whole class is struggling on the same issue, write relevant questions on the board.

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Some students select a fraction card and look for a decimal to match:

How can you read this fraction as a division?
Can you do the calculation without using a calculator?

Show me a Decimal card that can easily be matched to a Fraction card. [Students are likely to select non-repeating decimals.]

Some students may select an *Equation* card and look for a *Fraction* card to match, or use 'guess and check' to substitute values of x into the *Equation* cards.

Show me the solution to your equation.

Show me an Equation card that can easily be matched to an Fraction card. [Students are likely to select an equation that does not contain a subtraction.]

Some students will begin by selecting a *Decimals* card and looking for an *Equation* card to match:

Suppose you let your decimal be called x.

How would you write x without the repeating notation?

What is the value of $10x$? $100x$?

How can you use arithmetic on these expressions to eliminate the repeating notation?

What is the difference between $100x$ and $10x$? Does this eliminate the repeating notation?

Encourage students to use a variety of strategies. If, for example, they have matched several fraction cards to decimal ones, ask them to match an equation card or a decimal card to a fraction card.

Some cards have no partner and students will need to construct these. Some students may also notice that there are fewer fraction cards than decimal cards. Leave them to realize, or discover by solving the equations, that $0.4\overline{9} = 0.5$ and that $0.1\overline{9} = 0.2$.

Whole-class discussion: comparing posters (20 minutes)

Ask students to share their thinking with the whole class. Invite groups of students to show three cards that match and ask them to explain their reasoning.

How did you decide that that equation matched this decimal?
How did you solve the equation to find the matching fraction?

When students have shared a few examples, challenge them to find fraction equivalents for some harder examples.

Find a fraction that represents one of these decimals:

$1.\overline{36},\ 0.0\overline{6},\ 0.\overline{123},\ \ldots$

Show me your solutions using your mini-whiteboards.
Show me your answers in their lowest terms.

Show me an example of a repeating decimal for which the method the method 1000x - 100x would be useful. Can you explain? [$0.12\overline{3},\ 0.00\overline{1},\ 0.01\overline{2},$ *]*

Finally, ask students:

Can you give me an example of a decimal that does not terminate nor repeat?

Explain that these numbers are called irrational because they cannot be written as fractions. Encourage students to find a few examples from their prior knowledge, or to create some of their own:

For example: *0.12345678910111213141516…*

$\sqrt{2}, \sqrt{3}, \sqrt{5}$

$\pi,\ 2\pi,\ 3\pi,\ \ldots n\pi$

Review individual solutions to *Repeating Decimals* (20 minutes)

Ask students to look again at their original individual solutions to the problems on repeating decimals, together with your comments.

Read through your original solution to the Repeating Decimals problems.

Make some notes on what you have learned during the lesson.

Now have a go at the second sheet: Repeating decimals (revisited). Can you use what you have learned to answer these questions?

Suggestion for an extension activity

Invite students to create their own set of decimals, equations and fractions cards. They may then like to try these out on some other students.

