Sine

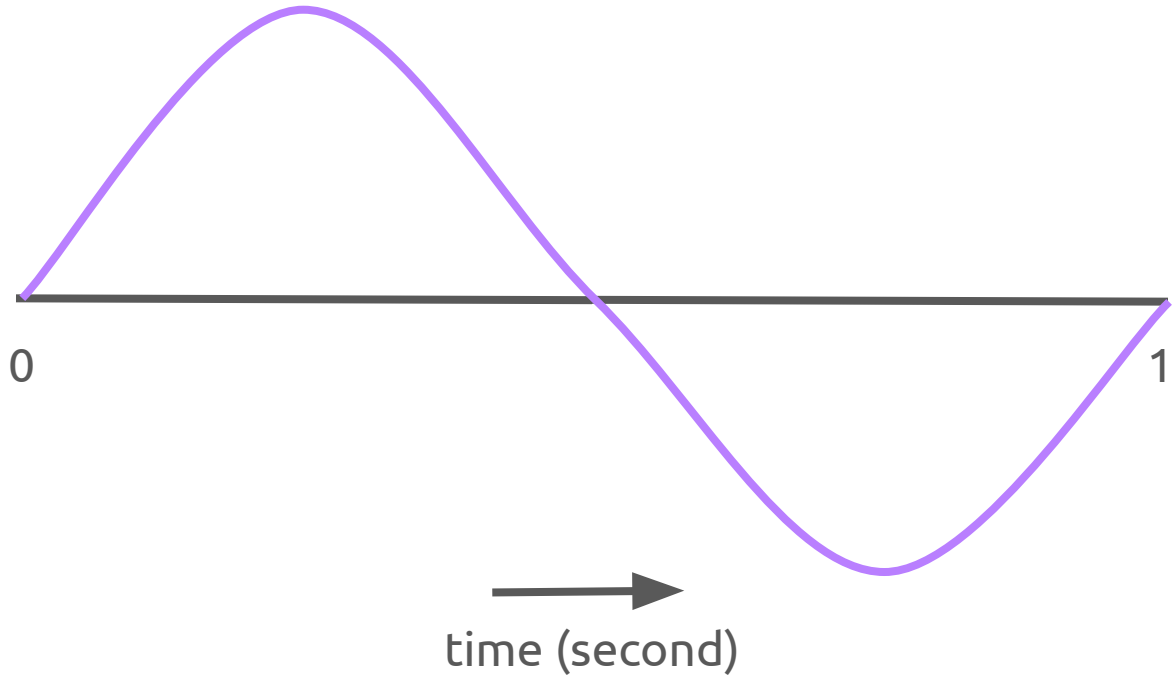
- function
- continuous- → discrete time domain
- phase

