

# Triangular Numbers

Triangular numbers are numbers that can be represented as a triangle.

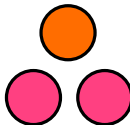
 **Example** Here are the first four triangular numbers:

This subscript notation tells you which triangular number it is.  $T_1$  is the first triangular number,  $T_2$  is the second and so on.

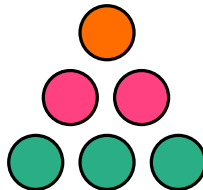
$$T_1 = 1$$



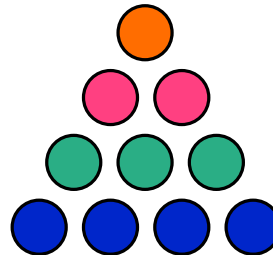
$$T_2 = 3$$



$$T_3 = 6$$



$$T_4 = 10$$



Each additional row of the pattern adds an extra one each time.

The sequence of triangular numbers is: 1 3 6 10 15 21 28 ...



# Prime Numbers

A **prime number** is a positive integer that has exactly **two factors**.

These factors are 1 and the number itself.

The first 10 primes are 2, 3, 5, 7, 11, 13, 17, 19, 23, 29

## Examples

1 is not a prime number because it only has one factor, the number 1  
2 is the only even prime number.

A number that is not prime (or 1) is called a **composite number**.

There are an infinite number of primes.

# Rational and Irrational Numbers

A **rational number** is any number that can be written as a **ratio of two numbers** - i.e. as a fraction  $\frac{a}{b}$  where  $a$  and  $b$  are whole numbers (and  $b$  is not zero).

 Examples

$$7 = \frac{7}{1}$$

All integers can be written as a fraction over 1

$$4\frac{4}{5} = \frac{24}{5}$$

Fractions and mixed numbers

$$3.2 = \frac{16}{5}$$

Terminating decimals

$$0.\dot{3} = \frac{1}{3}$$

Recurring decimals

If a number is not rational, we call it **irrational**. In decimal form, irrational numbers are infinitely long with no recurring pattern.

 Examples

$\sqrt{3} = 1.73205\dots$  is a **surd** and is therefore **irrational**.

$\pi$  is also an irrational number.

# Reciprocals

The **reciprocal** of a number is its **multiplicative inverse**.

When you multiply a number by its reciprocal, you get the answer 1



The reciprocal of 5 is  $\frac{1}{5}$ , because  $5 \times \frac{1}{5} = 1$

$\times \frac{1}{5}$  is the same as  $\div 5$

We can find the reciprocal by writing the original number as a fraction (if it isn't one already) and then “flipping” it.



Find the reciprocal of 12

$$12 = \frac{12}{1} \xrightarrow{\text{Flip}} \frac{1}{12}$$



Find the reciprocal of  $\frac{3}{4}$

$$\frac{3}{4} \xrightarrow{\text{Flip}} \frac{4}{3}$$