The Difference Between the Rational Numbers and the Irrational Numbers Explained

The Rational Numbers Q,
are the numbers that can be written as a ratio (fraction) of two integers.
They can be in the form of fractions, integers, terminating decimals, or repeating decimals.

In form of fractions.	$\frac{3}{5}$ is a rational number, because in this fraction, **3** is an integer, and **5** is an integer.	$\frac{-1}{4}$ is a rational number, because in this fraction, **-1** is an integer, and **4** is an integer.
In form of integers.	7 is a rational number, because we can write it as a fraction, $\frac{7}{1}$ and in this fraction, **7** is an integer, and **1** is an integer.	-9 is a rational number, because we can write it as a fraction, $\frac{-9}{1}$ and in this fraction, **-9** is an integer, and **1** is an integer.
In form of terminating decimals.	0.25 is a rational number, because we can write it as a fraction, $0.25 = \frac{25}{100} = \frac{1}{4}$ and in this fraction, **1** is an integer, and **4** is an integer.	0.713 is a rational number, because we can write it as a fraction, $0.713 = \frac{713}{1000}$ and in this fraction, **713** is an integer, and **1000** is an integer.
In form of repeating decimals.	$0.636363\ldots$ is a rational number, because we can write it as a fraction, $0.636363\ldots = \frac{7}{11}$ and in this fraction, **7** is an integer, and **11** is an integer.	$0.33333\ldots$ is a rational number, because we can write it as a fraction, $0.33333\ldots = \frac{1}{3}$ and in this fraction, **1** is an integer, and **3** is an integer.

The Irrational Numbers I,
are the numbers that cannot be written as a ratio (fraction) of two integers,
and they are represented by decimals that never terminate nor repeat.

Decimals that never terminate nor repeat.	$\sqrt{5} = 2.23606797\ldots$ $\sqrt{3} = 1.7320508\ldots$ $\sqrt{12} = 3.46410161\ldots$ $\pi = 3.14159265\ldots$ $e = 2.7182818284\ldots$

In conclusion…
If a decimal is terminating or repeating, then the decimal is a rational number.
If a decimal is neither repeating not terminating, then the decimal is an irrational number.

More Examples
4.723 is a terminating decimal, therefore the decimal is a rational number.
0.9 is a terminating decimal, therefore the decimal is a rational number.
$0.454545454545\ldots$ is a repeating decimal, therefore the decimal is a rational number.
$6.274274274274274\ldots$ is a repeating decimal, therefore the decimal is a rational number.
$3.1415926535897932\ldots$ is neither repeating not terminating, therefore the decimal is an irrational number.
$4.5825756949\ldots$ is neither repeating not terminating, therefore the decimal is an irrational number.