July 23, Week 8

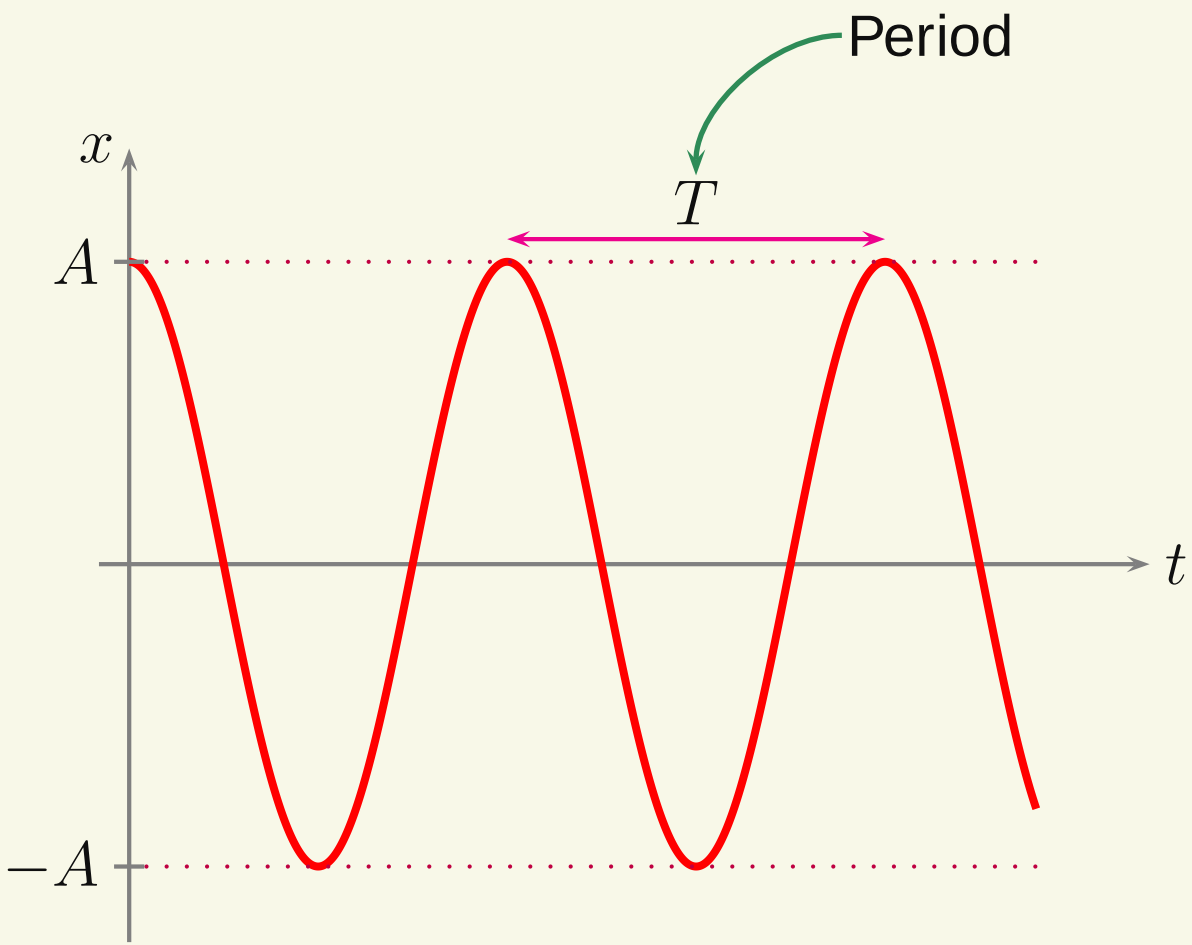
Today: Waves, Chapters 14 and 15

Final Exam, Tomorrow. 9:00-10:30 or 11:00-12:15

Four review questions on the final will come from tests #1, 2, 4, and 6. There will be six questions based on new material. You may skip two questions.

Simple Harmonic Motion II

For a mass started from rest, a distance A from zero, it can be shown that:



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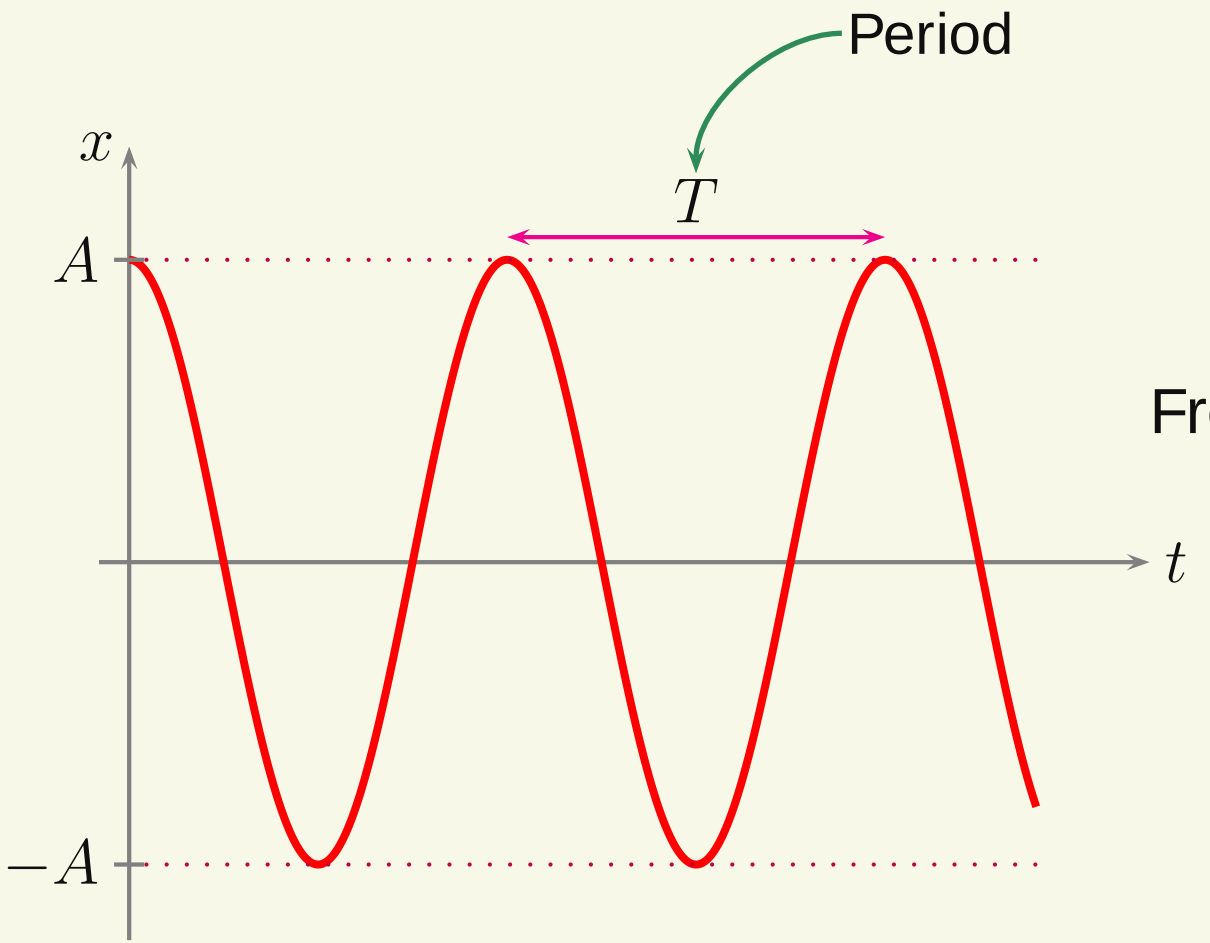

