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Converting Fractions and Decimals Guide Notes Math 8

Converting a Fraction to a Decimal

To convert a fraction to a decimal, divide the numerator by the denominator.

To convert a fraction to a decimal, write an equivalent fraction (if possible) whose denominator is 10, 100, or 1000.

Remember that the numerator is the dividend and the denominator is the divisor.

A terminating decimal is a decimal with a finite number of digits after the decimal point.

A repeating decimal is a decimal in which one digit or a group of digits is repeated without end.

Sample Problem 1: **Convert each fraction to a decimal, then determine if its decimal expansion is repeating or terminating.**

a. $\frac{3}{4}$

$\frac{3}{4} = \frac{3*25}{4*25} = \frac{75}{100} = 0.75$

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

A terminating decimal

b. $\frac{3}{11}$

$3 \div 11 = 0.27272\ldots\ldots\ldots$

-0

30

-22

80

-77

30

-22

80

-77

30

-22

3

$\frac{3}{11} = 0.27272\ldots\ldots\ldots$

$\frac{3}{11} = 0.\overline{27}$

A repeating decimal

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c. $\frac{12}{128}$

$12 \div 128 = 0.09375$

-0

120

-0

$1,200$

$-1,152$

480

-384

960

-896

640

-640

0

$\frac{12}{128} = 0.09375$

A terminating decimal

d. $\frac{3}{16}$

$3 \div 16 = 0.1875$

-0

30

-16

140

-128

120

-112

80

-80

0

$\frac{3}{16} = 0.1875$

A terminating decimal

Converting a Decimal to a Fraction

A terminating decimal can be written as a fraction simply by writing it as decimal fractions.

Sample problem 2: Convert each terminating decimal to a fraction.

a. 1.25

1.25

$1.25 = 1\frac{25}{100} = 1\frac{1 * 25}{4 * 25} = 1\frac{1}{4}$

$1.25 = 1\frac{1}{4}$

b. 4.5

4.5

$4.5 = 4\frac{5}{10} = 4\frac{5 * 1}{5 * 2} = 4\frac{1}{2}$

$4.5 = 4\frac{1}{2}$

c. 0.04

0.04

$0.04 = \frac{4}{100} = \frac{4 * 1}{4 * 25} = \frac{1}{25}$

$0.04 = \frac{1}{25}$

d. -5.12

-5.12

$-5.12 = -5\frac{12}{100} = -5\frac{4 * 3}{4 * 25} = -5\frac{3}{25}$

$-5.12 = -5\frac{3}{25}$

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A repeating decimal can be written as a fraction.

Follow these steps, to change each repeating decimal to a fraction.

Step 1: Let x equal the repeating decimal.

Step 2: Multiply by powers of 1, 10, or 100 to create 2 equations that isolate the repeating part of the decimal.

Step 3: Subtract the equations to remove the repeating part of the decimal.

Step 4: Solve the resulting equation and simplify the fraction.

Sample problem 3: Convert each repeating decimal to a fraction.

a. $0.666666\ldots\ldots$

0.666666
$10x = 6.66666$
$-\ x = 0.66666$
$9x = 6$
$x = \frac{6}{9} = \frac{2 * 3}{3 * 3}$
$x = \frac{2}{3}$

b. $1.252525\ldots\ldots\ldots$

$1.252525\ldots\ldots$
$100x = 125.2525$
$-\ x = \ \ 1.2525$
$99x = 124$
$x = \frac{124}{99}$

c. $0.181818\ldots\ldots$

0.181818
$100x = 18.1818$
$-\ x = \ \ 0.1818$
$99x = 18$
$x = \frac{18}{99} = \frac{9 * 2}{9 * 11}$
$x = \frac{2}{11}$

d. $0.3717171717\ldots\ldots\ldots$

$0.3717171717\ldots\ldots$
$1,000x = 371.7171717$
$-10\,x = \ \ 3.7171717$
$990x = 368$
$x = \frac{368}{990} = \frac{2 * 184}{2 * 495}$
$x = \frac{184}{495}$

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