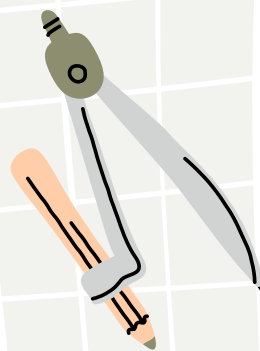
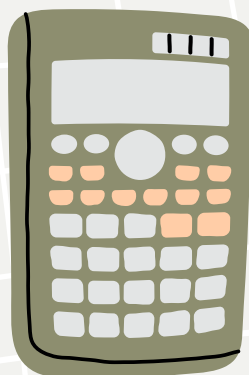
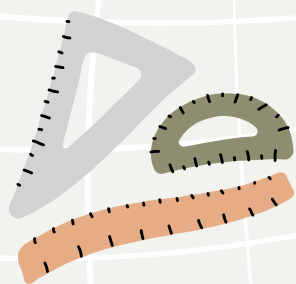


DECIMALS CONCEPT EXPLANATION



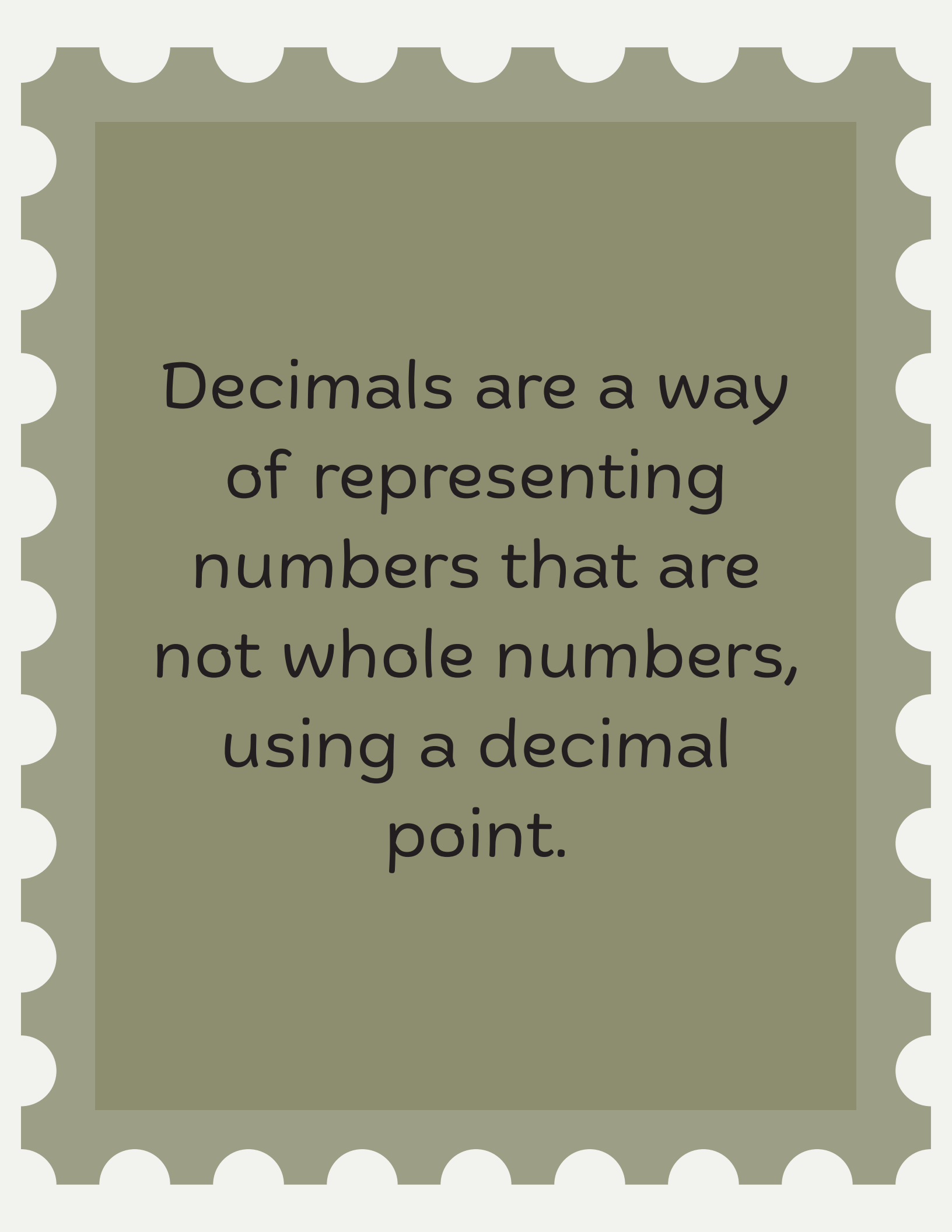
hotchpotch5

Decimals are numbers that have a dot, called a decimal point, to show values smaller than 1. Imagine you have a chocolate bar, and you break it into 10 equal pieces. Each piece is 0.1 (a tenth) of the whole bar. The decimal point helps us show parts of a whole easily, just like cutting your dosa into pieces.