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Solutions

Fraction Conversion Challenge

$\frac{1}{2}=0.5$	$\frac{2}{2}=1$							
$\frac{1}{3}=0.\bar{3}$	$\frac{2}{3}=0.\bar{6}$	$\frac{3}{3}=1$						
$\frac{1}{4}=0.25$	$\frac{2}{4}=0.5$	$\frac{3}{4}=0.75$	$\frac{4}{4}=1$					
$\frac{1}{5}=0.2$	$\frac{2}{5}=0.4$	$\frac{3}{5}=0.6$	$\frac{4}{5}=0.8$	$\frac{5}{5}=1$				
$\frac{1}{6}=0.1\bar{6}$	$\frac{2}{6}=0.\bar{3}$	$\frac{3}{6}=0.5$	$\frac{4}{6}=0.\bar{6}$	$\frac{5}{6}=0.8\bar{3}$	$\frac{6}{6}=1$			
$\frac{1}{7}=0.\overline{142857}$	$\frac{2}{7}=0.\overline{285714}$	$\frac{3}{7}=0.\overline{428571}$	$\frac{4}{7}=0.\overline{571428}$	$\frac{5}{7}=0.\overline{714285}$	$\frac{6}{7}=0.\overline{857142}$	$\frac{7}{7}=1$		
$\frac{1}{8}=0.125$	$\frac{2}{8}=0.25$	$\frac{3}{8}=0.375$	$\frac{4}{8}=0.5$	$\frac{5}{8}=0.625$	$\frac{6}{8}=0.75$	$\frac{7}{8}=0.875$	$\frac{8}{8}=1$	
$\frac{1}{9}=0.\bar{1}$	$\frac{2}{9}=0.\bar{2}$	$\frac{3}{9}=0.\bar{3}$	$\frac{4}{9}=0.\bar{4}$	$\frac{5}{9}=0.\bar{5}$	$\frac{6}{9}=0.\bar{6}$	$\frac{7}{9}=0.\bar{7}$	$\frac{8}{9}=0.\bar{8}$	$\frac{9}{9}=1$

Repeating Decimals

1. $\frac{2}{3} = 0.\bar{6}$ $\quad \frac{3}{11} = 0.\overline{27}$ $\quad \frac{5}{6} = 0.8\bar{3}$

2.

$$x = 0.1\bar{6}$$
$$\Rightarrow 100x = 16.\bar{6}$$
$$\Rightarrow 10x = 1.\bar{6}$$
$$\Rightarrow 90x = 15$$
$$\Rightarrow x = \frac{15}{90} = \frac{1}{6}$$

3. $0.54 = \frac{27}{50}$ $\quad 0.\bar{4} = \frac{4}{9}$ $\quad 0.\overline{54} = \frac{6}{11}$ $\quad 0.5\bar{9} = \frac{3}{5}$

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Repeating Decimals (Revisited)

1. $\frac{4}{3} = 1.\dot{3}$ $\frac{4}{11} = 0.\overline{36}$ $\frac{1}{6} = 0.1\dot{6}$

2.

$$x = 0.8\dot{3}$$
$$\Rightarrow 100x = 83.\dot{3}$$
$$\Rightarrow 10x = 8.\dot{3}$$
$$\Rightarrow 90x = 75$$
$$\Rightarrow x = \frac{75}{90} = \frac{5}{6}$$

3. $0.\dot{5} = \frac{5}{9}$ $0.\overline{45} = \frac{5}{11}$ $0.4\dot{9} = \frac{1}{2}$

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Matching Decimals, Equations, Fractions

Decimals	Equations	Fractions
1.2	$10x = 12$	$\frac{6}{5}$
$1.1\overline{9}$	$100x - 10x = 108$	
1.5	$10x = 15$	$\frac{3}{2}$
$1.4\overline{9}$	$100x - 10x = 135$	
$0.1\overline{2}$	$100x - 10x = 11$	$\frac{11}{90}$
$0.1\overline{5}$	**New card:** $100x - 10x = 14$	**New card:** $\frac{7}{45}$
0.12	$100x = 12$	$\frac{3}{25}$
$1.\overline{5}$	$10x - x = 14$	$\frac{14}{9}$
$1.\overline{2}$	**New card:** $10x - x = 11$	**New card:** $\frac{11}{9}$
$0.\overline{15}$	$100x - x = 15$	$\frac{5}{33}$
$0.\overline{12}$	**New card:** $100x - x = 12$	**New card:** $\frac{4}{33}$
0.15	$100x = 15$	$\frac{3}{20}$

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Repeating Decimals

How to write repeating decimals

We draw a line above decimal digits when they repeat over and over again.

For example: $0.\overline{3}$ is the same as the decimal 0.333333333333… (and so on)

$0.\overline{25}$ is the same as the decimal 0.252525252525… (and so on)

$0.12\overline{34}$ is the same as the decimal 0.1234343434… (and so on)

1. Use a calculator to change these fractions into decimals.
   Try to use the notation described above.

$\frac{2}{3}$ = …… $\frac{3}{11}$ = …… $\frac{5}{6}$ = ……

2. Complete the following explanation to convert $0.1\overline{6}$ into a fraction:

Let $x = 0.1\overline{6}$

$100x$ = ...