Sine

function

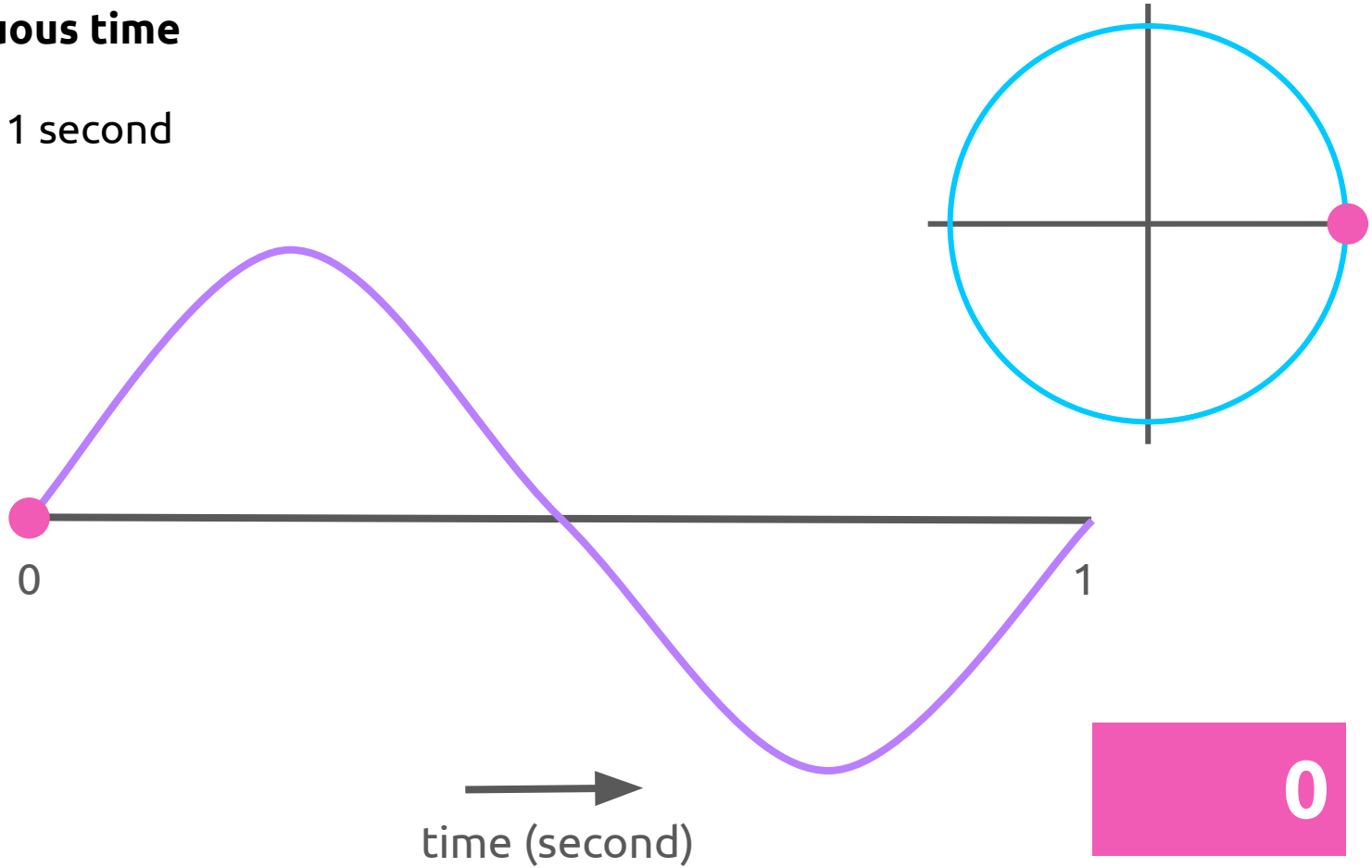
Sine in continuous time

- frequency = 1
- wavelength = 1 second



Sine in continuous time

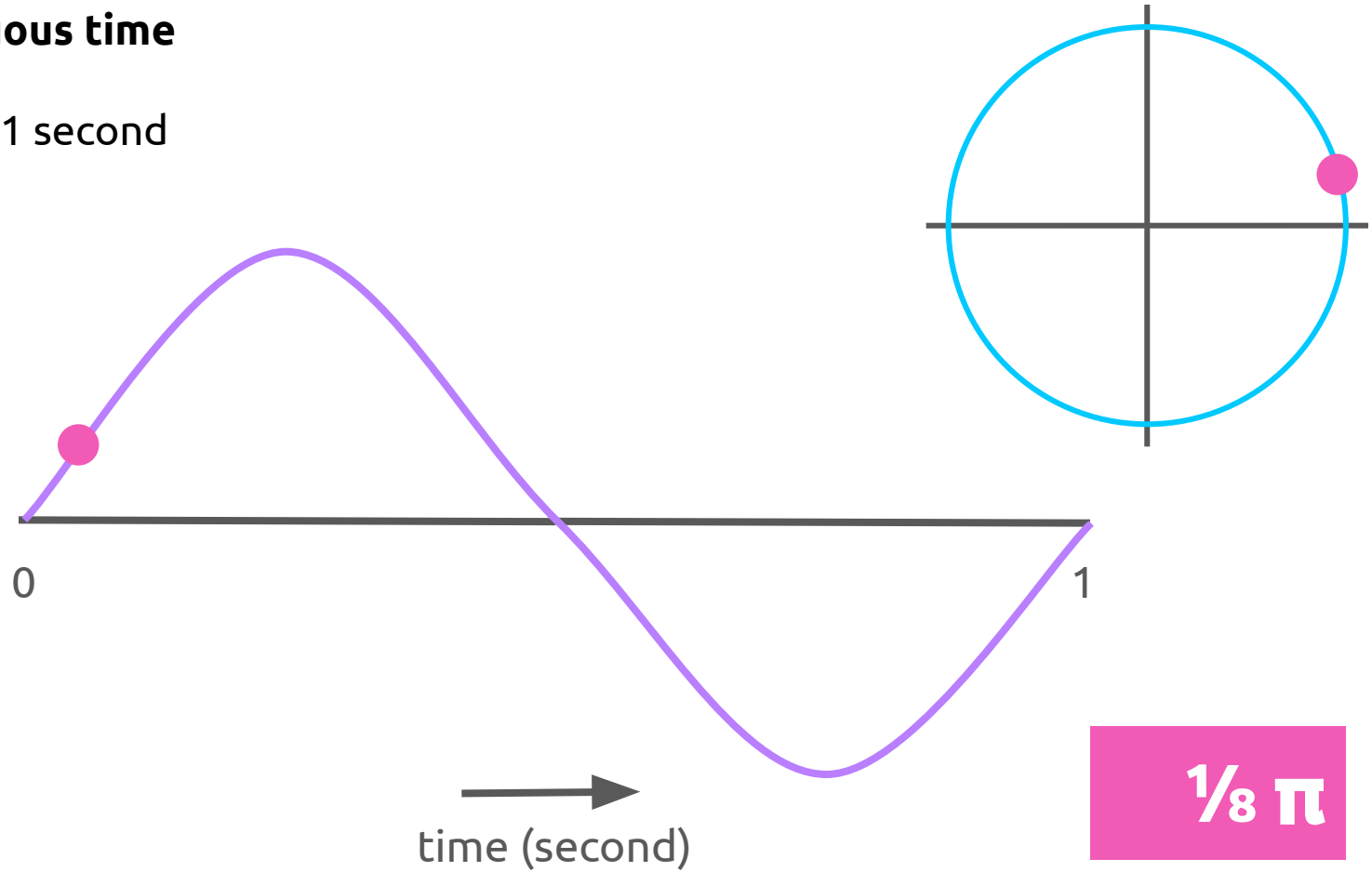
- frequency = 1
- wavelength = 1 second



0

Sine in continuous time

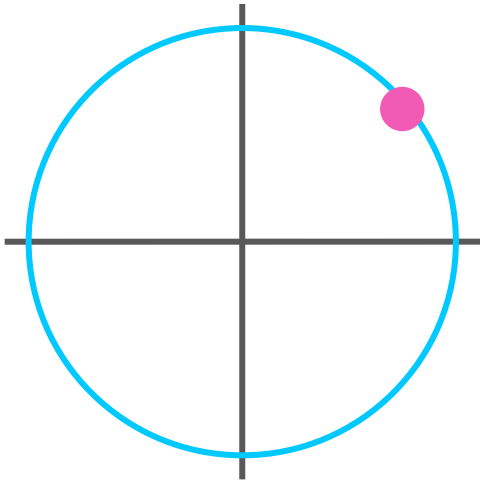
- frequency = 1
- wavelength = 1 second

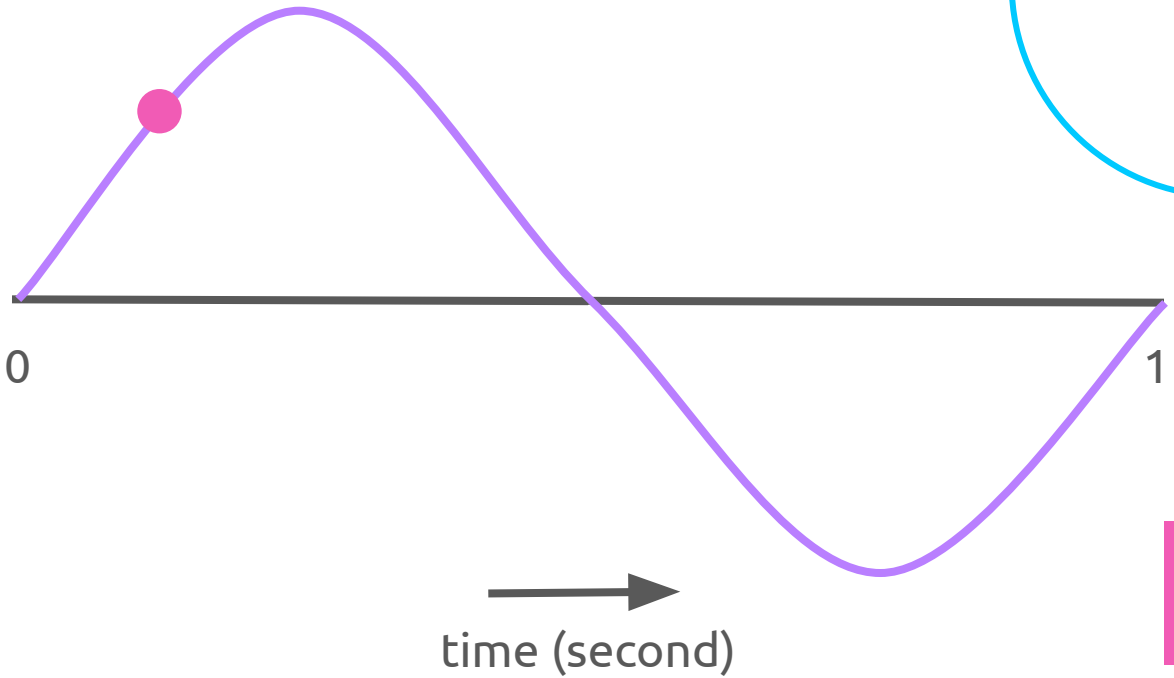


⅛ π

Sine in continuous time

- frequency = 1
- wavelength = 1 second

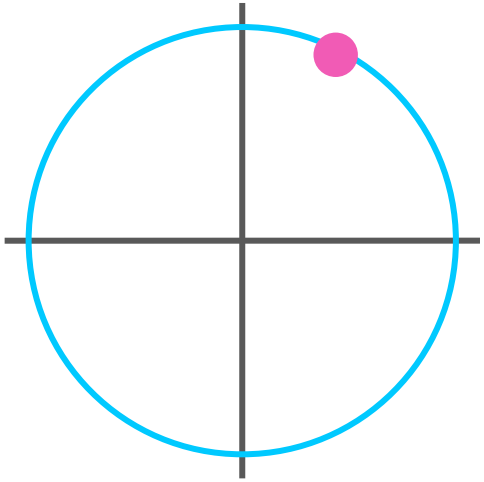


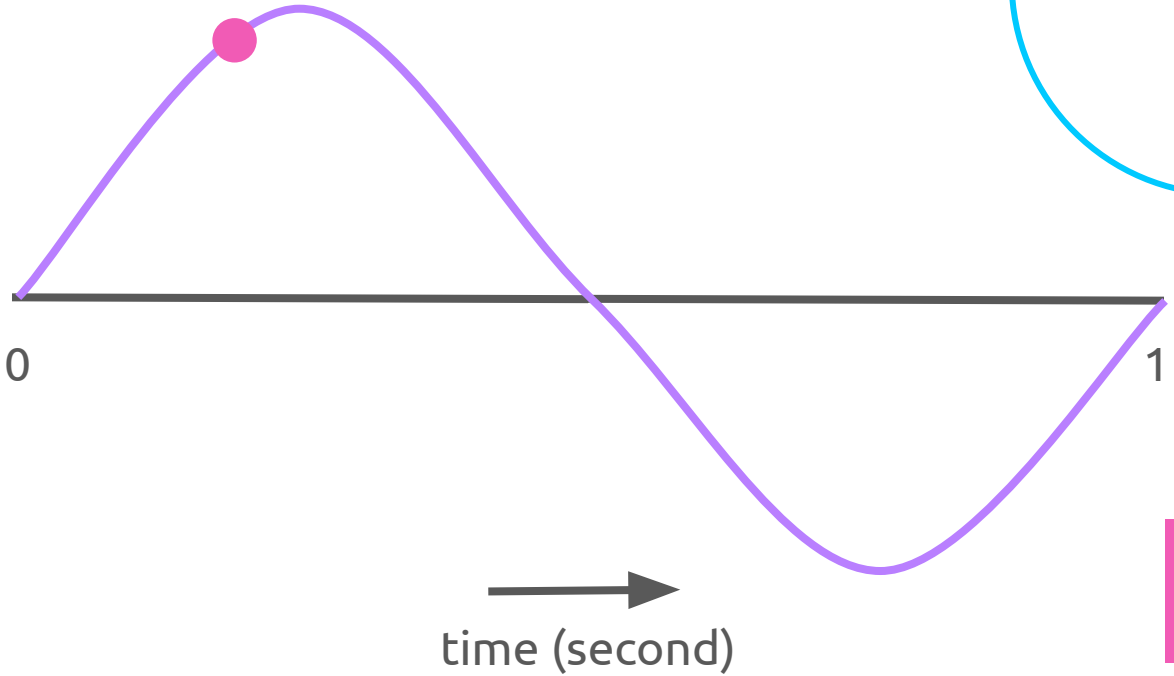


¼ π

Sine in continuous time

- frequency = 1
- wavelength = 1 second