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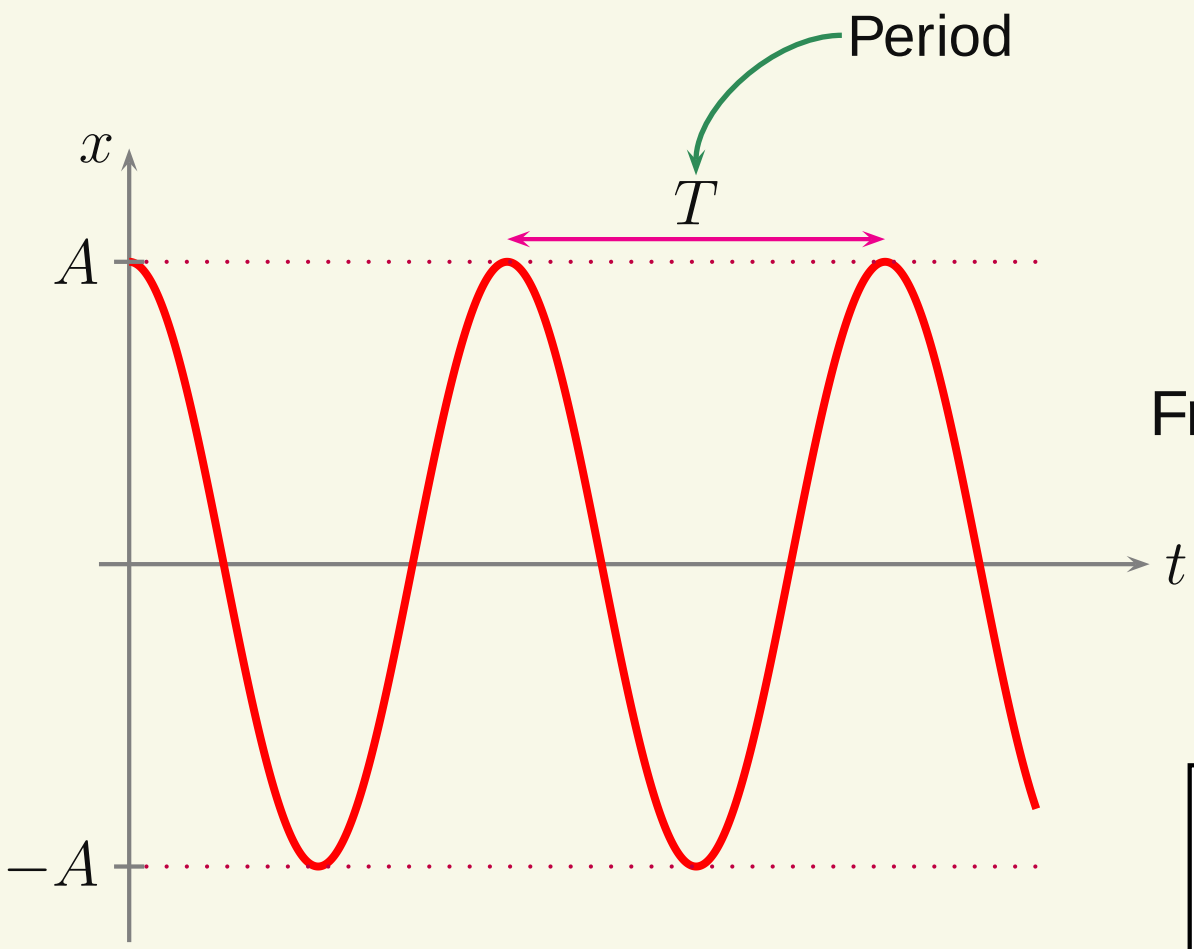

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The mass and the spring constant values determine the period

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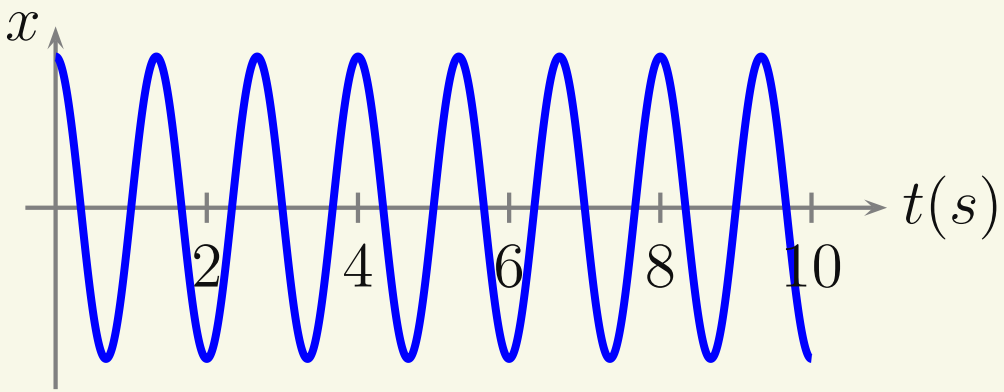

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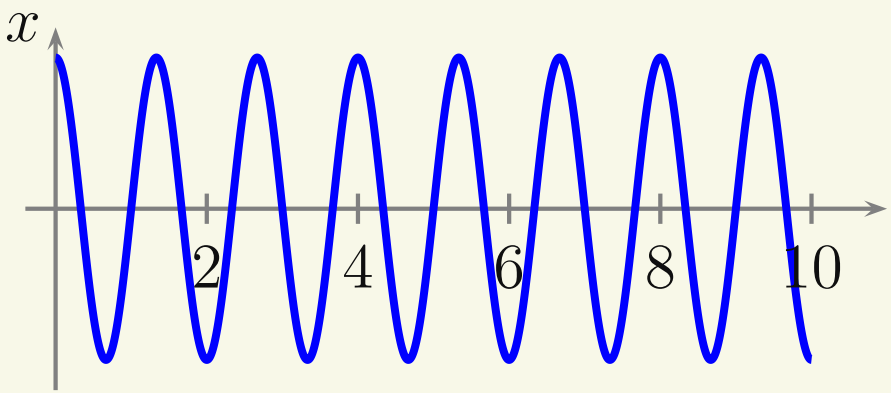

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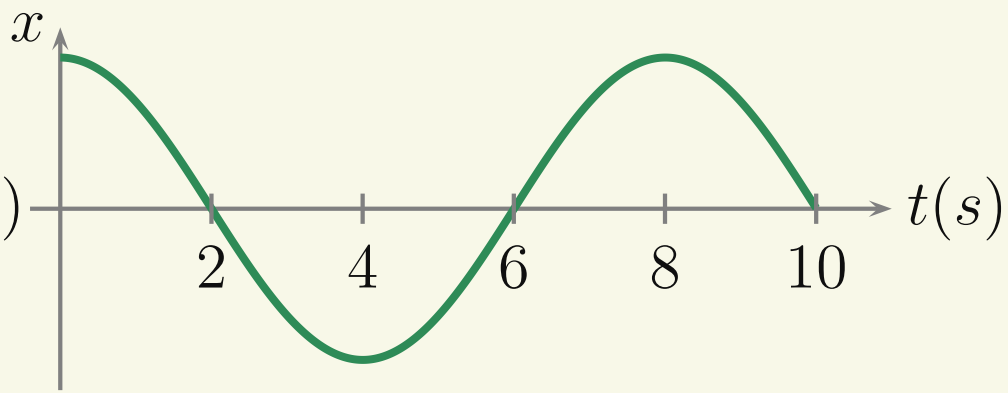

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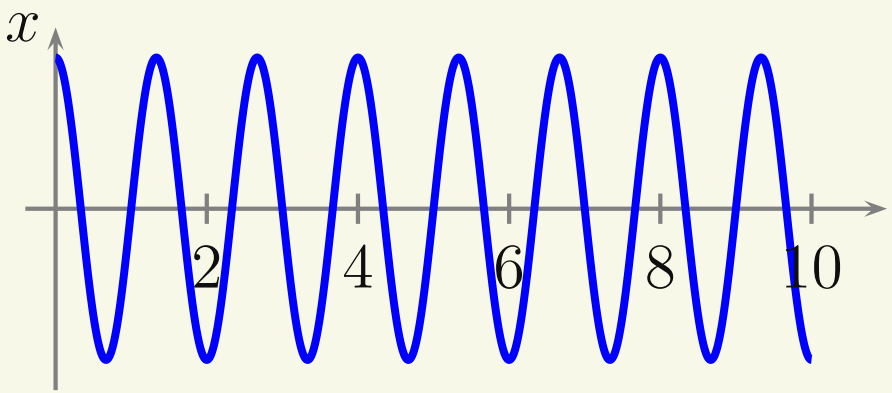

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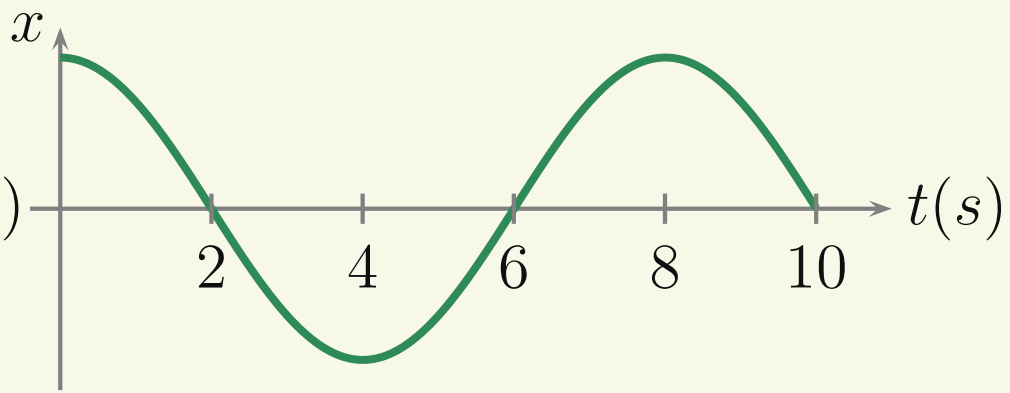

