Teacher Notes

Math 7 Notes
Lesson 4.1
Terminating and Repeating Decimals

A fraction is a **division problem.**

Any fraction can be expressed as a decimal by dividing the numerator by **the denominator.**

$\frac{5}{12}$ $12\overline{)5.0000}$ → $0.41\overline{6}$

$\frac{1}{3}$ $3\overline{)1.000}$ → $0.\overline{3}$

The decimal form of a **fraction is either**

*terminating If the remainder eventually becomes zero when you divide, the decimal **is terminating.**

$\frac{1}{2} = .5$ $2\overline{)1.00}$

or

*repeating If the decimal has one or more **digits that repeat,** it can be written **using bar notation.**

$\frac{1}{3} = .\overline{3}$

Write each of these repeating decimals with correct bar notation.

0.63636363... $0.\overline{63}$

0.2444444... $0.2\overline{4}$

0.15666666... $0.15\overline{6}$

0.2454545... $0.2\overline{45}$

Show the meaning of the bar notation for these decimals.

$0.\overline{91}$ .919191...

$0.2\overline{3}$ 0.2333...

$0.\overline{245}$ .245245...

$0.1\overline{23}$ .123323...

To find the decimal for a fraction, without using a calculator, ask yourself **these questions:**

Is it a fraction I have memorized ?

Memory List

$\frac{1}{2} = 0.5$

$\frac{1}{3} = 0.\overline{3}$

$\frac{2}{3} = 0.\overline{6}$

$\frac{1}{4} = 0.25$

$\frac{3}{4} = 0.75$

$\frac{1}{5} = 0.2$

$\frac{2}{5} = 0.4$

$\frac{3}{5} = 0.6$

$\frac{4}{5} = 0.8$

$\frac{1}{5} = \frac{2}{10}$

$\frac{1}{6} = .1\overline{6}$

$\frac{2}{6} = \frac{1}{3} = .\overline{3}$

$\frac{3}{6} = \frac{1}{2} = .5$

$\frac{4}{6} = \frac{2}{3} = .\overline{6}$

$\frac{5}{6} = .8\overline{3}$

$\frac{1}{8} + \frac{2}{8} = \frac{3}{8}$ $\quad .125 + .25 = .375$

MEMORIZE these fraction/decimal relationships

$\frac{1}{8} = 0.125$	$\frac{1}{9} = 0.\overline{1}$	$\frac{1}{10} = 0.1$
$\frac{2}{8} = 0.25$	$\frac{2}{9} = 0.\overline{2}$	$\frac{2}{10} = 0.2$
$\frac{3}{8} = 0.375$	$\frac{3}{9} = 0.\overline{3}$	$\frac{3}{10} = 0.3$
$\frac{4}{8} = 0.5$	$\frac{4}{9} = 0.\overline{4}$	$\frac{4}{10} = 0.4$
$\frac{5}{8} = 0.625$	$\frac{5}{9} = 0.\overline{5}$	$\frac{5}{10} = 0.5$
$\frac{6}{8} = 0.75$	$\frac{6}{9} = 0.\overline{6}$	$\frac{6}{10} = 0.6$
$\frac{7}{8} = 0.875$	$\frac{7}{9} = 0.\overline{7}$	$\frac{7}{10} = 0.7$
	$\frac{8}{9} = 0.\overline{8}$	$\frac{8}{10} = 0.8$
		$\frac{9}{10} = 0.9$

$.5 + .125$

$.75 - .125$

Can the fraction be simplified to a fraction I have memorized ?

$\frac{22}{44} \; \frac{1}{2}$ (.5)

$\frac{12 \div 4}{16 \div 4} = \frac{3}{4}$ (.75)

$\frac{20 \div 5}{25 \div 5} = \frac{4}{5}$ (.8)

$\frac{27 \div 9}{81 \div 9} \; \frac{3}{9} = \frac{1}{3}$ (.$\overline{3}$)

$\frac{5}{25} = \frac{1}{5} = .2$

$\frac{24 \div 6}{30 \div 6} = \frac{4}{5} = .8$

No Brainer ?

Does it have a **denominator** that is a power of ten (10,100,1000...)?

Think...place value as you read the fraction

$\frac{13}{1000}$ "thirteen thousandths" 0.___ = 0.013

$\frac{7}{100}$ "seven hundredths" 0.__ = 0.07

Can you rewrite it as a no brainer ?

Can the fraction easily be **rewritten** with a denominator of 10, 100, 1000, ...?

Think...Rewrite it with a new **denominator**.

$\frac{7 \times 5}{20 \times 5} \; \frac{35}{100}$ 0.35 $\quad \frac{11 \times 4}{25 \times 4} \; \frac{44}{100}$ 0.44

Last Resort....Do long division!

$\frac{\text{numerator}}{\text{denominator}}$ → denominator ⟌ numerator

$\frac{3}{16}$

$16\overline{)3.000}$ = .1875

-16

140

-128

120

-112

80

-80

0

0.1875

$\frac{7}{11}$

$11\overline{)7.000}$ = .63.63

-66

40

-33

70

-66

40

-33

$0.\overline{63}$

We may need to change mixed numbers or negative numbers to decimals.

Examples:

$-2\frac{1}{4}$

$-2.$

$\frac{1}{4} = 0.25$

-2.25

$-\frac{7}{9}$

$-0.\overline{7}$

$8\frac{3}{20}$

$8.$

$\frac{3}{20} \times \frac{5}{5} = \frac{15}{100}$

8.15

Write decimals as fractions or mixed numbers in simplest form by reading the decimal without saying "point". Read using place value!

-6.2 "Negative six and two tenths"

$-6\frac{2}{10} = -6\frac{1}{5}$

Examples:

0.34

$\frac{34}{100}$

$\frac{17}{50}$

-1.25

$-1\frac{25}{100}$

$-1\frac{1}{4}$

- 0.05

$-\frac{5}{100}$

$-\frac{1}{20}$

Write a fraction that is equivalent to a terminating decimal between two given decimals.

- *Extend the decimal places by adding zeros.
- *Pick a decimal
- *Convert it to a fraction in simplest form

many answers

0.3 and 0.5

0.4

$\frac{4}{10} = \frac{2}{5}$

OR

0.30 0.50

$\frac{31}{100}$

0.8 and 0.95

0.80 0.95

$\frac{81}{100}$

0.12 and 0.13

.120 0.130

$\frac{121}{1000}$

Be precise!

Write Jon's daily practice times as an exact decimal number.

Monday: 1 hour 14 minutes

$1\frac{14}{60} =$ $30\overline{)7.00}$ (.233; 60; 100; 90; 100)

$1\frac{7}{30} = 1.2\overline{3}$ hrs

Friday: 2 hours 40 minutes

$2\frac{40}{60} = 2\frac{2}{3}$

$= 2.\overline{6}$

Tuesday: 45 minutes

$\frac{45}{100} = \frac{3}{4}$

0.75 hr

Saturday: 24 minutes

$\frac{24}{60} = \frac{4}{10} = 0.4$ hr.

or $\frac{2}{5}$