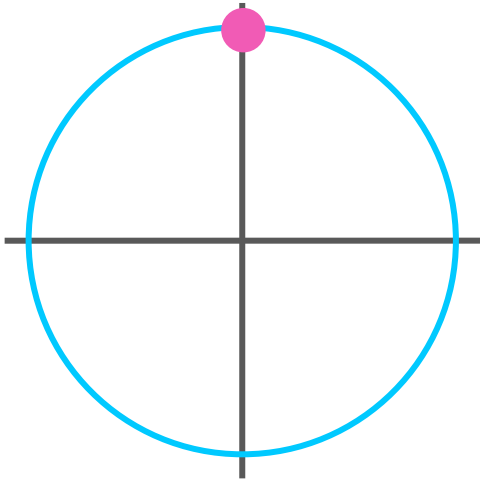


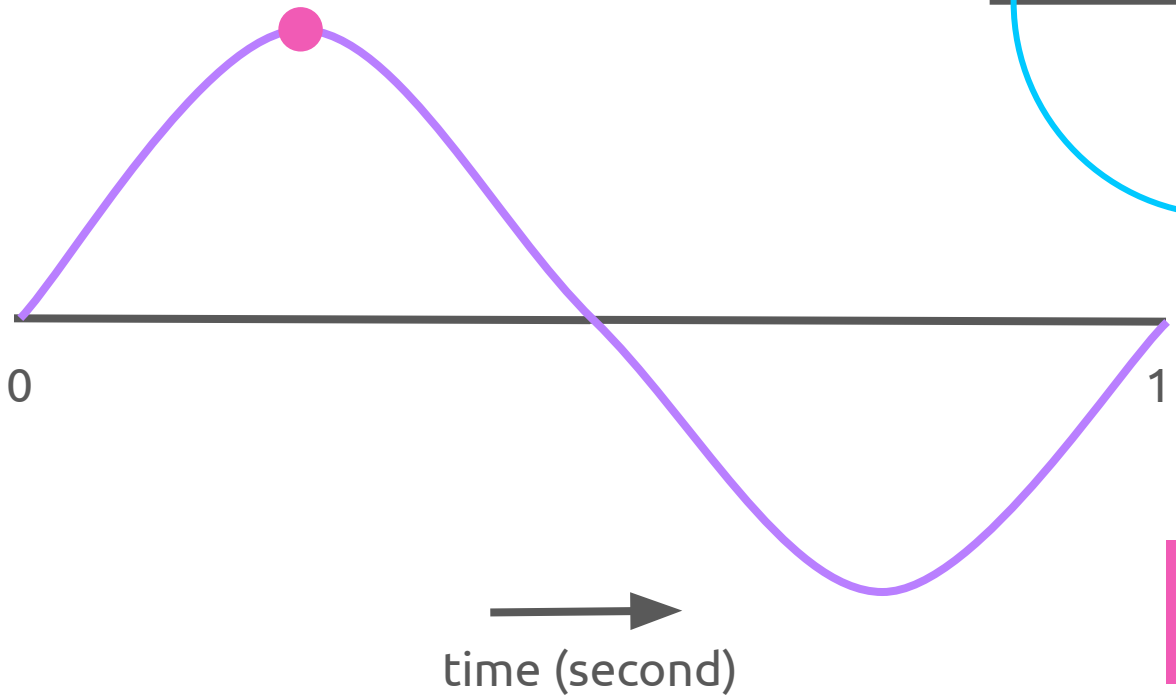


$\frac{3}{8}\pi$

Sine in continuous time

- frequency = 1
- wavelength = 1 second

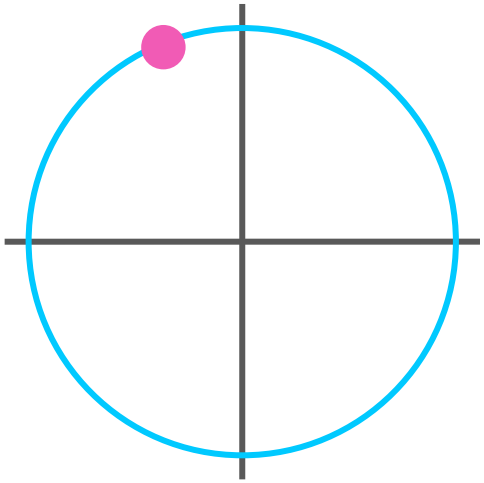


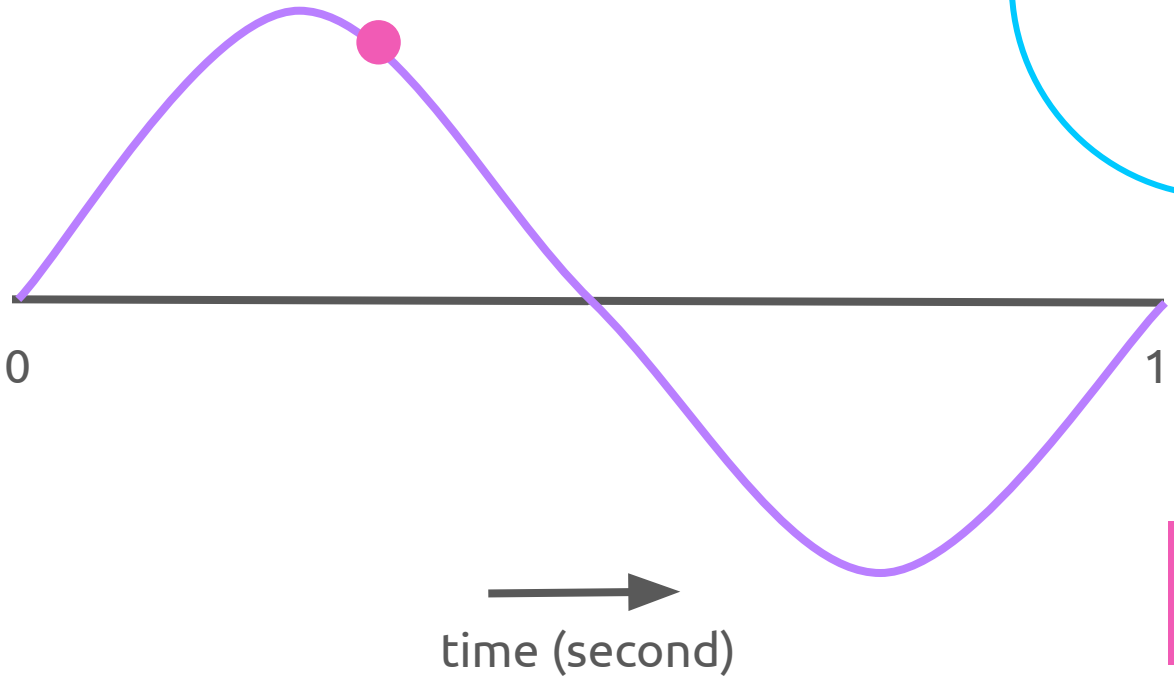


½ π

Sine in continuous time

- frequency = 1
- wavelength = 1 second

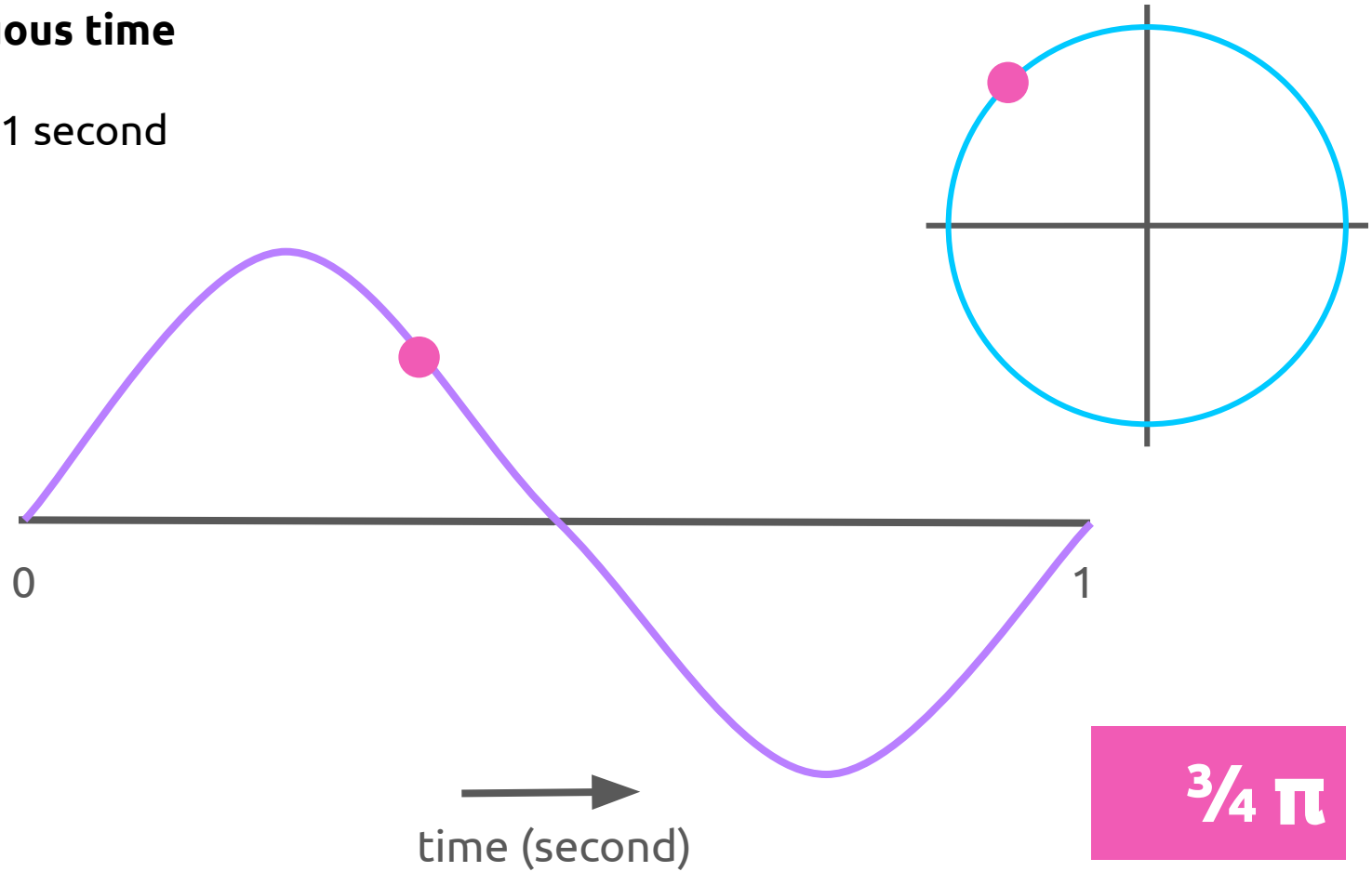




$\frac{5}{8}\pi$

Sine in continuous time

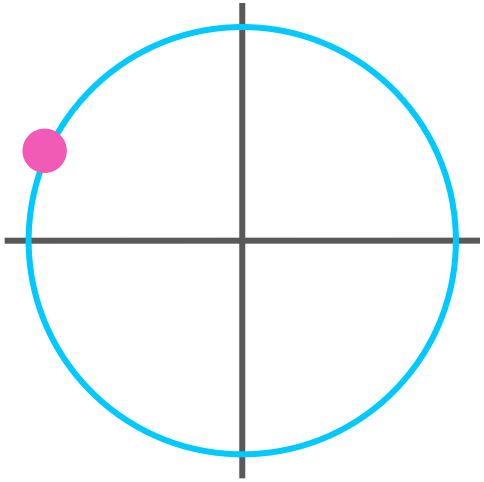
- frequency = 1
- wavelength = 1 second

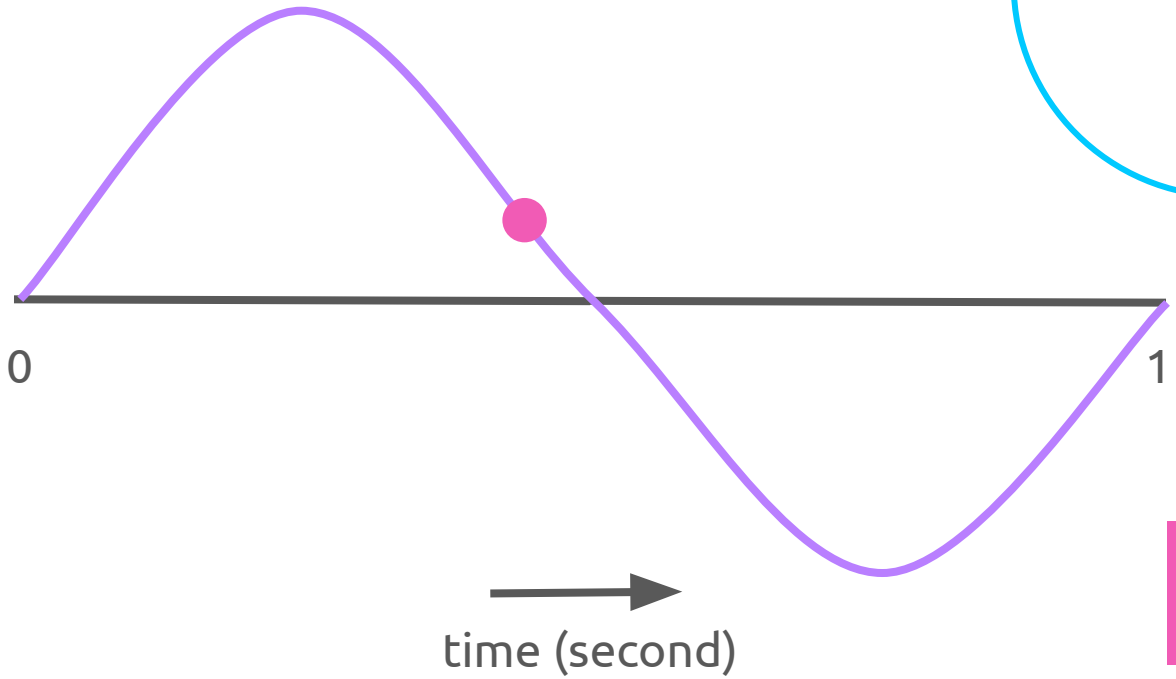


¾ π

Sine in continuous time

- frequency = 1
- wavelength = 1 second

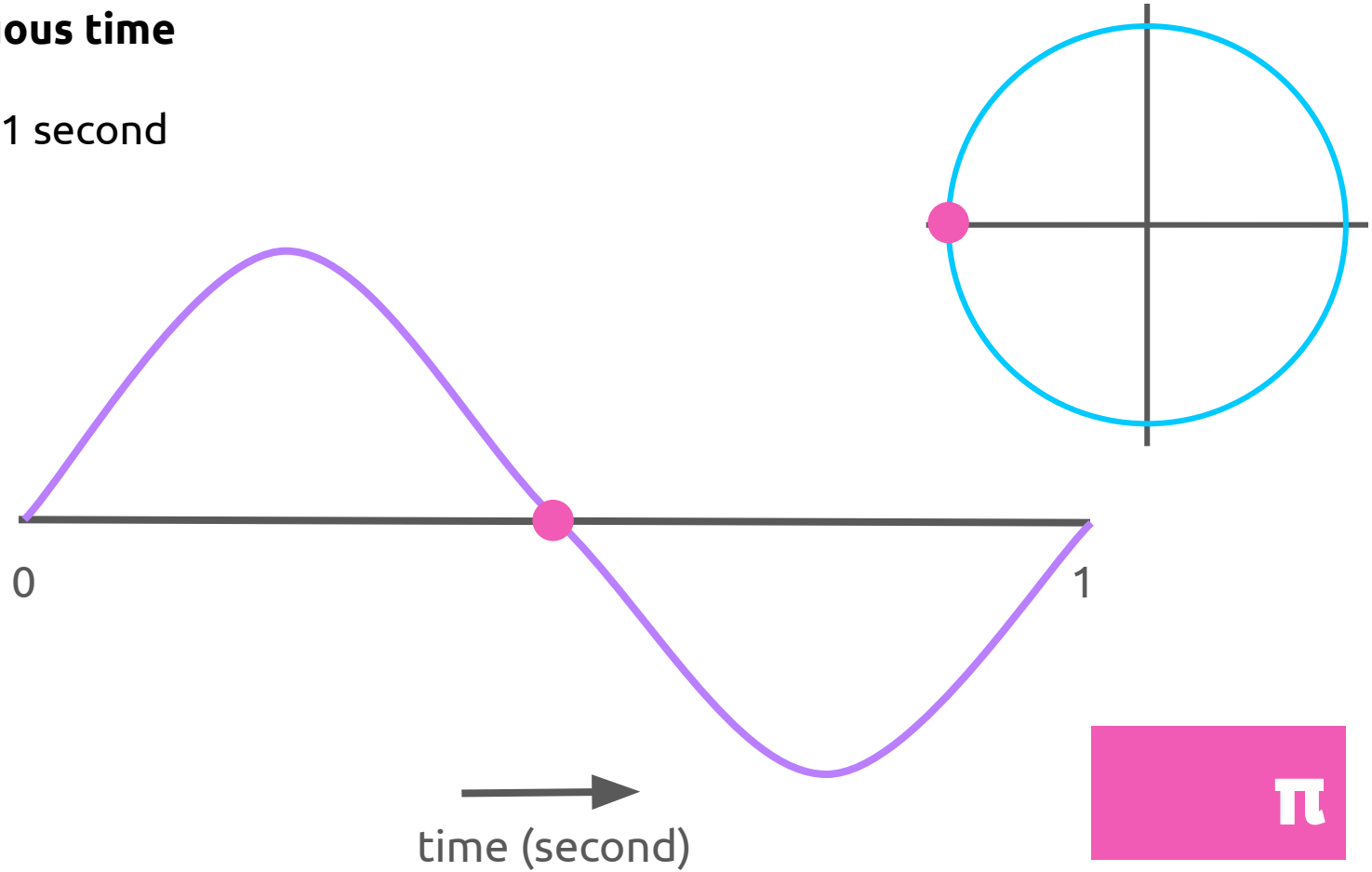