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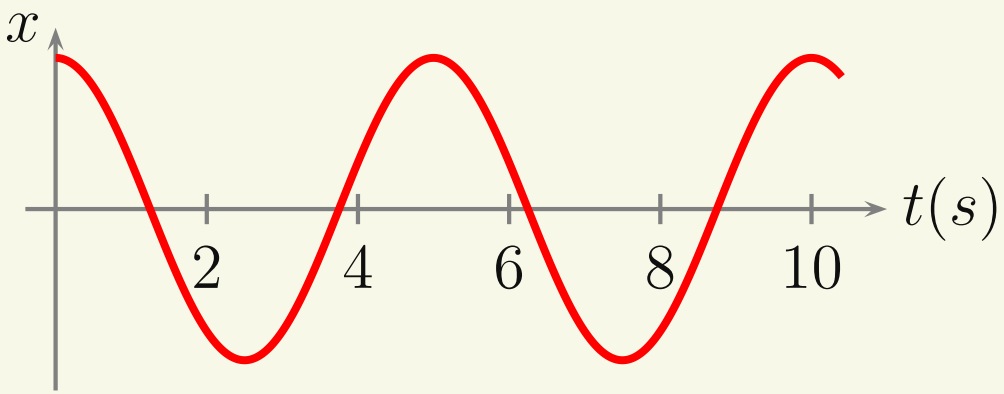

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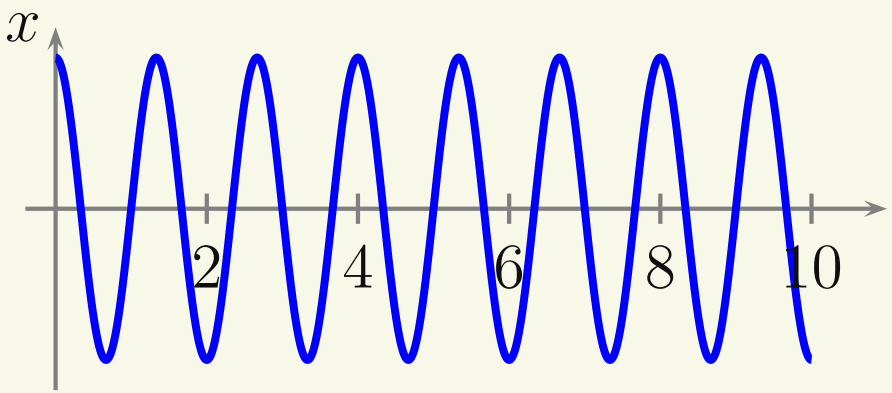

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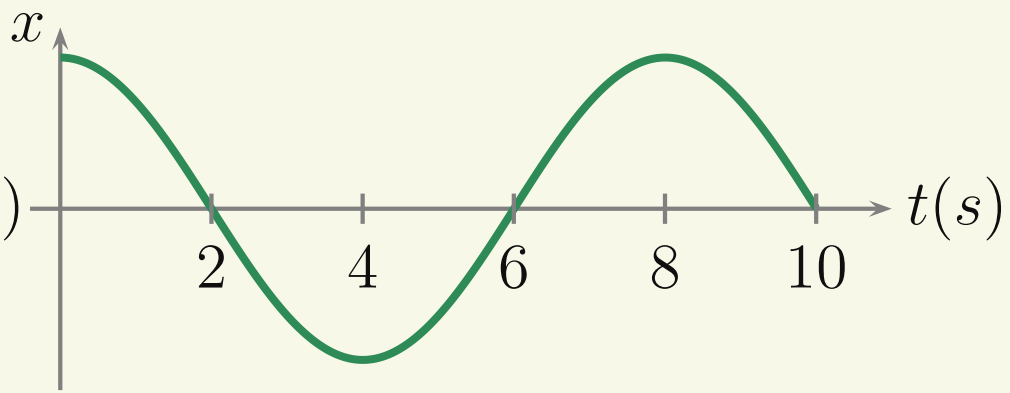

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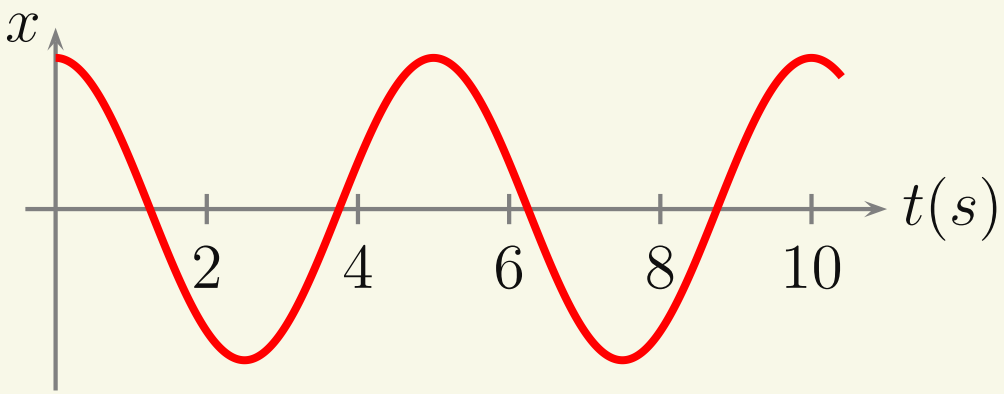

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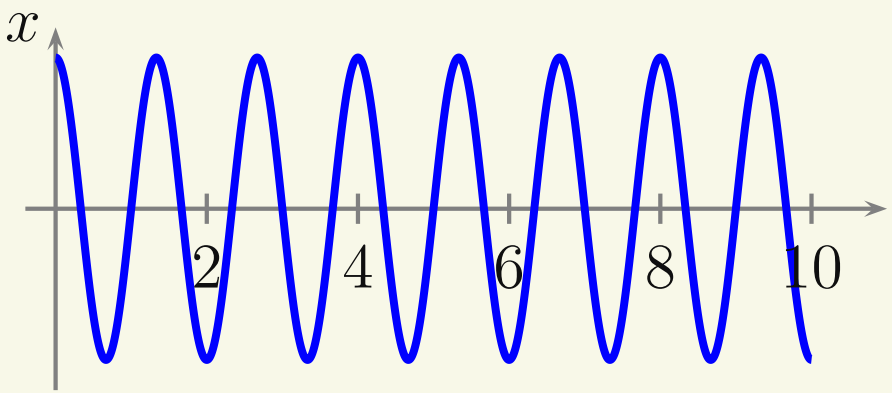

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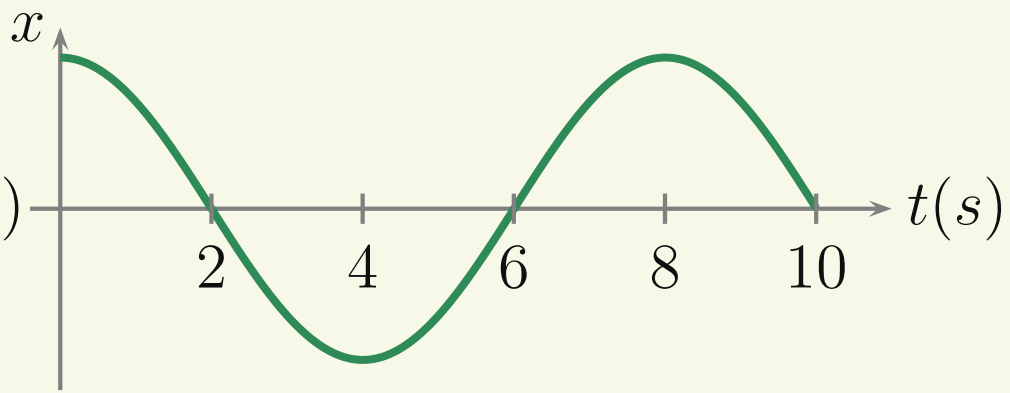

