

Decimals to Fractions Investigation

Purpose:

Investigate for which fractions the decimal equivalent is terminating and for which it is recurring.

1. For terminating decimals, investigate the relationship between the fraction and the number of places of the decimal. Use the given examples and create more.

There are many possible decimal and fraction possibilities you can use.

Fraction	Decimal	Number of places of the decimal
$1/2$	0.5	1
$3/5$	0.6	1
$7/10$	0.7	1
$7/25$	0.28	2
$33/100$	0.33	2
$21/50$	0.42	2
$3/8$	0.375	3
$333/1000$	0.333	3
$111/250$	0.444	3

2. Explain how you converted the decimal to a fraction for each case (1 decimal place, 2 decimal places and 3 decimal places).

If there is 1 digit after the decimal, put that digit as the numerator over 10. Then simplify.

If there are 2 digits after the decimal, put the digits as the numerator over 100. Then simplify.

If there are 3 digits after the decimal, put the digits as the numerator over 1000. Then simplify.

3. What is the rule for converting terminating decimals to fractions?

Divide the digits after the decimal by 10 to the power of the number of digits: 1 digit after would be over 10^1 or 10, 2 digits would be over 10^2 or 100, 3 digits would be over 10^3 or 100.

Advanced answer: if n is the number of digits after the decimal, then the digits after the decimal are put in the numerator and the denominator is 10^n .

4. Verify your rule by testing a terminating decimal with more than 3 decimal places.

As long as you tested the rule with a terminating decimal of more than 3 decimal places and were able to come up with a correct answer, you got this.

5. For recurring decimals, investigate the relationship between the fraction and the number of places in the recurring part of the decimal. Do the given examples and create more to test your thoughts.

There are many correct possibilities for these answers.

Fraction	Decimal	Number of places of the decimal
$1/3$	$0.\overline{3}$	1
$2/3$	$0.\overline{6}$	1
$1/9$	$0.\overline{1}$	2
$1/99$	$0.\overline{01}$	2
$1/11$	$0.\overline{09}$	2
$142857/999999$ or $1/7$	$0.\overline{142857}$	6

5. Explain how you can convert recurring decimals to a fraction.

If there is 1 digit after the decimal repeating, put that digit as the numerator over 9. Then simplify.

If there are 2 digits after the decimal repeating, put the digits as the numerator over 99. Then simplify.

If there are 3 digits after the decimal repeating, put the digits as the numerator over 999. Then simplify.