7/8 π

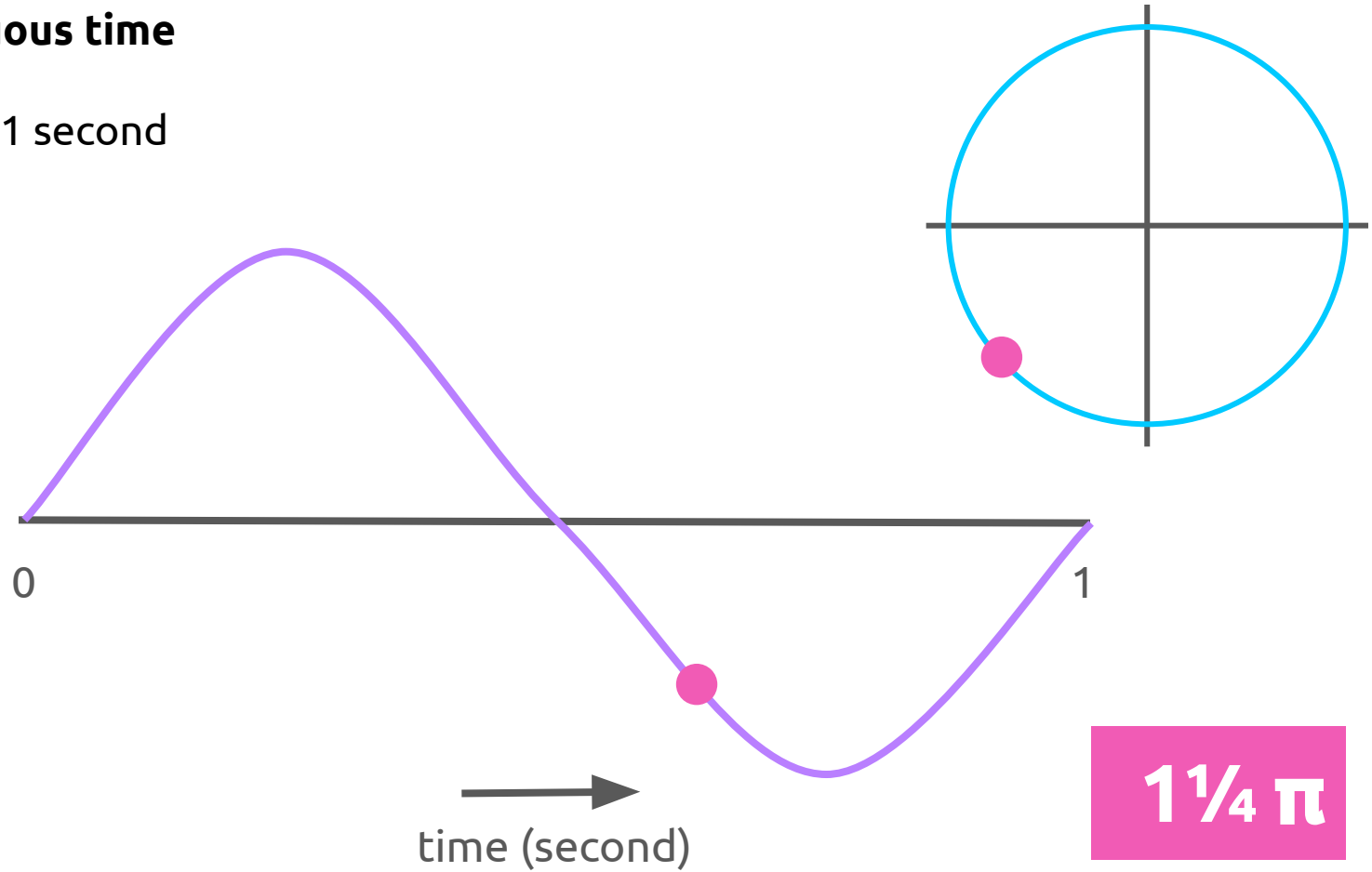
Sine in continuous time

- frequency = 1
- wavelength = 1 second



Sine in continuous time

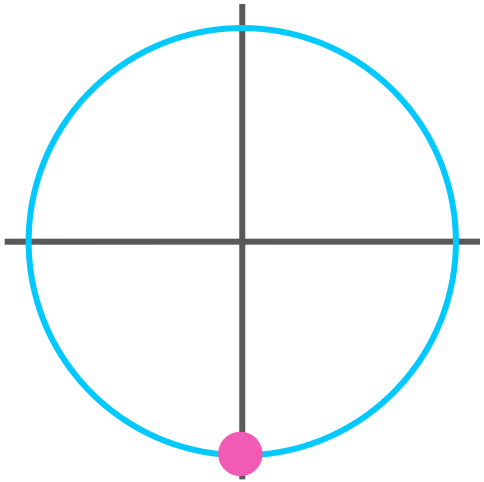
- frequency = 1
- wavelength = 1 second

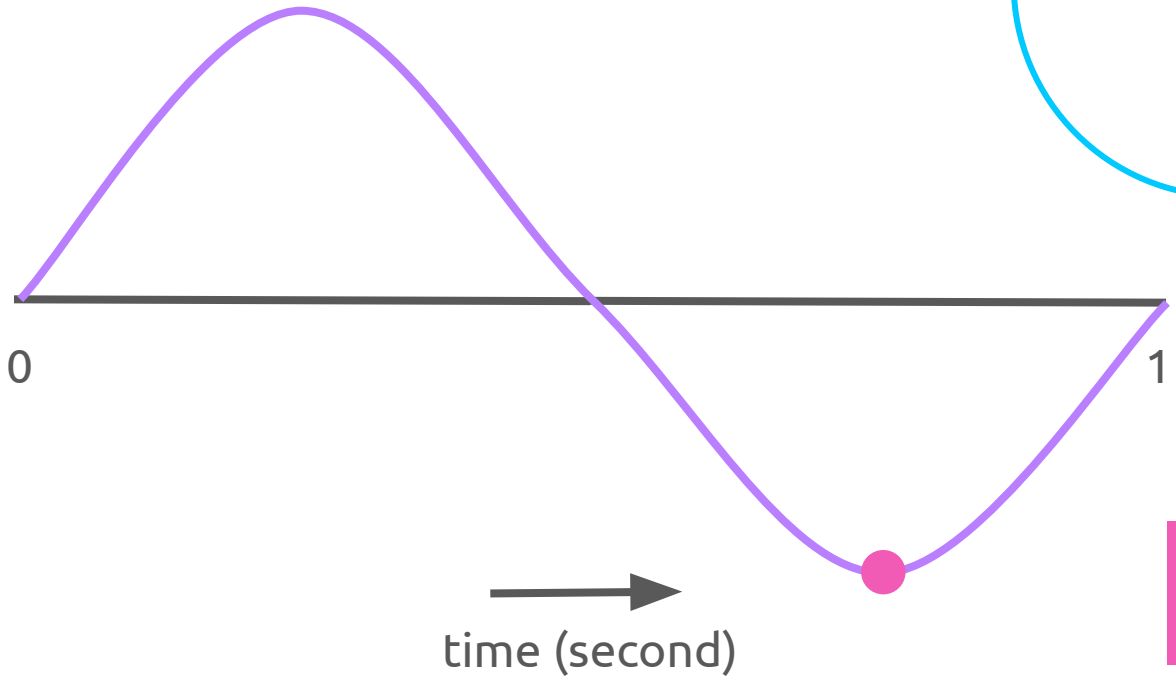


1¼ π

Sine in continuous time

- frequency = 1
- wavelength = 1 second

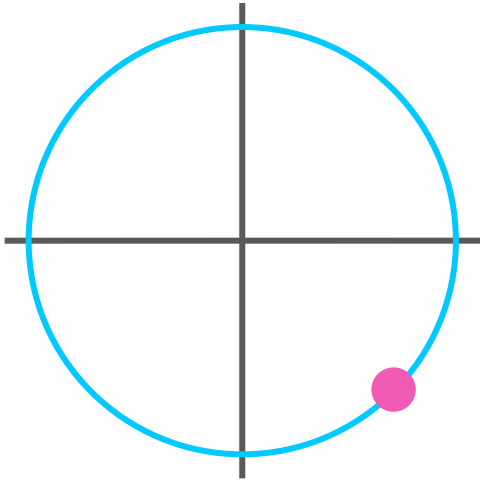


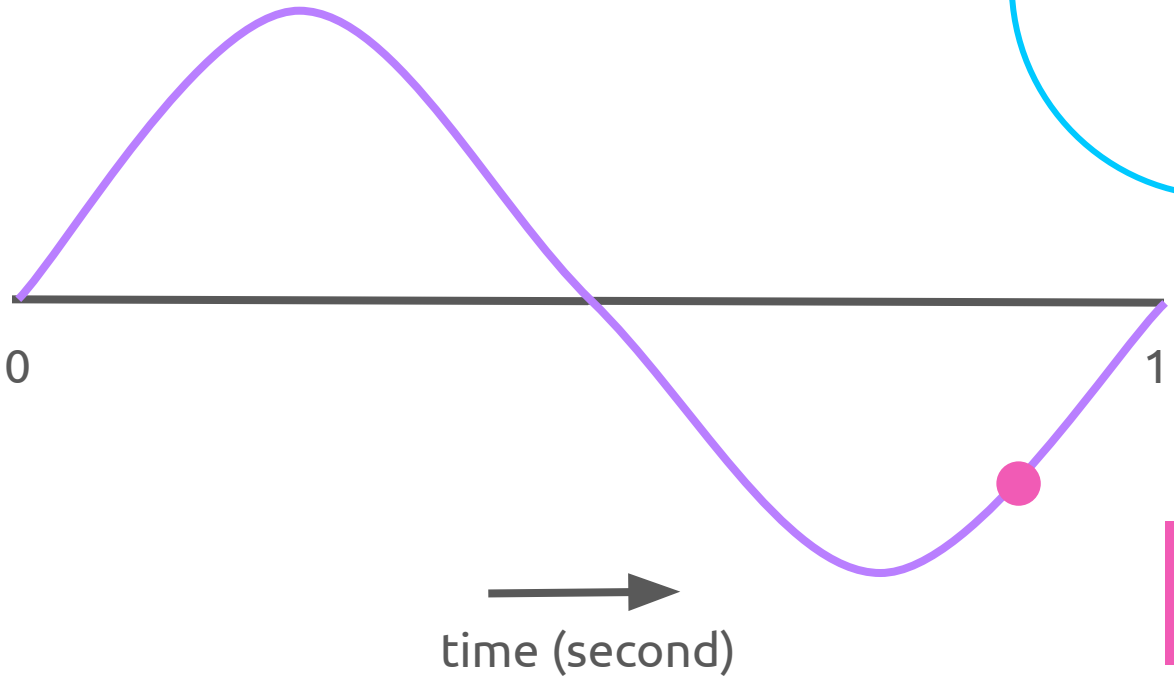


1½ π

Sine in continuous time

- frequency = 1
- wavelength = 1 second

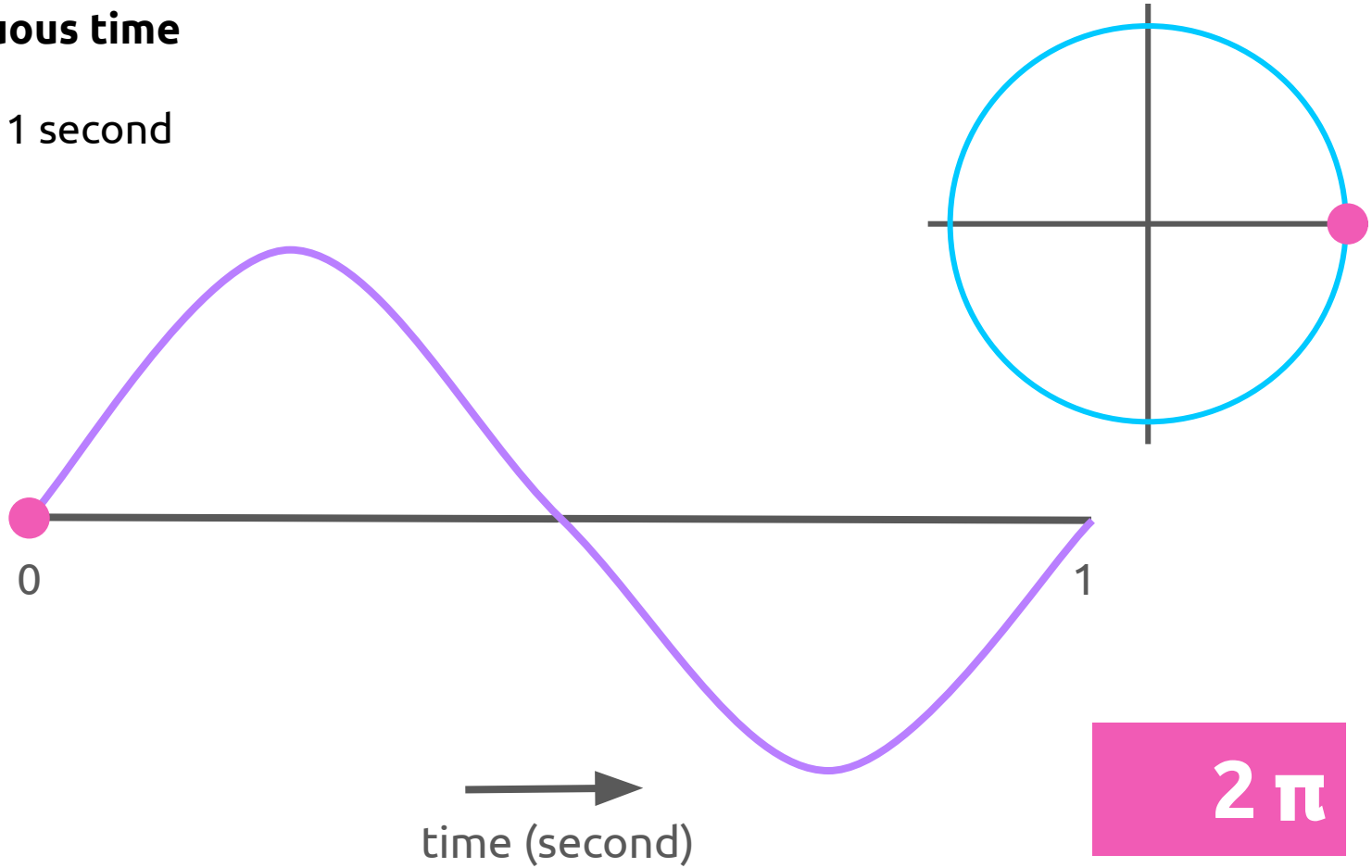




$1\frac{3}{4}\pi$

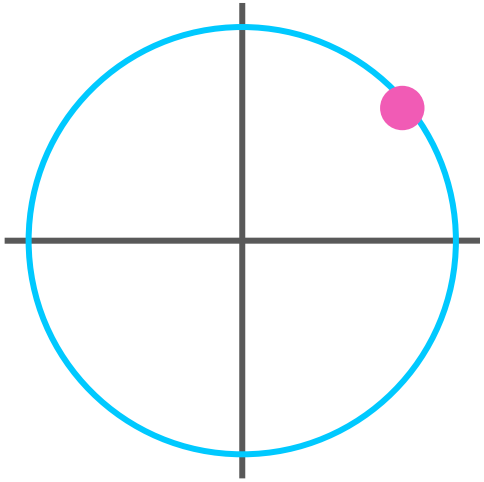
Sine in continuous time