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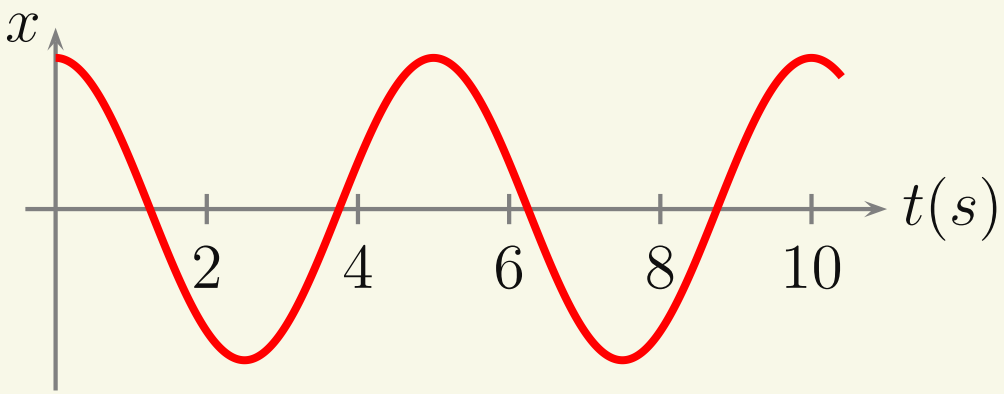

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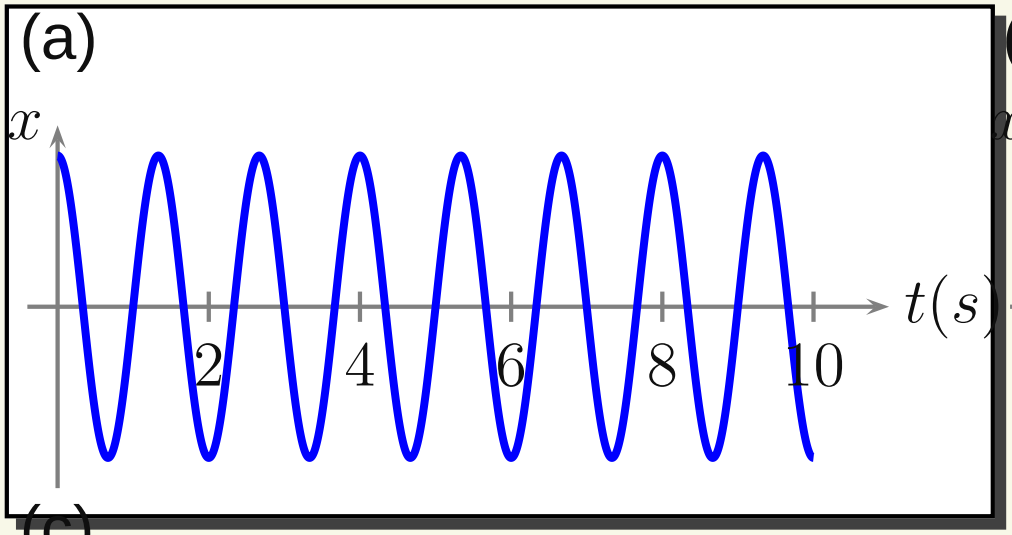

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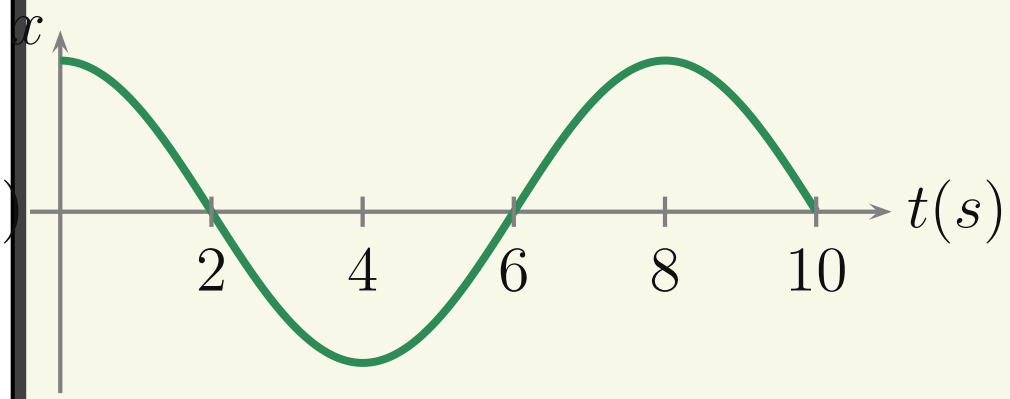

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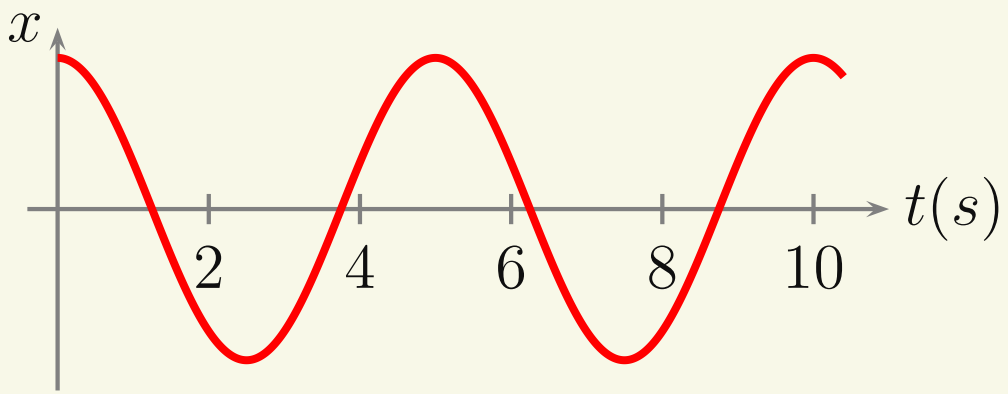

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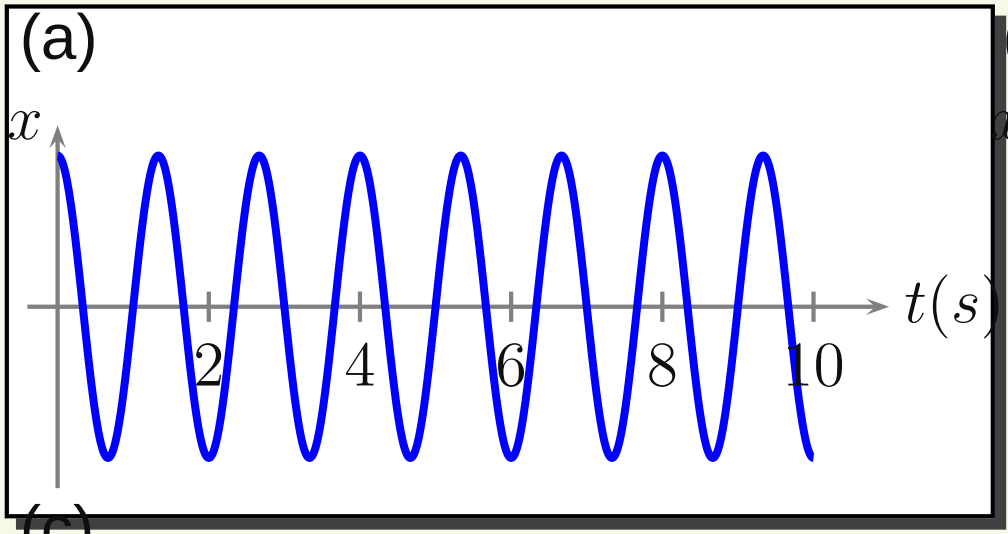

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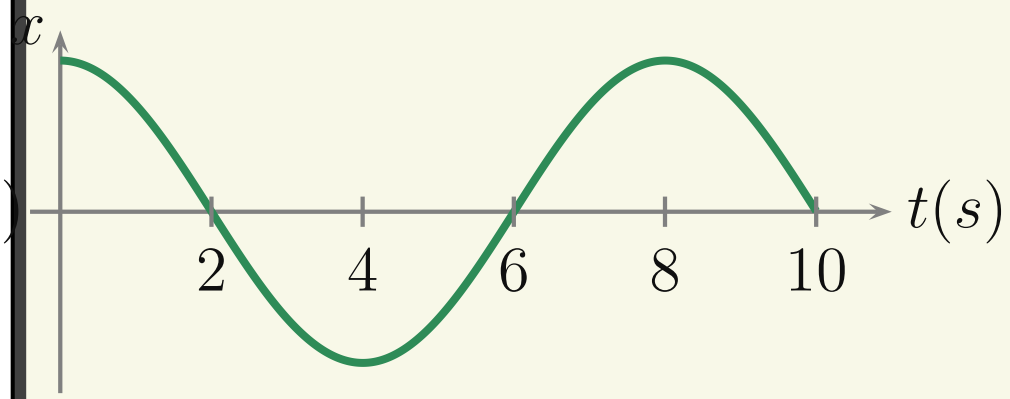