$10x$ = ...

$100x - 10x$ = ...

So, x .....

3. Change each of these decimals into fractions.
   Please show your method clearly next to each question.

0.54 = ……	
$0.\overline{4}$ = ……	
$0.\overline{54}$ = ……	
$0.5\overline{9}$ = ……	

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Fraction Conversion Challenge

$\frac{1}{2} =$	$\frac{2}{2} =$							
$\frac{1}{3} =$	$\frac{2}{3} =$	$\frac{3}{3} =$						
$\frac{1}{4} =$	$\frac{2}{4} =$	$\frac{3}{4} =$	$\frac{4}{4} =$					
$\frac{1}{5} =$	$\frac{2}{5} =$	$\frac{3}{5} =$	$\frac{4}{5} =$	$\frac{5}{5} =$				
$\frac{1}{6} =$	$\frac{2}{6} =$	$\frac{3}{6} =$	$\frac{4}{6} =$	$\frac{5}{6} =$	$\frac{6}{6} =$			
$\frac{1}{7} =$	$\frac{2}{7} =$	$\frac{3}{7} =$	$\frac{4}{7} =$	$\frac{5}{7} =$	$\frac{6}{7} =$	$\frac{7}{7} =$		
$\frac{1}{8} =$	$\frac{2}{8} =$	$\frac{3}{8} =$	$\frac{4}{8} =$	$\frac{5}{8} =$	$\frac{6}{8} =$	$\frac{7}{8} =$	$\frac{8}{8} =$	
$\frac{1}{9} =$	$\frac{2}{9} =$	$\frac{3}{9} =$	$\frac{4}{9} =$	$\frac{5}{9} =$	$\frac{6}{9} =$	$\frac{7}{9} =$	$\frac{8}{9} =$	$\frac{9}{9} =$

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Card Set A: Decimals

1.2	$1.\overline{5}$
1.5	$1.\overline{2}$
$0.1\overline{2}$	$0.\overline{15}$
$0.1\overline{5}$	$0.\overline{12}$
0.12	$1.1\overline{9}$
$1.4\overline{9}$	0.15

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Card Set B: Equations

$100x = 12$	$10x - x = 14$
$100x - x = 15$	$10x = 12$
E	$100x = 15$
$100x - 10x = 11$	$100x - 10x = 108$
E	$10x = 15$
$100x - 10x = 135$	E

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Card Set C: Fractions

$\frac{3}{25}$	$\frac{6}{5}$
$\frac{3}{20}$	$\frac{14}{9}$
F	$\frac{11}{90}$
$\frac{5}{33}$	F
F	$\frac{3}{2}$

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Repeating Decimals (Revisited)

How to write repeating decimals

We draw a line above decimal digits when they repeat over and over again.

For example: $0.\bar{3}$ is the same as the decimal 0.333333333333… (and so on)

$0.\overline{25}$ is the same as the decimal 0.252525252525… (and so on)

$0.12\overline{34}$ is the same as the decimal 0.1234343434… (and so on)

1. Use a calculator to change these fractions into decimals.
Try to use the notation described above.

$\frac{4}{3}$ = …… $\frac{4}{11}$ = …… $\frac{1}{6}$ = ……

2. Complete the following explanation to convert $0.8\bar{3}$ into a fraction:

Let $x = 0.8\bar{3}$

$100x$ = ...

$10x$ = ...

$100x - 10x$ = ...

So, x .....

3. Change each of these repeating decimals into fractions.
Please show your method clearly next to each question.

$0.\bar{5}$ = ……	
$0.\overline{45}$ = ……	
$0.4\bar{9}$ = ……	

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Matching Decimals and Fractions

- Take turns to find matching cards.
- Explain your thinking clearly to your group.
- If you find a card that has no match, create one on a blank card.
- When you have three cards that match, stick them side-by-side on your poster.
- Record your reasoning on the poster.

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