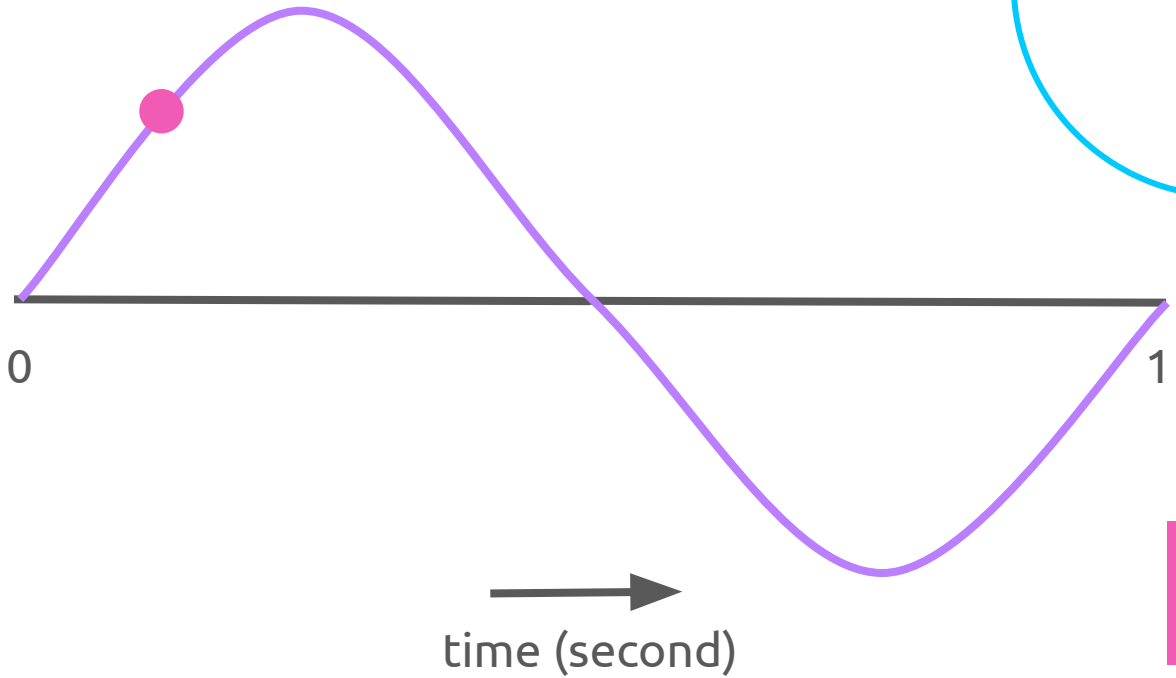
- frequency = 1
- wavelength = 1 second



Sine in continuous time

- frequency = 1
- wavelength = 1 second

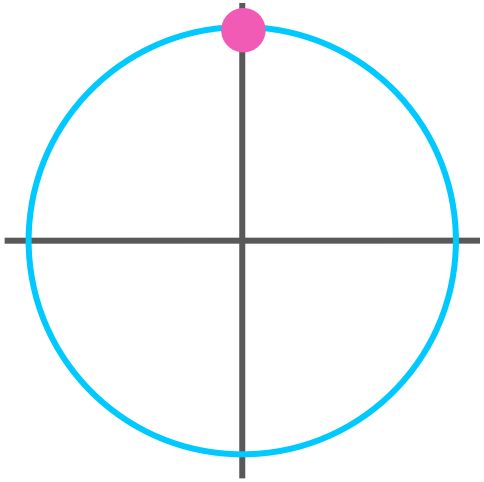


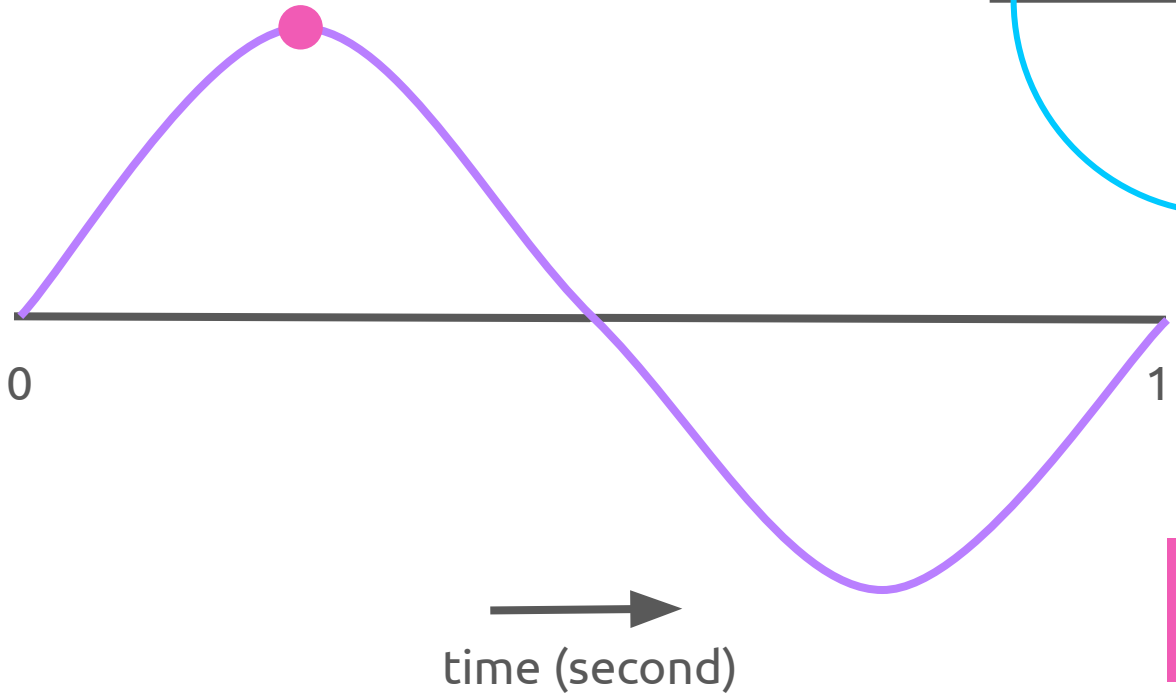


$2\frac{1}{4}\pi$

Sine in continuous time

- frequency = 1
- wavelength = 1 second

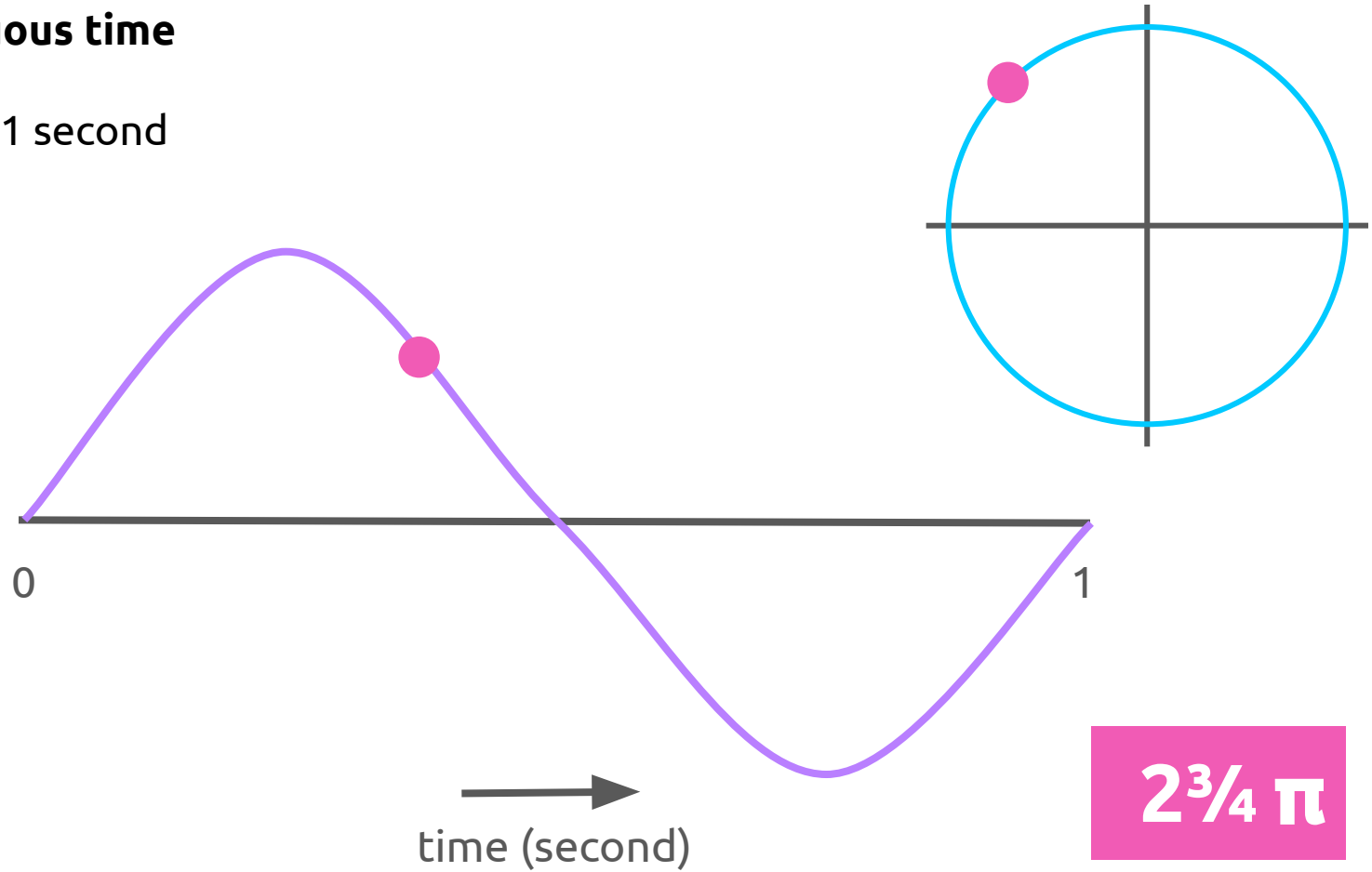




2½ π

Sine in continuous time

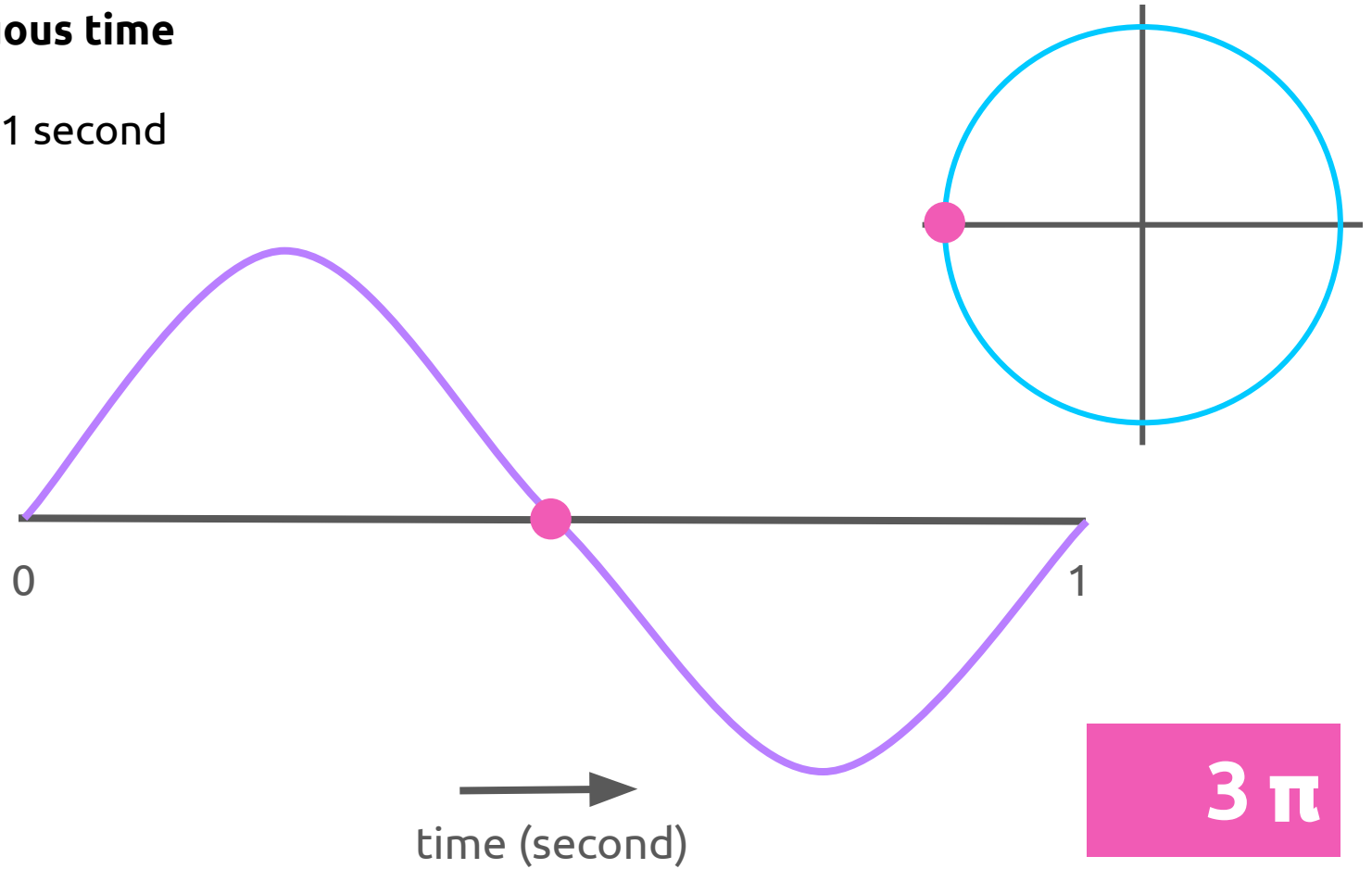
- frequency = 1
- wavelength = 1 second



$2\frac{3}{4}\pi$

Sine in continuous time

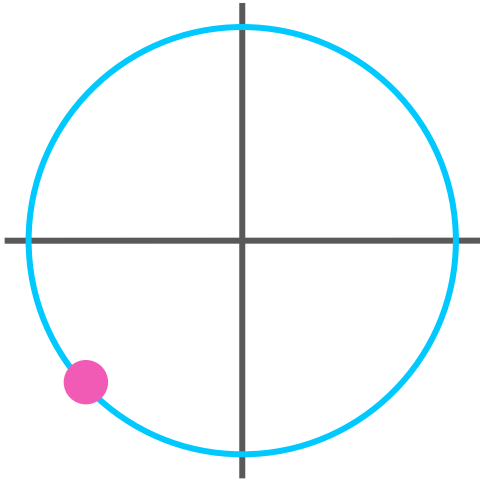
- frequency = 1
- wavelength = 1 second