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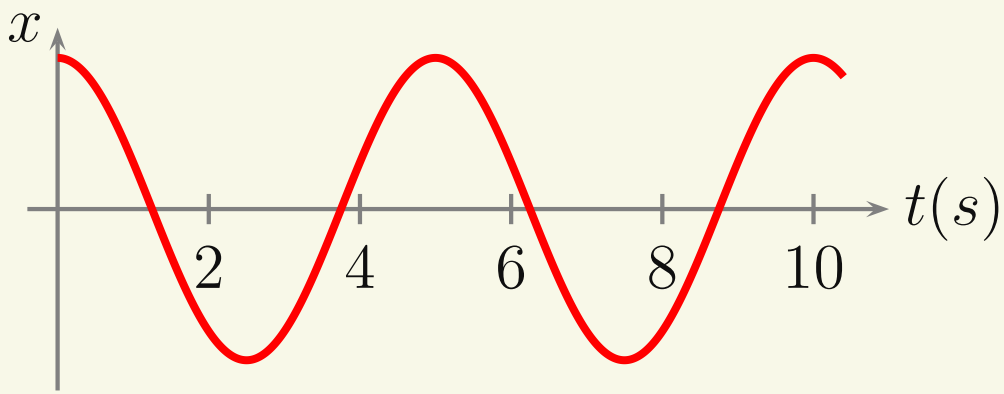

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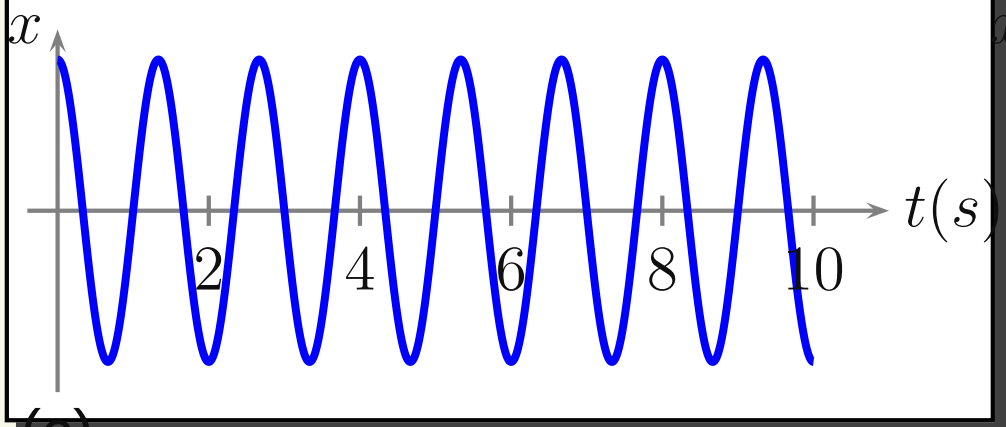

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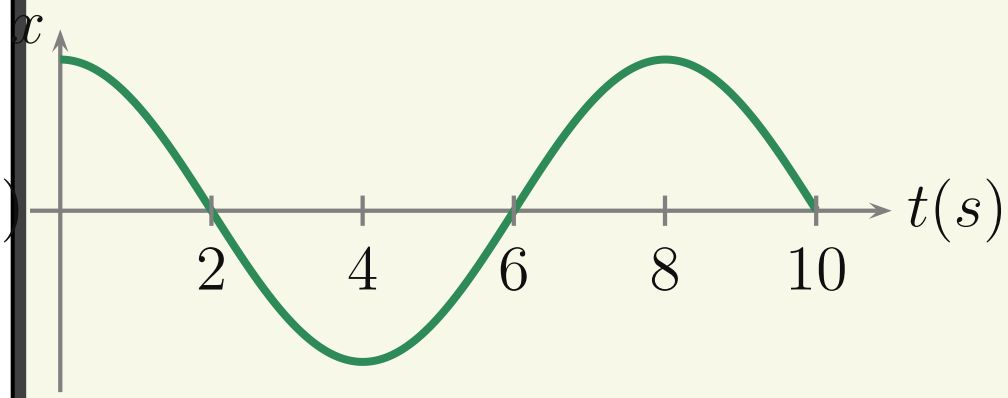

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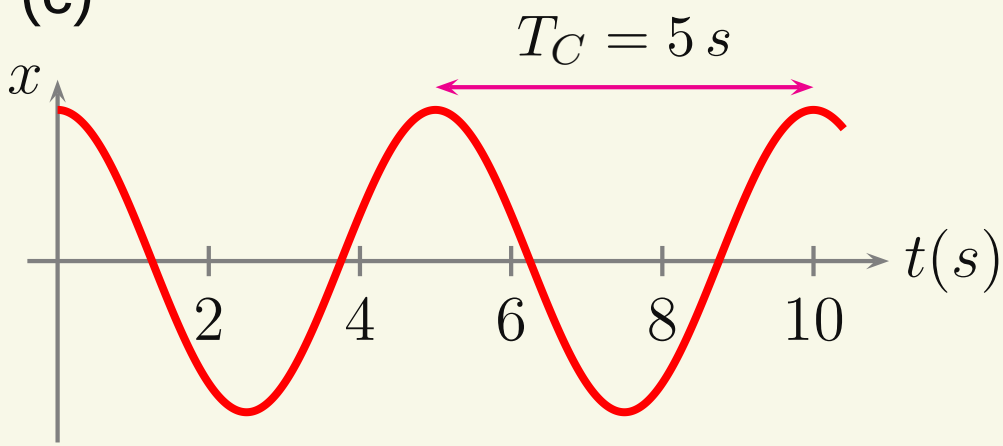

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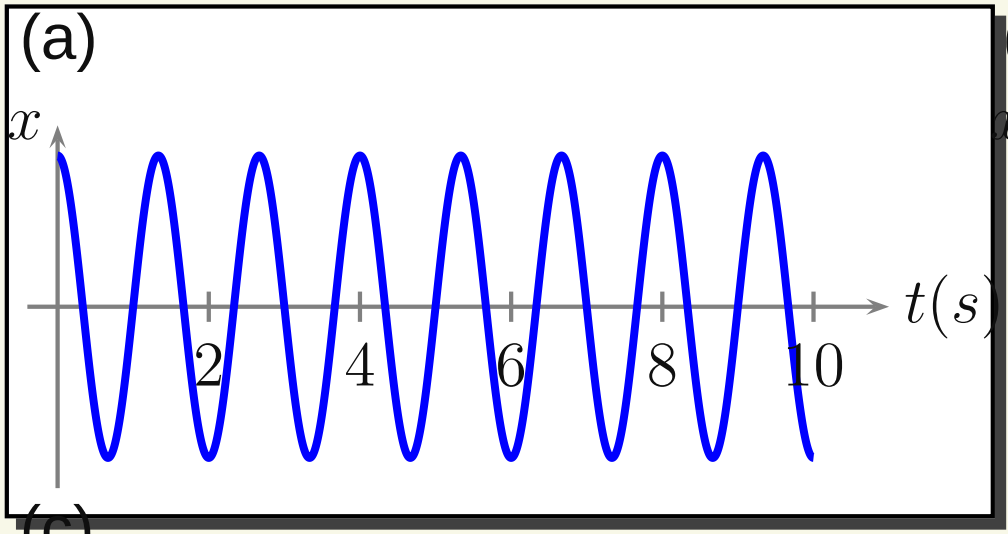

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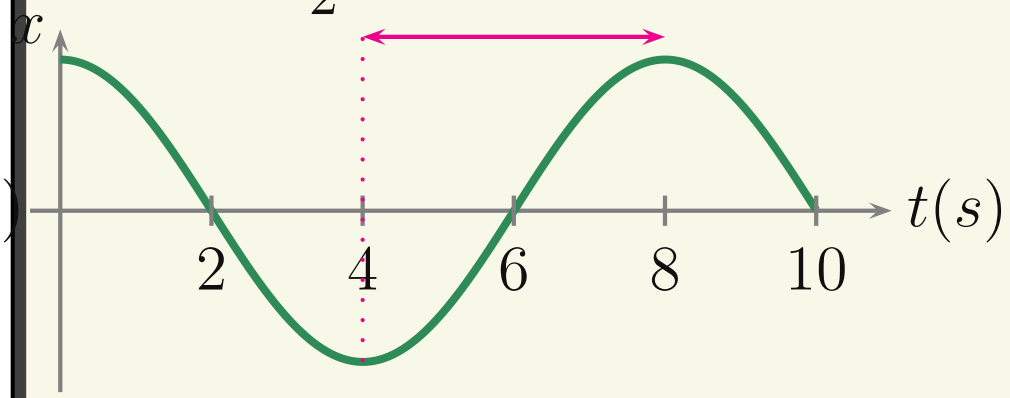
$\frac{1}{2}T_B = 4\,s \Rightarrow T_B = 8\,s$



