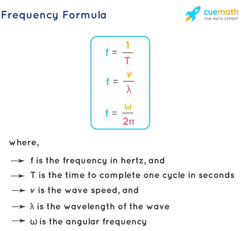
# Frequency Formula

The frequency formula is used to find the frequency of a wave. Frequency is defined as the number of cycles completed per unit time. It also tells about how many crests go through a fixed point per unit time. Sometimes it is known as reciprocal of time. Frequency is expressed in Hertz(Hz). The frequency formula is used to find the frequency of the wave. Let us understand it better using solved examples.

## What is the Frequency Formula?

Frequency is the total number of occurrences of a repeating event per unit of the given time. There are different frequency formulas to calculate frequency depending upon the quantities known. The formula for the frequency of a wave is used to find frequency (f), time period (T), wave speed (V), and wavelength (λ). 1 Hertz refers to one cycle per second.




## Frequency Formula

The frequency formula is given as,

**Formula 1:** The frequency formula in terms of time is given as:

$f = 1/T$

### where,

- f is the frequency in hertz measured in m/s, and
- T is the time to complete one cycle in seconds

**Formula 2:** The frequency formula in terms of wavelength and wave speed is given as,

$f = v/\lambda$

where,

- $v$ is the wave speed in m/s, and
- λ is the wavelength of the wave in m

**Formula 3:** Frequency in terms of angular frequency is articulated as,

$f = \omega/2\pi$

where ω is the angular frequency

Let us understand the frequency formula better through a few solved examples.



## Examples Using Frequency Formula

**Example 1:** Using the frequency formula, find the frequency of a wave where one cycle is completed in 0.5s.
**Solution:**

To find: Frequency

Given:

Time = 0.5s

Using frequency formula

f = 1 / T



**Answer: Frequency is 2Hz.**

**Example 2:** Find the frequency of lightwave when the wavelength of the light is 600nm.
**Solution:**

To find: Frequency

Given: Wavelength = 600nm = $600 \times 10^{-9}$ m

$= 6 \times 10^{-7}$ m

We know that the speed of the light = $3 \times 10^{8}$ m/s

Using frequency formula

$f = v / \lambda$

$f = 3 \times 10^{8} / 6 \times 10^{-7}$

$f = 5 \times 10^{14}$ $sec^{-1}$

**Answer: Frequency is $5 \times 10^{14}$ Hz.**

**Example 3:** Determine the frequency of the pendulum that takes 4 seconds to complete one cycle.
**Solution:**

To find: Frequency

Given:

Time = 4s

Using frequency formula

f = 1 / T

f = 1 / 4

f = 0.25

**Answer: Frequency is 0.25 Hz.**

## FAQs on Frequency

- What is Frequency Formula?
- What are the Applications of Frequency Formula?
- How is Frequency Formula Applied For the Given values?
- What is 'T' in Frequency Formula?