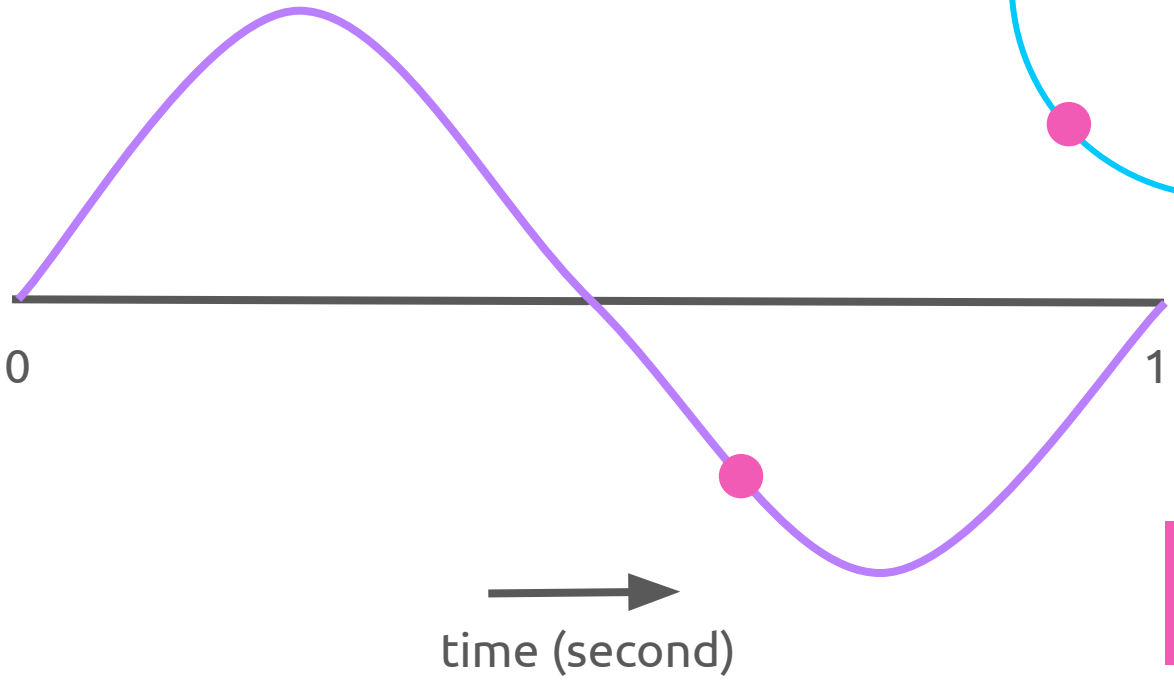


3 π

Sine in continuous time

- frequency = 1
- wavelength = 1 second

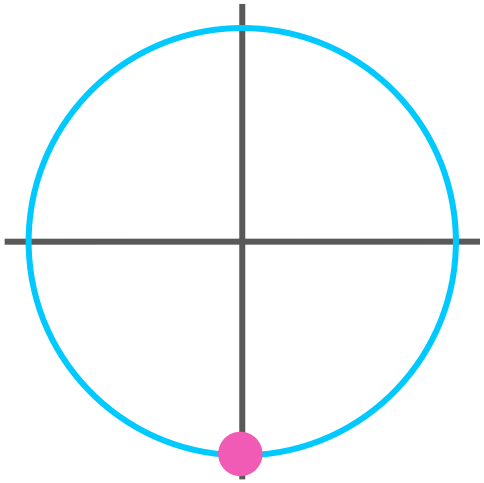


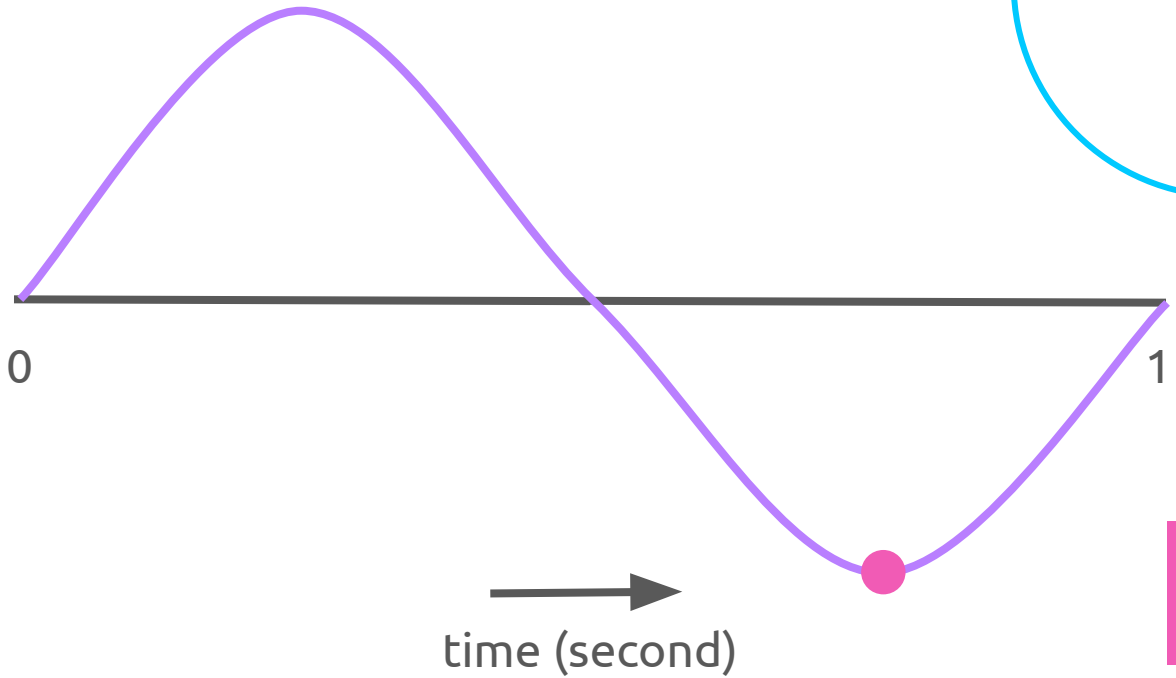


3¼ π

Sine in continuous time

- frequency = 1
- wavelength = 1 second

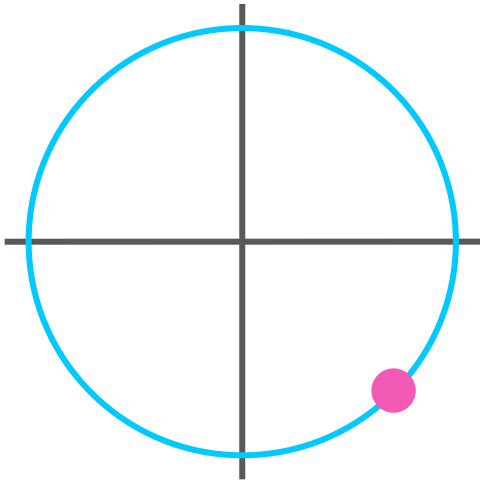


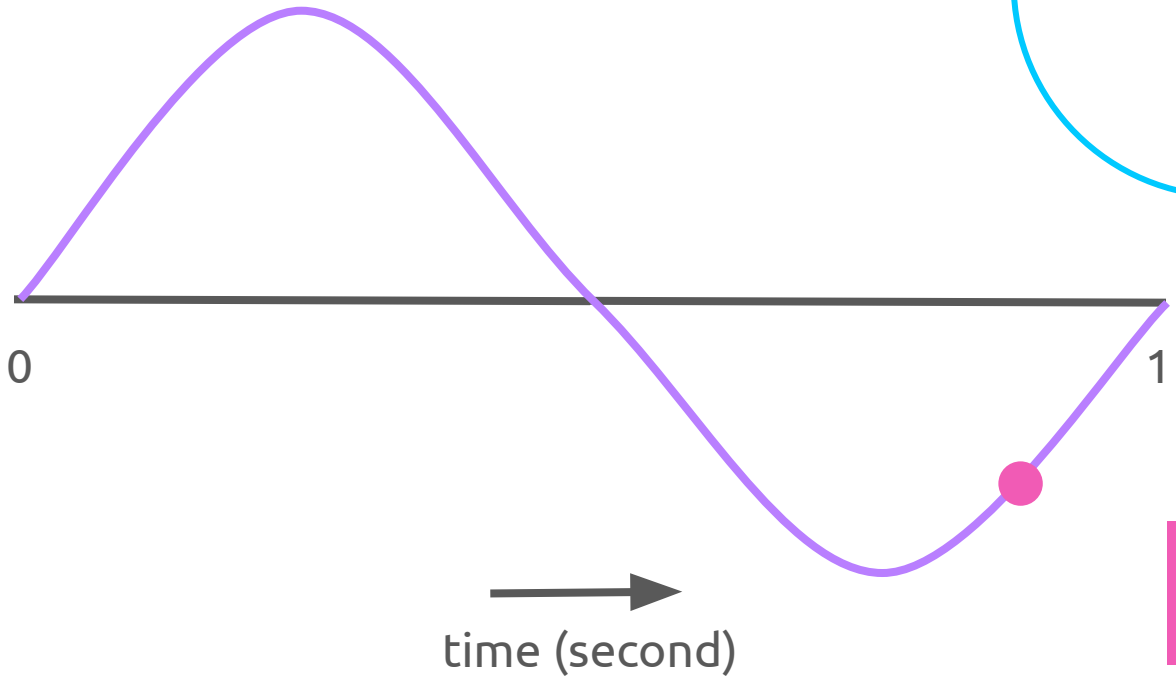


3½ π

Sine in continuous time

- frequency = 1
- wavelength = 1 second

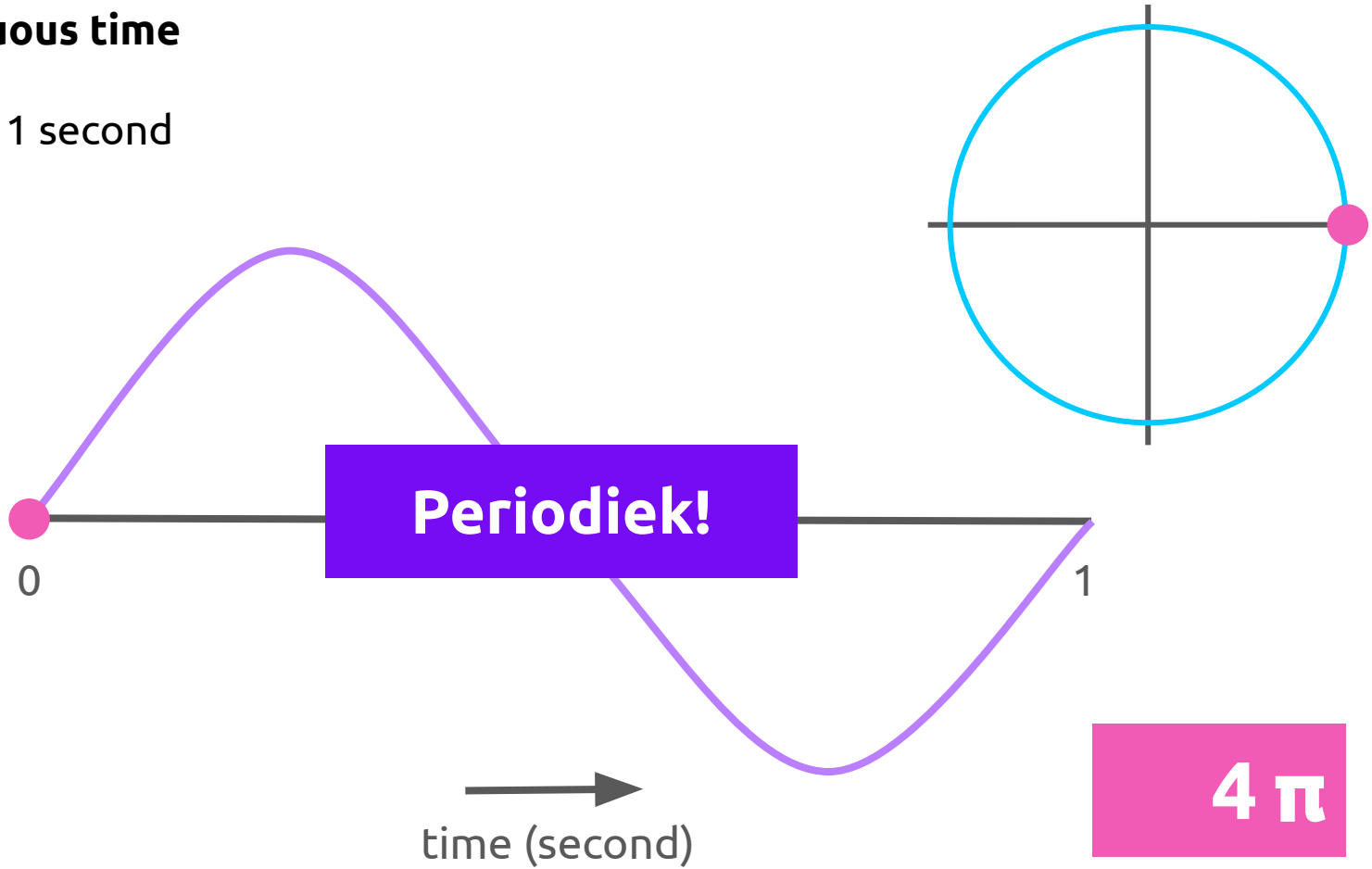




$3\frac{3}{4}\pi$

Sine in continuous time

- frequency = 1
- wavelength = 1 second

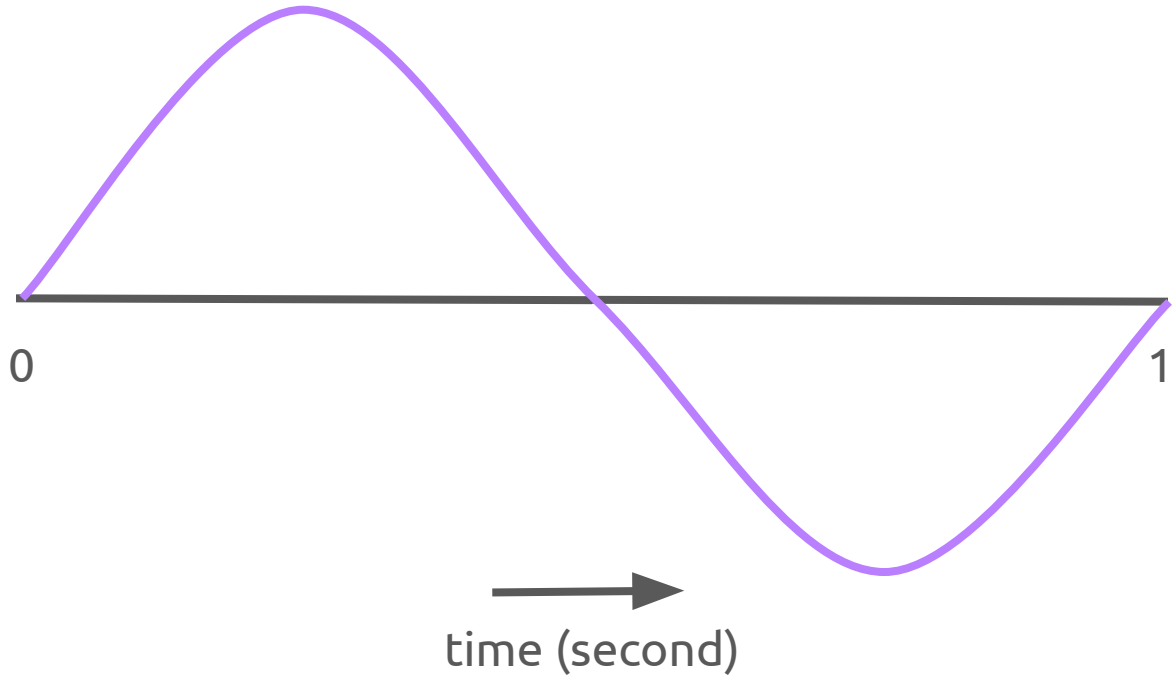


Sine

continuous- to discrete time domain