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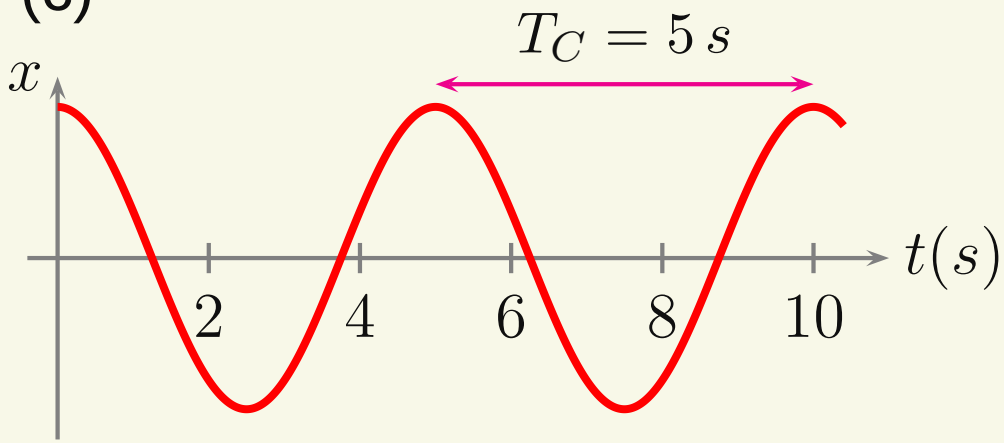

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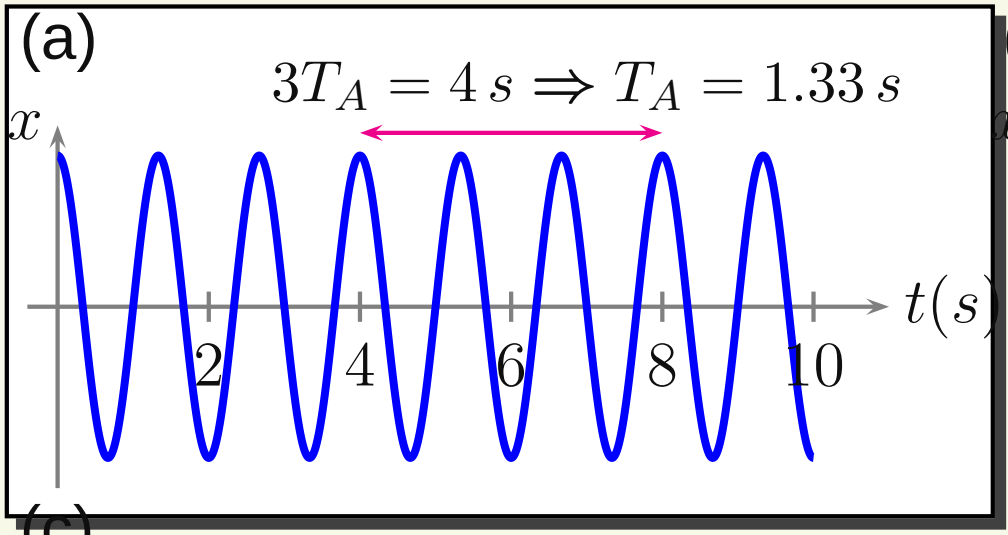

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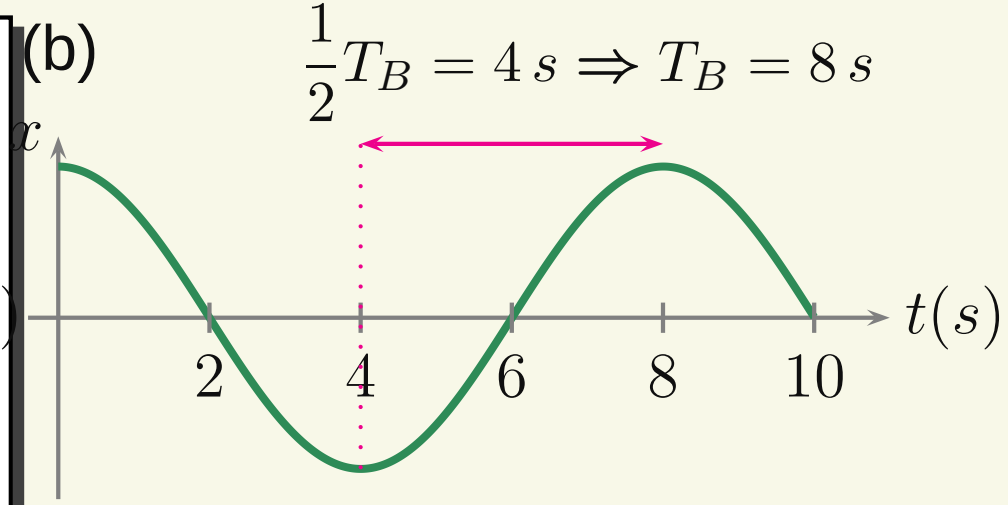

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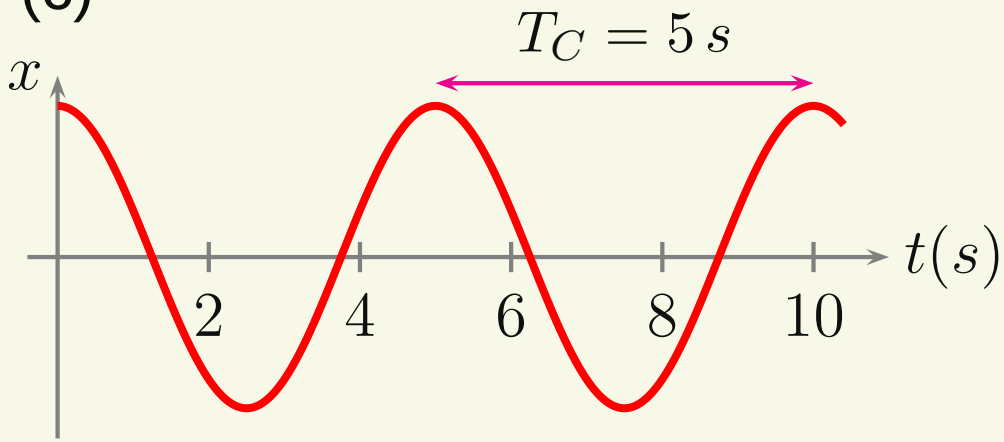
$T_C = 5\,s$



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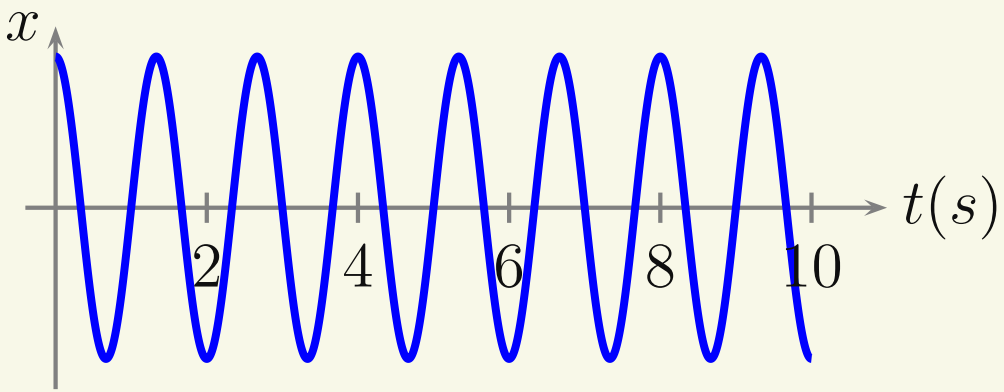