Key Terms

decimal point: the dot that separates whole numbers from fractional parts

tenths: each of ten equal parts into which a whole is divided



Decimals are a way
of representing
numbers that are
not whole numbers,
using a decimal
point.

Decimals
More Than Just
Dots !

The Decimal Point

This is the most defining feature of a decimal. It's a dot (.) that separates the whole number part of a number from the fractional part.

Everything to the left of the decimal point represents whole units (ones, tens, hundreds, etc.).

Everything to the right of the decimal point represents parts of a whole unit (tenths, hundredths, thousandths, etc.).

Decimal Place Value

Each digit in a decimal has a specific value based on its position relative to the decimal point.

Left of the Decimal Point

- *The digit immediately to the left is the ones place.*
- *The next digit to the left is the tens place.*
- *The next is the hundreds place, and so on.*
- *Each place value to the left is 10 times larger than the place value to its right.*

Right of the Decimal Point

- *The digit immediately to the right is the tenths place. ($1/10$)*
- *The next digit to the right is the hundredths place. ($1/100$)*
- *The next is the thousandths place. ($1/1000$)*
- *And so on.*
- *Each place value to the right is $1/10$ (or one-tenth) the value of the place value immediately to its left.*

Examples

- *In the number 345.678*
- *3 is in the hundreds place (300)*
- *4 is in the tens place (40)*
- *5 is in the ones place (5)*
- *. is the decimal point*
- *6 is in the tenths place ($6/10$ or 0.6)*
- *7 is in the hundredths place ($7/100$ or 0.07)*
- *8 is in the thousandths place ($8/1000$ or 0.008)*

Decimals as Fractions

Every decimal can be represented as a fraction, and vice-versa.

Decimal to Fraction: The denominator of the fraction is determined by the place value of the last digit in the decimal.

- $0.5 = 5/10$
- $0.25 = 25/100$
- $0.123 = 123/1000$

Fraction as Decimal

Divide the numerator by the denominator.

- $1/2 = 0.5$
- $3/4 = 0.75$
- $1/8 = 0.125$

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Types of Decimals:

Terminating Decimals:

These decimals have a finite number of digits after the decimal point.

- Examples: 0.5, 0.75, 0.125, 3.14

Repeating Decimals (or Recurring Decimals)

These decimals have a digit or a sequence of digits that repeat infinitely after the decimal point.

- Examples: $0.333\dots$ (often written as $0.\overline{3}$),
 $0.142857142857\dots$ (often written as $0.\overline{142857}$),
 $0.666\dots$ ($0.\overline{6}$)

Repeating Decimals (or Recurring Decimals)

Non-terminating, Non-repeating Decimals: These decimals have an infinite number of digits after the decimal point that do not follow a repeating pattern. These are actually irrational numbers.

- Examples: $(3.1415926535\dots)$, $(1.4142135623\dots)$

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Operations with Decimals

Just like with whole numbers, you can perform arithmetic operations (addition, subtraction, multiplication, and division) with decimals.

The key is to:

Operations with Decimals

- Addition and Subtraction: Align the decimal points vertically.
- Multiplication: Multiply as if they were whole numbers, then count the total number of decimal places in the numbers being multiplied and place the decimal point that many places from the right in the answer.
- Division: You often need to make the divisor a whole number by moving the decimal point. If you do this, you must move the decimal point in the dividend the same number of places. Then perform the division.

Comparing Decimals

- To compare decimals, start from the leftmost digit and compare the digits in each place value.
- Example: Compare 0.7 and 0.65
- The tenths digit in 0.7 is 7.
- The tenths digit in 0.65 is 6.
- Since 7 is greater than 6, 0.7 is greater than 0.65.

Why are decimals important ?

- Decimals are used extensively in:
- Money: Dollars and cents are a perfect example of decimal representation.
- Measurements: Length, weight, volume, temperature are often expressed using decimals.

Why are decimals important ?

- Science and Engineering: Precision is often required, making decimals essential.
- Technology: Computers and digital devices heavily rely on decimal (and binary) representations.

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