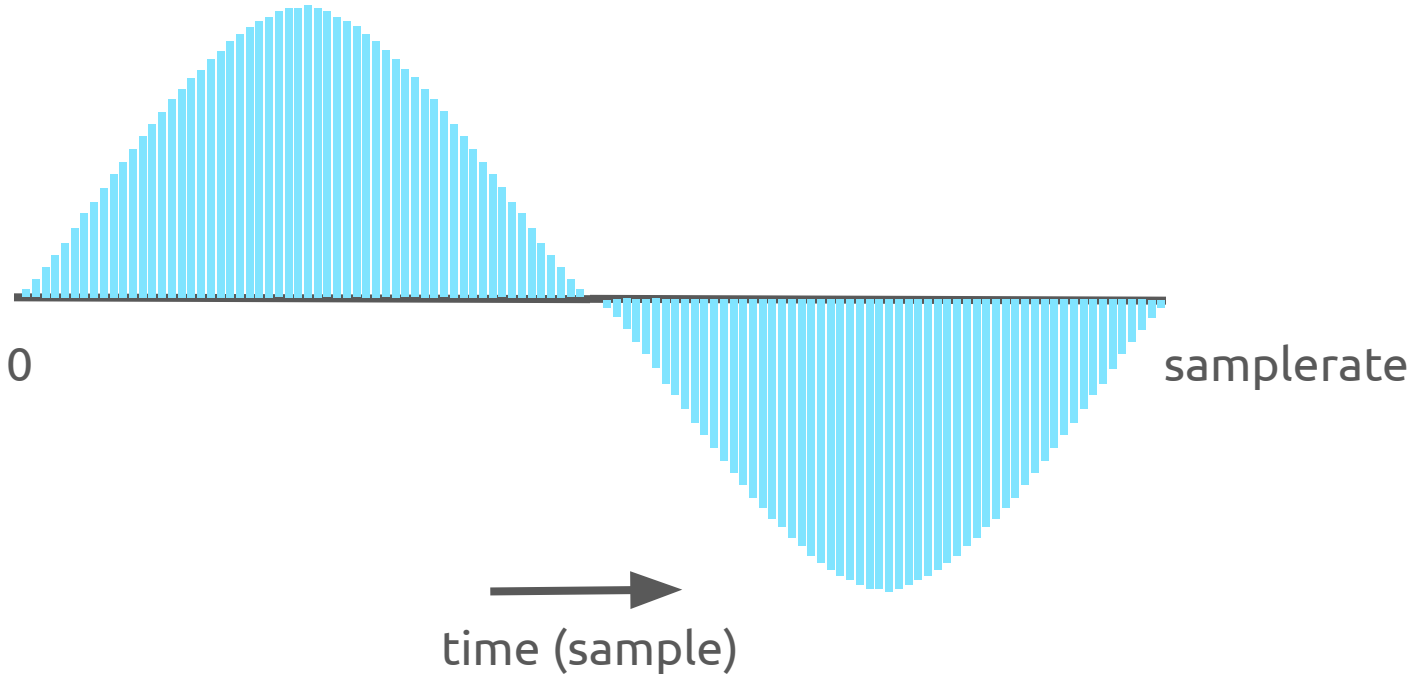
Sine in continuous time

- frequency = 1
- wavelength = 1 second



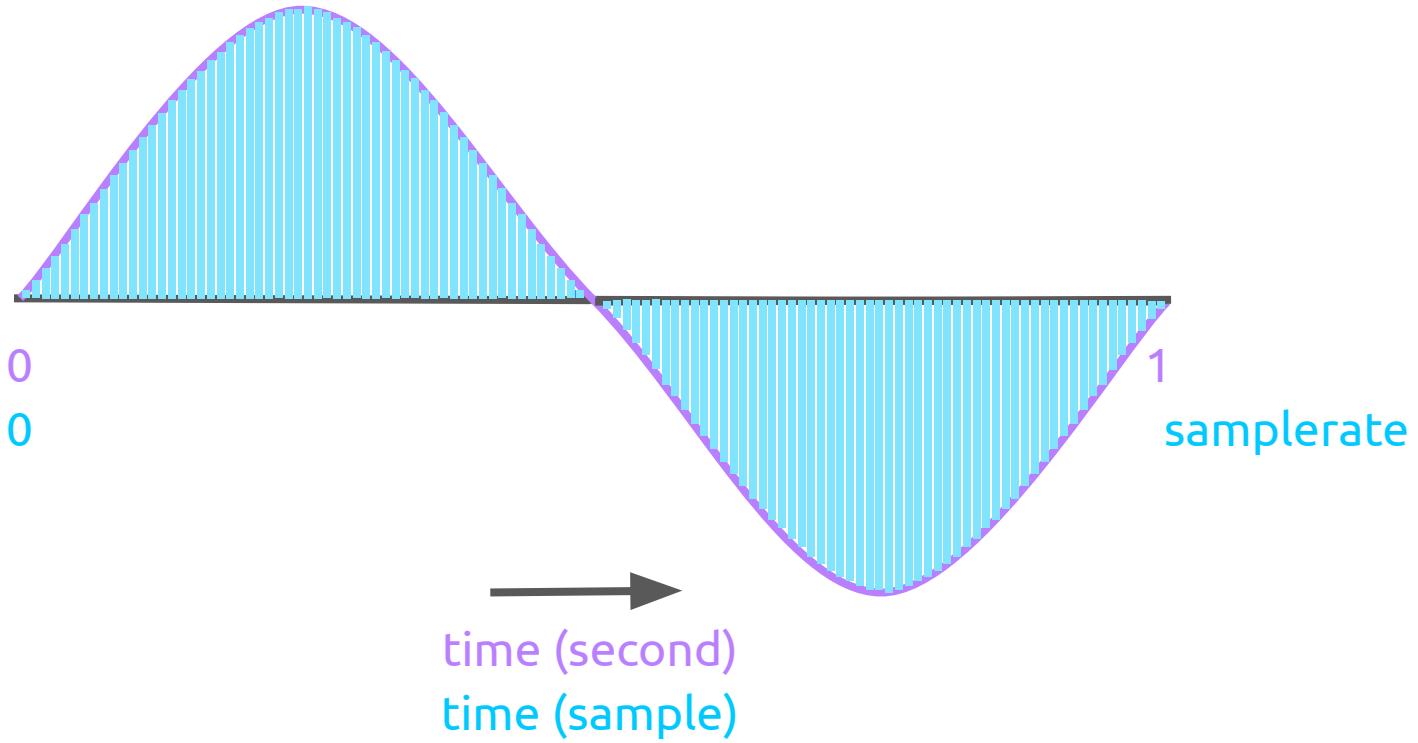
Sine in discrete time

- frequency = 1
- wavelength = 1 second → samplerate



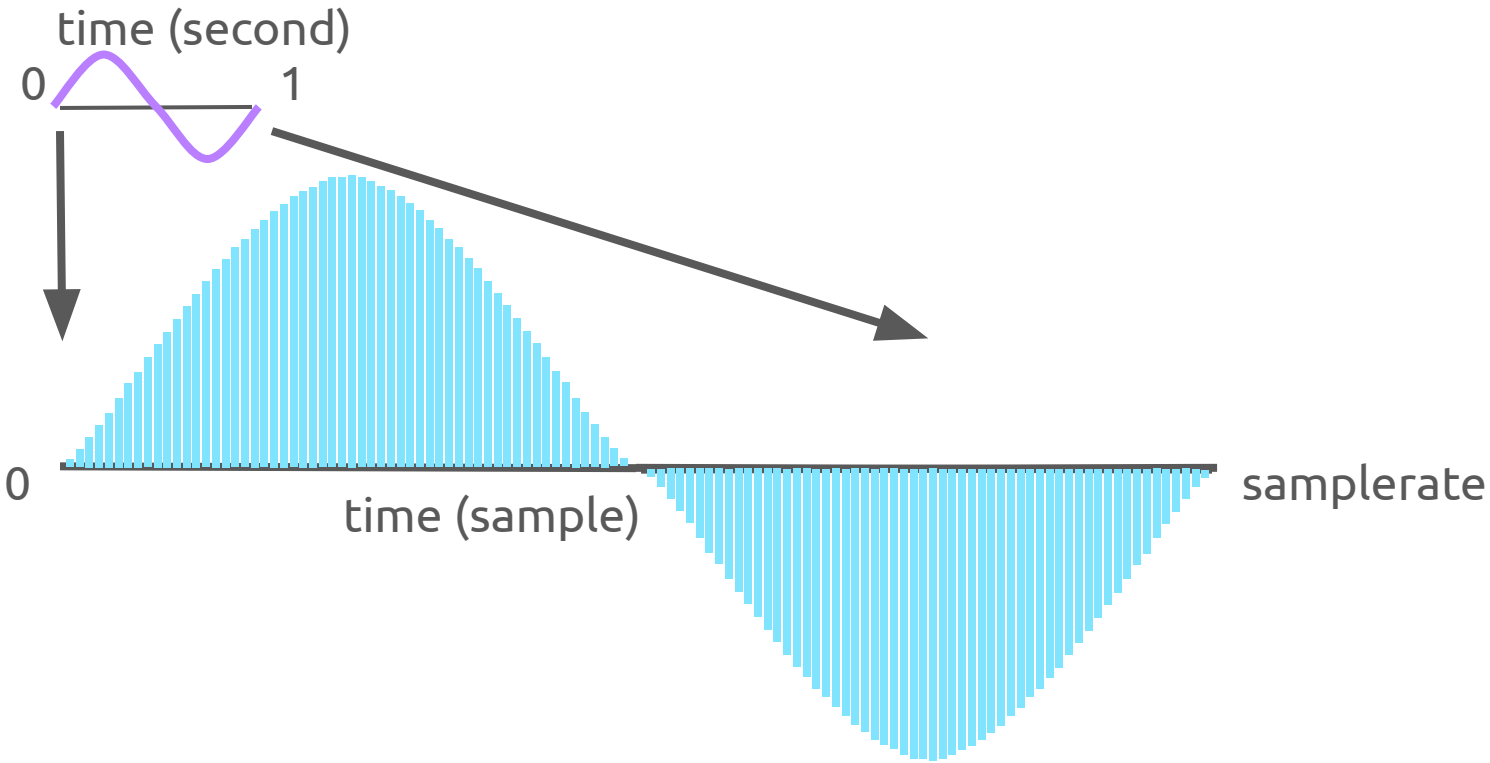
Sine in discrete time

- frequency = 1
- wavelength = 1 second → samplerate



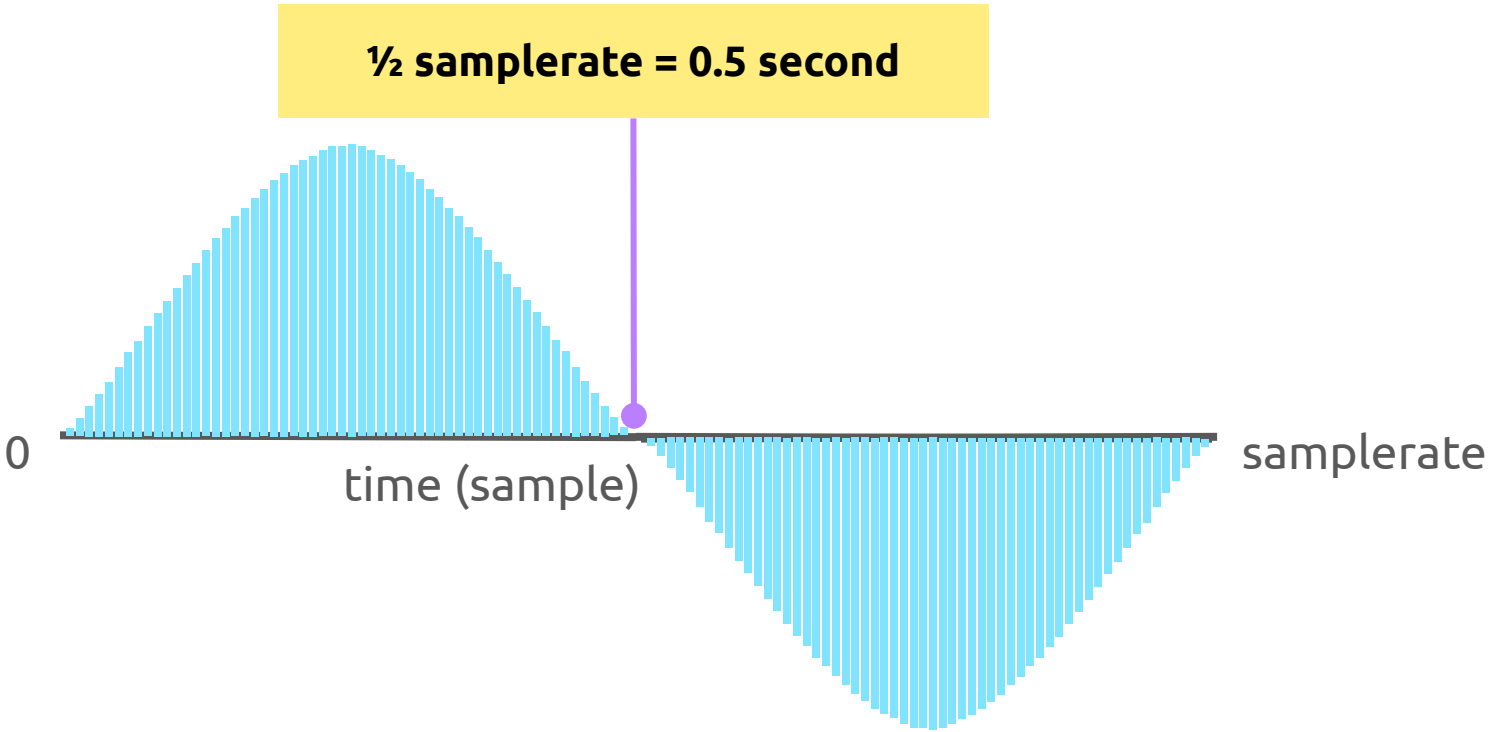
Continuous time → discrete time

interval [0, 1] (second) → interval [0, samplerate] (sample)



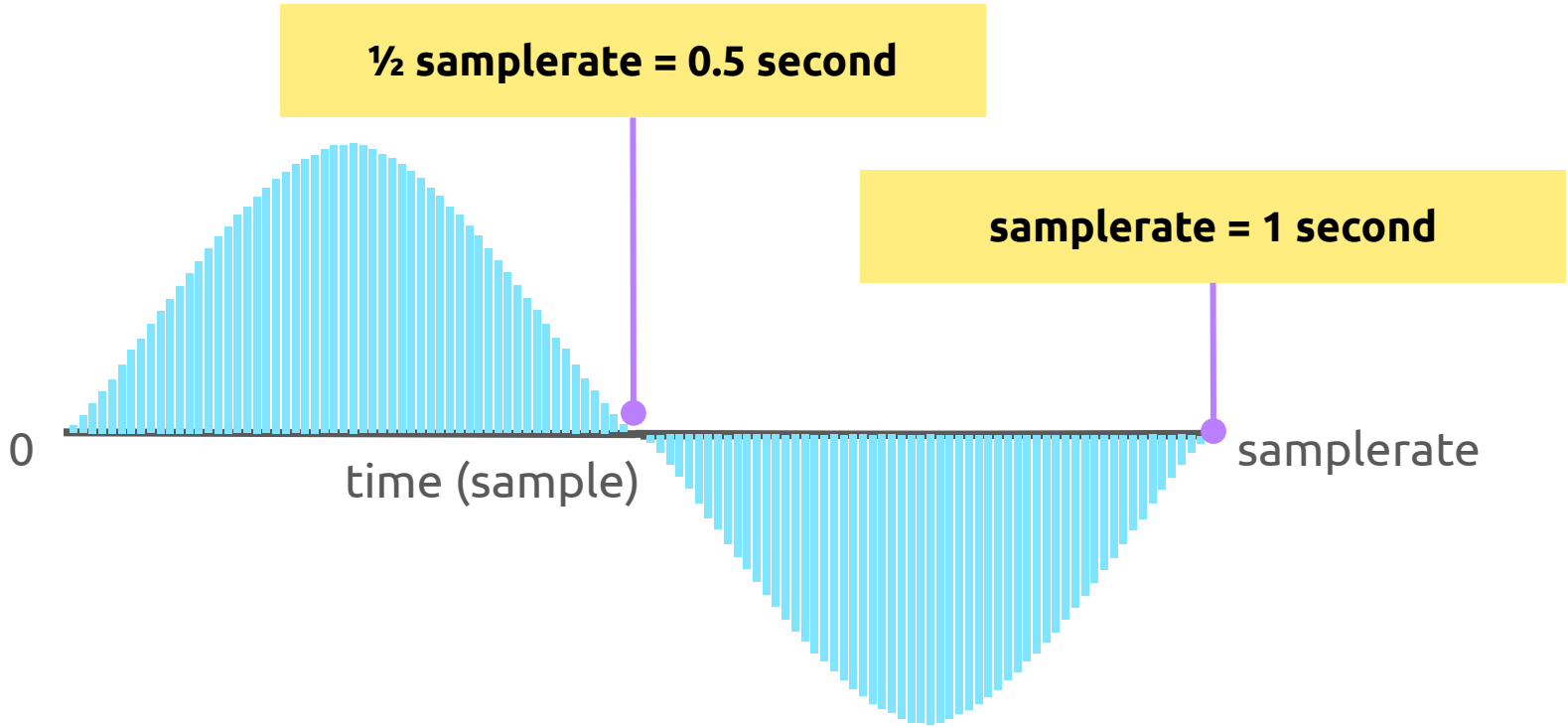
Continuous time → discrete time

interval [0, 1] (second) → interval [0, samplerate] (sample)