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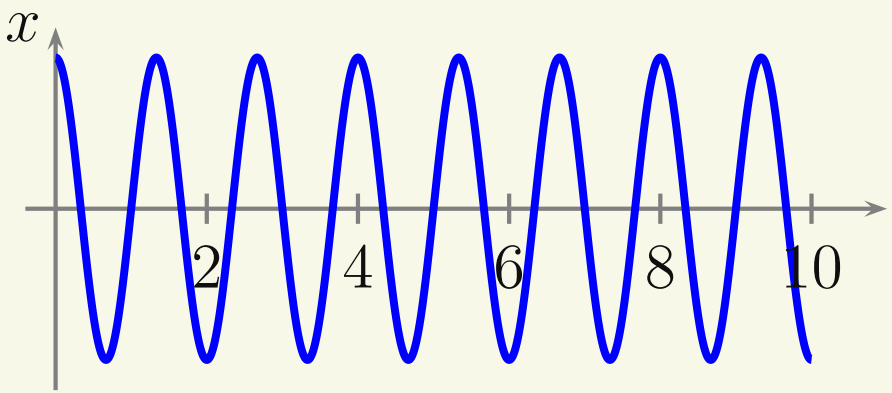

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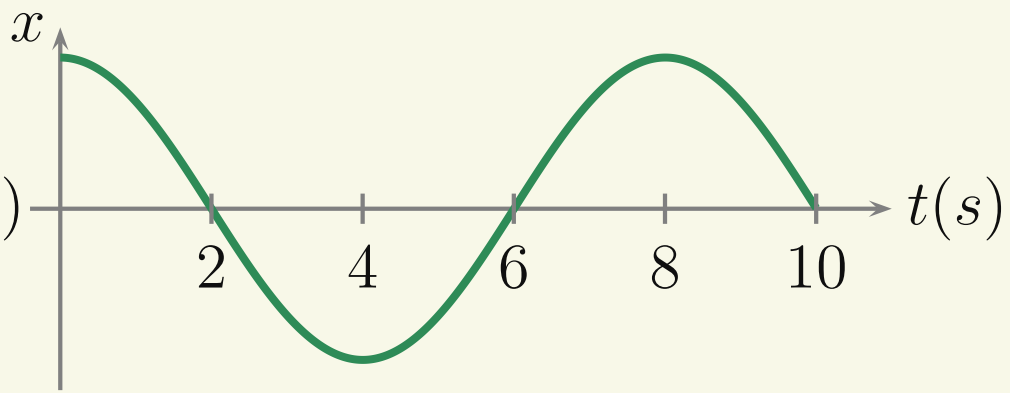

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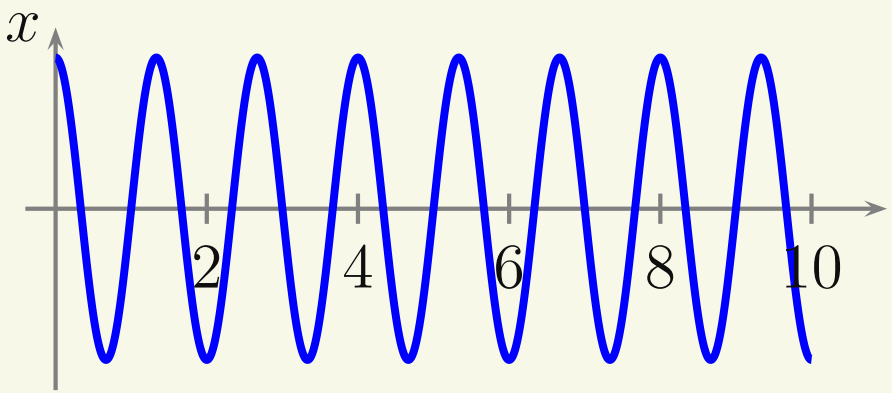

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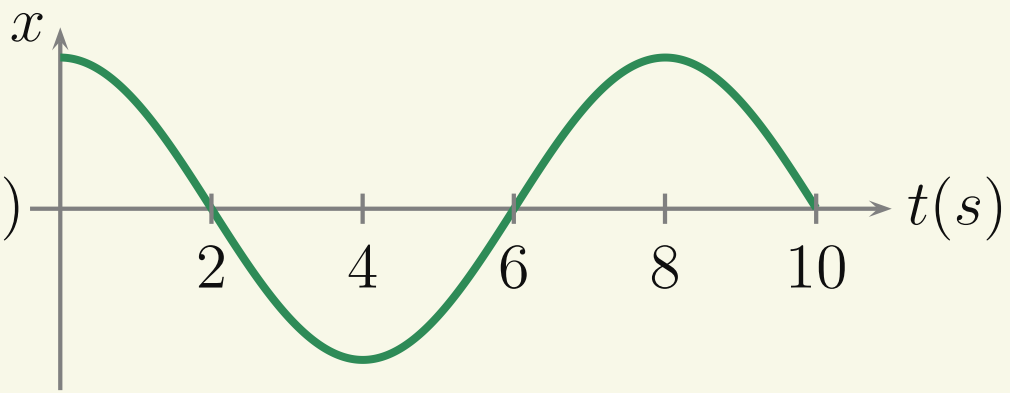

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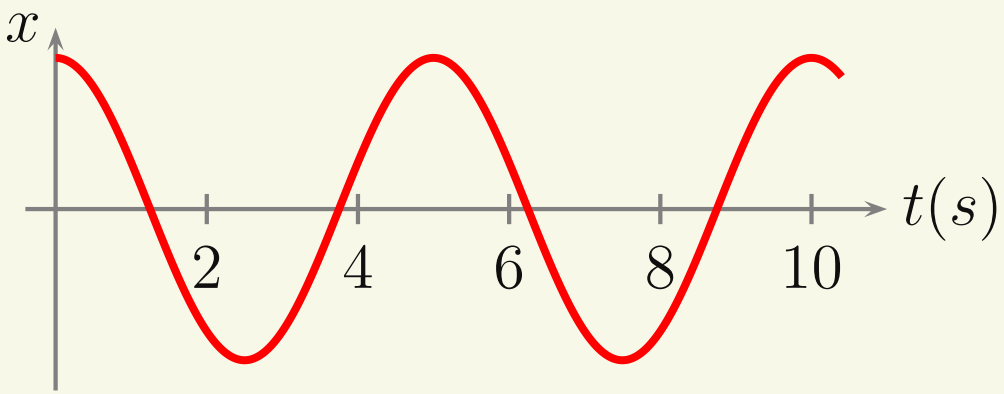

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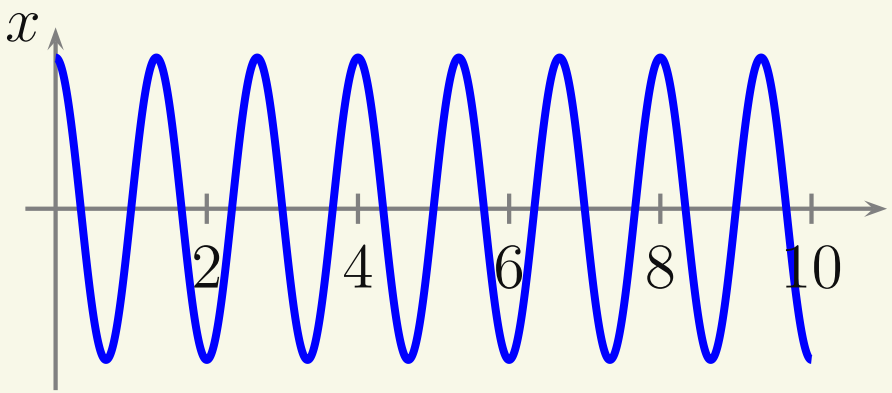

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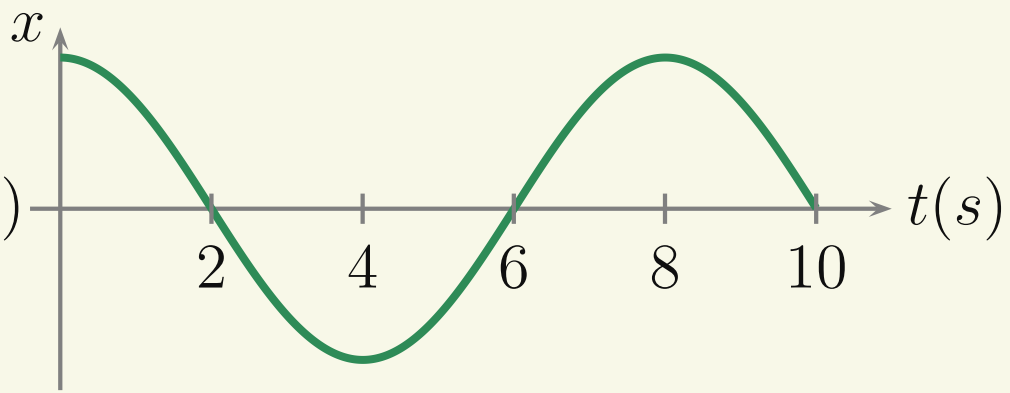

