

The wave equation can be used to work out wave speed.

$$\text{wave speed} = \text{frequency} \times \text{wavelength}$$
$$v = f \times \lambda$$

Remember:

- Wave speed (v) is measured in metres per second (m/s)
- Frequency (f) is measured in hertz (Hz)
(1 kHz equals 1 000 Hz, e.g. 4 kHz = 4 000 Hz)
- Wavelength (λ) is measured in metres (m)
(km equals 1 000 m, e.g. 4 km = 4 000 m)

The equation can be rearranged to work out frequency or wavelength.

Task

Calculate the following:

1. The speed of a wave with a frequency of 10 kHz and a wavelength of 2 m.
2. The speed of a wave with a wavelength of 50 cm and a frequency of 4 kHz.
3. The frequency of a wave travelling at 500 m/s with a wavelength of 25 m.
4. The speed of a radio wave with a wavelength of 3 000 m and a frequency of 100 kHz.
5. The speed of a wave with a frequency of 30 kHz and wavelength of 10 m.
6. The wavelength of a wave travelling at 11 km/s with a frequency of 5.5 kHz.
7. The frequency of a wave of 50 cm length, which is travelling at 9 km/s.

Answers

1. 20 000 m/s or 20 km/s
2. 2 000 m/s or 2 km/s
3. 20 Hz
4. 3×10^8 m/s
5. 300 000 m/s or 3×10^5 m/s
6. 2 m
7. 18 kHz