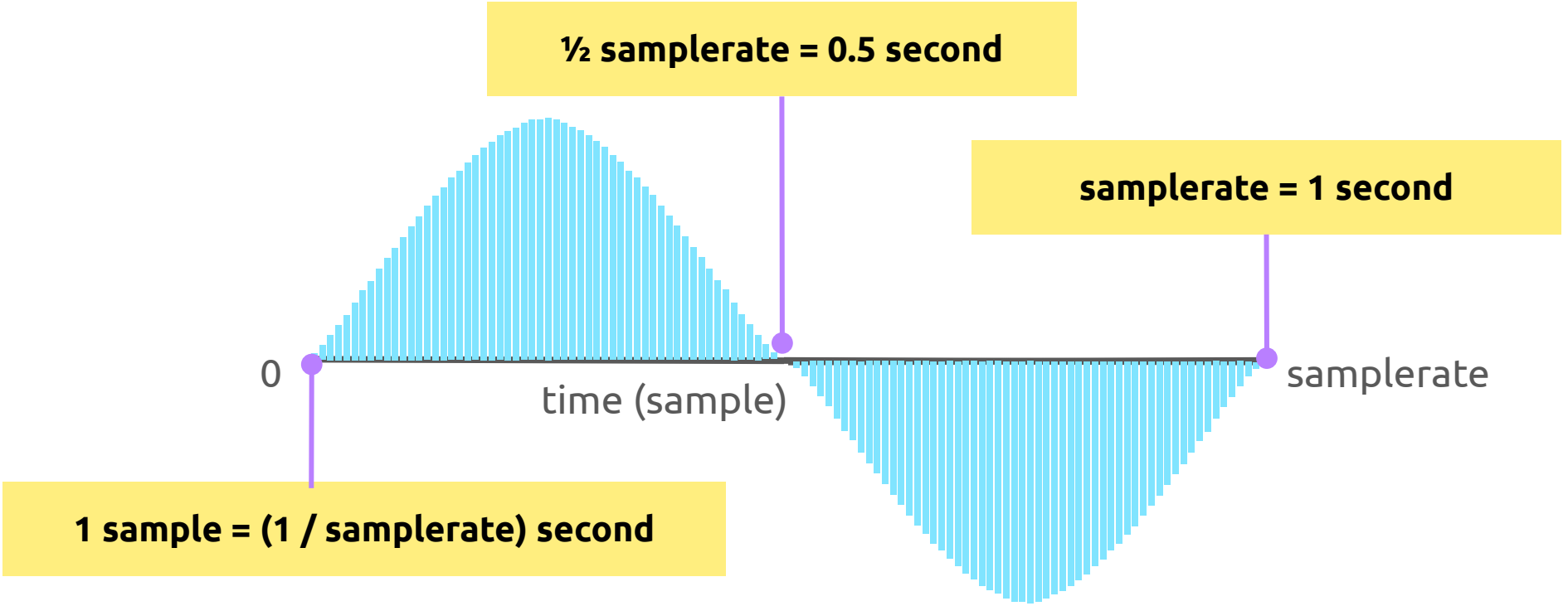
Continuous time → discrete time

interval [0, 1] (second) → interval [0, samplerate] (sample)



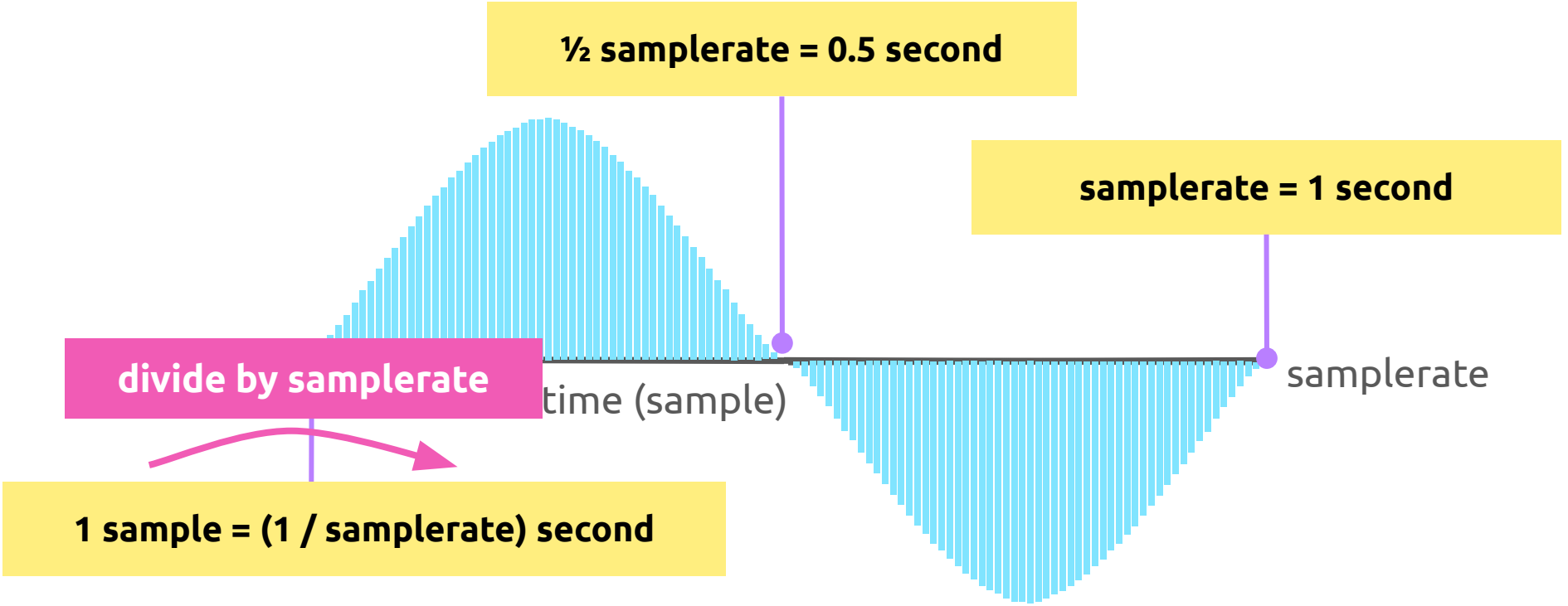
Continuous time → discrete time

interval [0, 1] (second) → interval [0, samplerate] (sample)



Continuous time → discrete time

interval [0, 1] (second) → interval [0, samplerate] (sample)

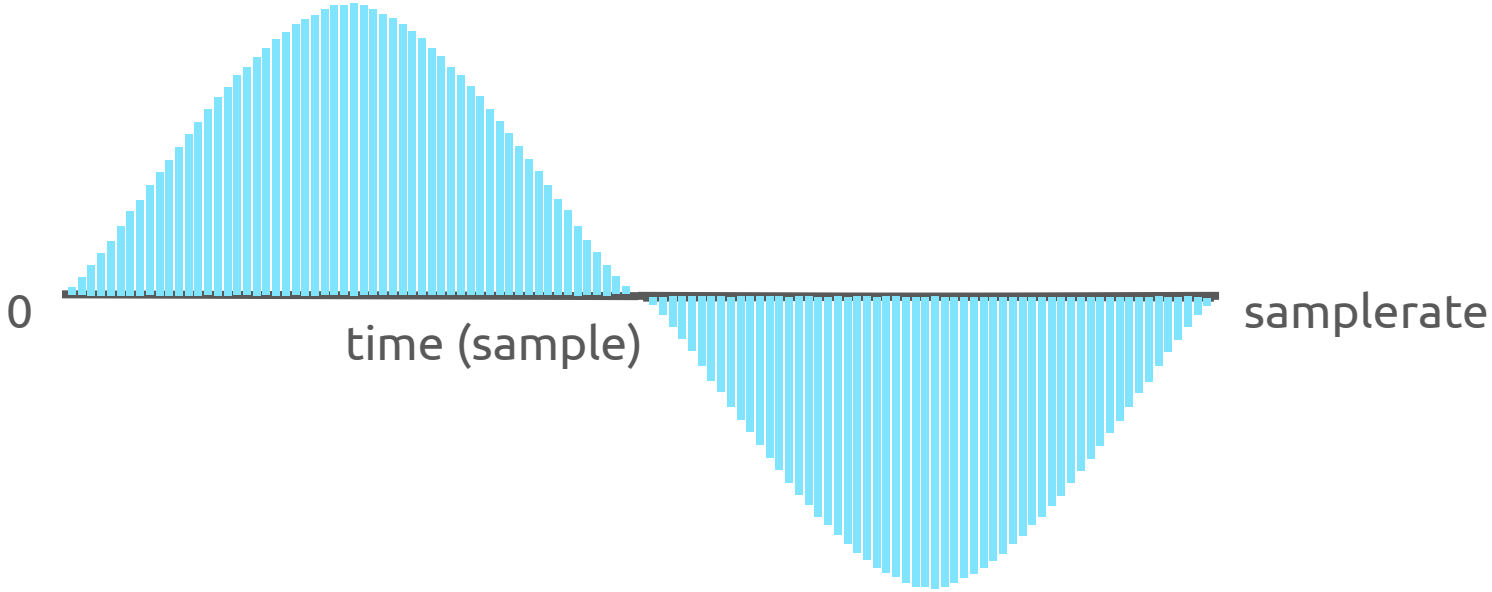


Sine

phase

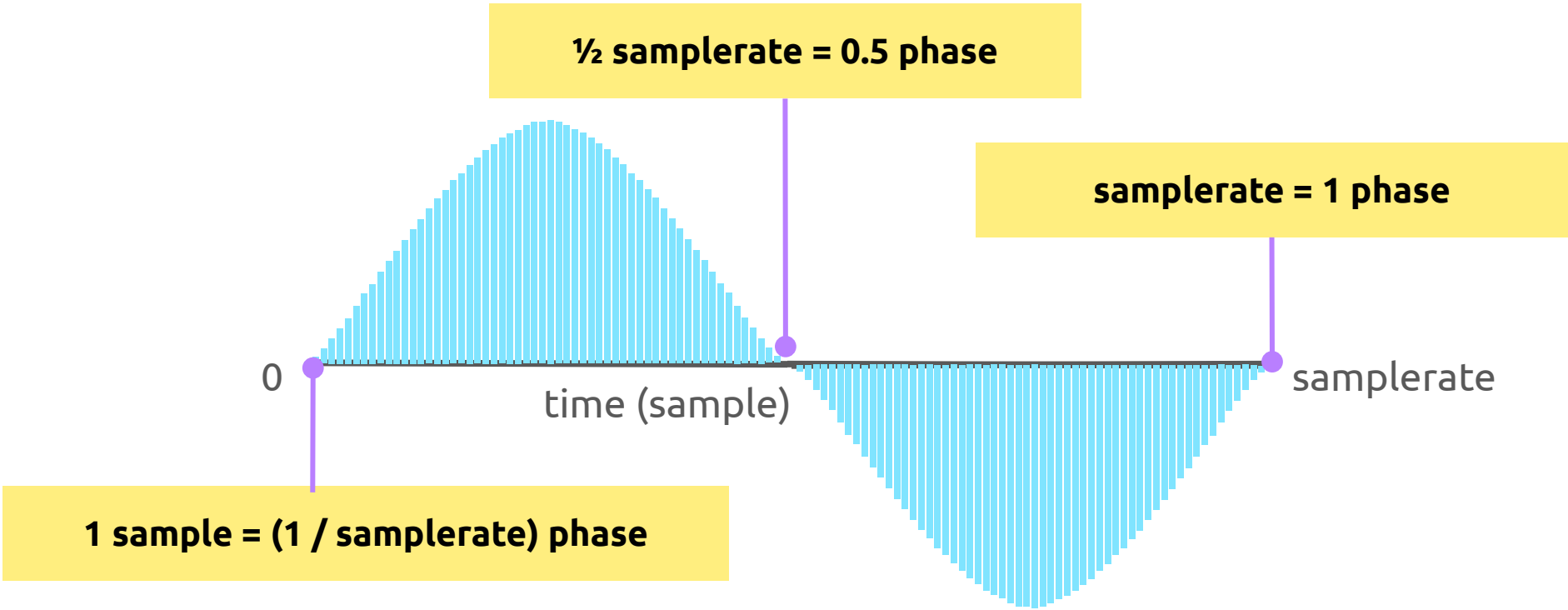
Sine in discrete time

[0, samplerate] samples → [0, 1] phase



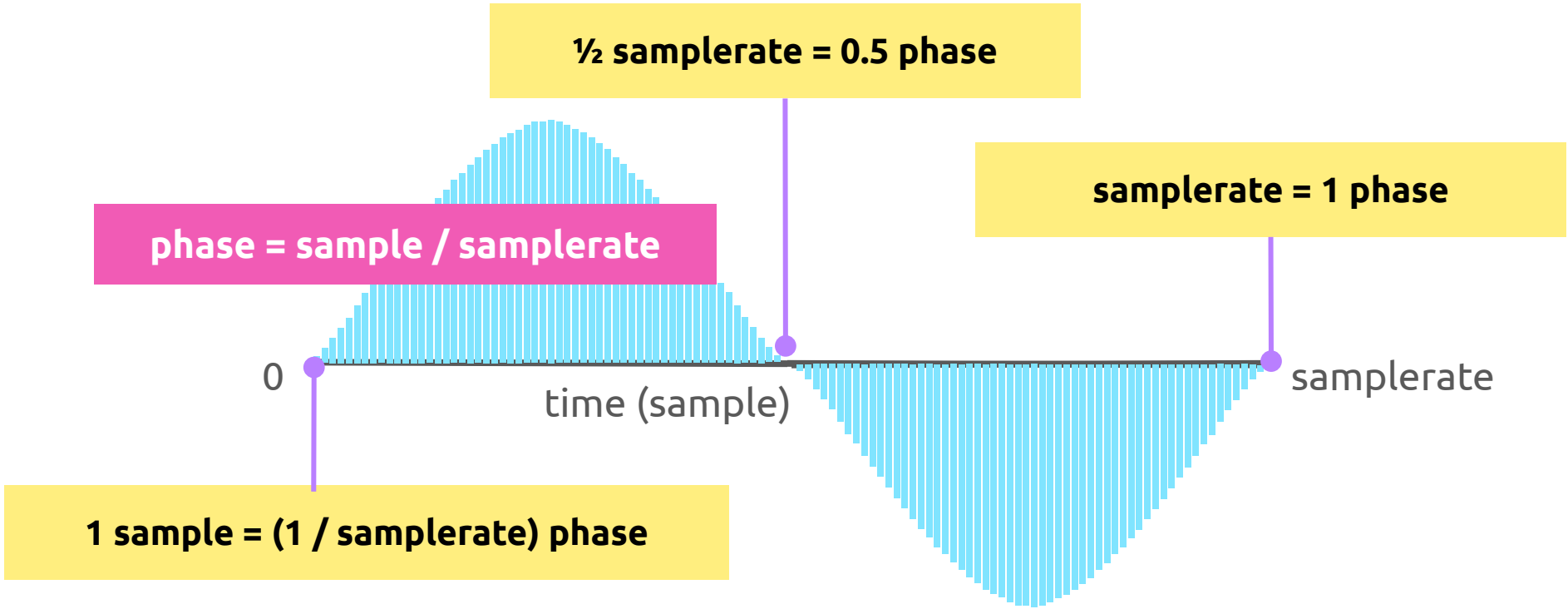
Sine in discrete time

[0, samplerate] samples → [0, 1] phase



Sine in discrete time

[0, samplerate] samples → [0, 1] phase



To sum up

- Continuous time

$$f(t) = \sin(t * 2\pi)$$

- Discrete time

$$f(sample) = \sin(sample / samplerate * 2\pi)$$

- Discrete time, expressed as function of the phase

$$f(phase) = \sin(phase * 2\pi)$$