

RATIONAL AND IRRATIONAL NUMBERS

- A **rational number** is a number that can be made into a fraction. Decimals that repeat or terminate are rational because they can be changed into fractions.
- An **irrational number** is a number that cannot be made into a fraction. Decimals that do not repeat or end are irrational numbers. Pi is an irrational number.
- Any fraction can be changed into a decimal and any decimal can be changed into a fraction. This is because a decimal is based on the place values of tenths, hundredths, and thousandths etc., and most fractions can be changed to have a denominator of ten, hundred or thousand etc.



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- **Mixed numbers** are a whole number and a fraction such as $1 \frac{4}{5}$.
 - A mixed number can be changed into a fraction by multiplying the denominator by the whole number and then adding the numerator, this number becomes the new numerator and the denominator stays the same. The fraction, $1 \frac{4}{5}$ would become $\frac{9}{5}$.
 - A fraction in which the numerator is greater than the denominator is called an **improper fraction**. To change an improper fraction into a mixed decimal, the numerator is divided by the denominator to get the whole number and the remainder. With the whole number, the remainder becomes the numerator and the denominator stays the same.

- Mixed numbers can be changed into improper fractions.

Example:

$$4 \frac{3}{5} = (5)(4) + 3 = 23 \text{ (new denominator) or } 23/5$$

- Improper fractions can be changed into mixed numbers.

Example:

Improper fraction, $78/7 \rightarrow 7 \frac{1}{7}$ $\sqrt{78} = 11 \text{ R}1 \rightarrow$ mixed number, $11 \frac{1}{7}$

- Square roots are used in many different ways. They can be used to find the length of the sides of a square if the area is given. They can also be used to determine if a triangle is a right triangle. To determine which two numbers a square root is between, look for



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Try This!

Change the following into decimals:

$\frac{6}{20}$ _____ $\frac{8}{12}$ _____ $\frac{9}{13}$ _____

Change the following into fractions:

.33333 _____ .825 _____ .125 _____

Order the fractions and decimals from least to greatest:

.45, $\frac{2}{6}$, $\frac{3}{5}$, .22 _____

Change the following into improper fractions:

$\frac{4}{5}$

$\frac{3}{7}$

$\frac{2}{16}$

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$\frac{45}{3}$

$\frac{38}{4}$

$\frac{29}{3}$



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Which of the following numbers are rational and which are irrational?

$\frac{3}{8}$, .252525, .87524136..., .6543

Compute the square roots of these numbers:

$\sqrt{169}$ _____

$\sqrt{625}$ _____

$\sqrt{2.25}$ _____

What two numbers is $\sqrt{24}$ between? _____