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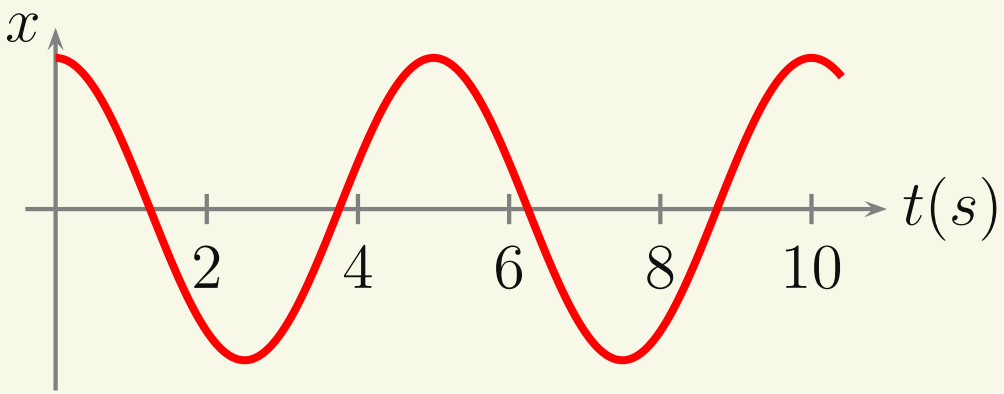

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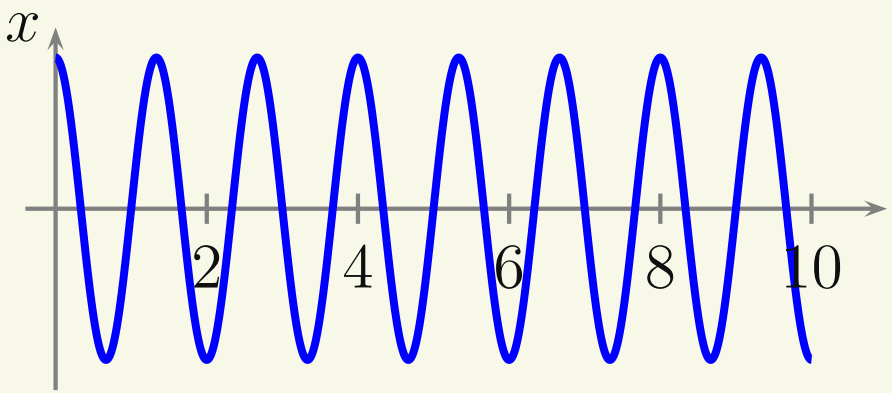

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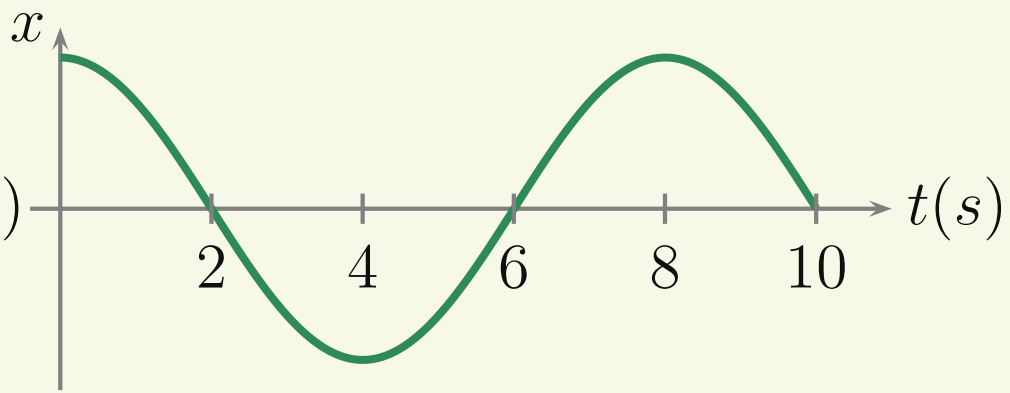

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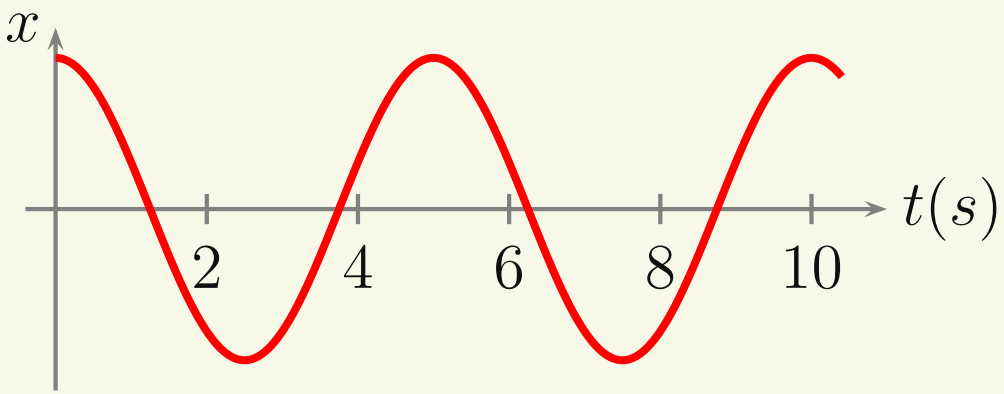

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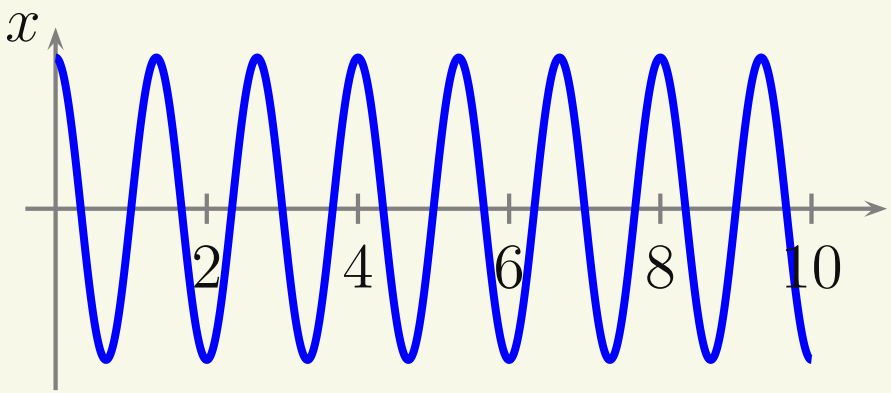

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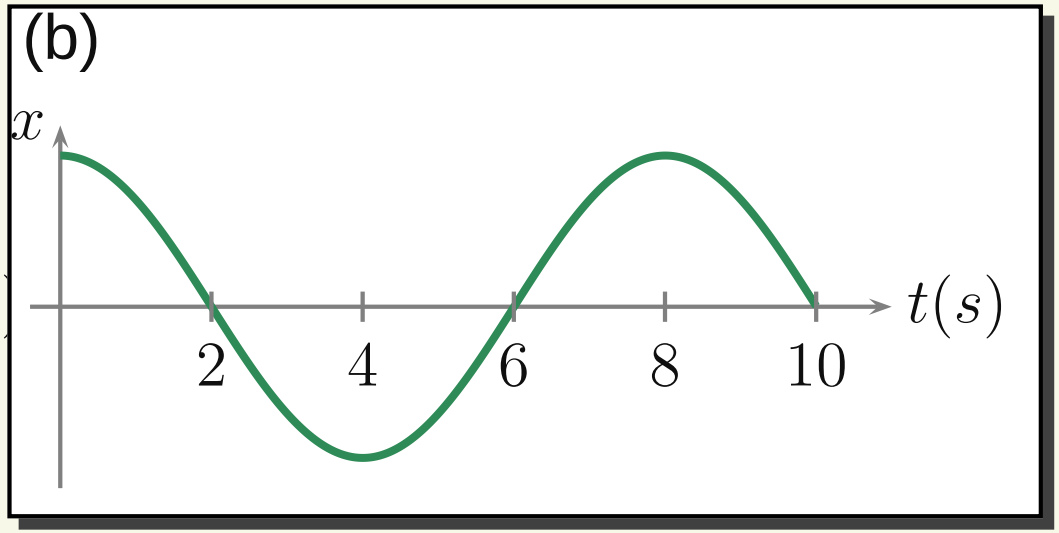

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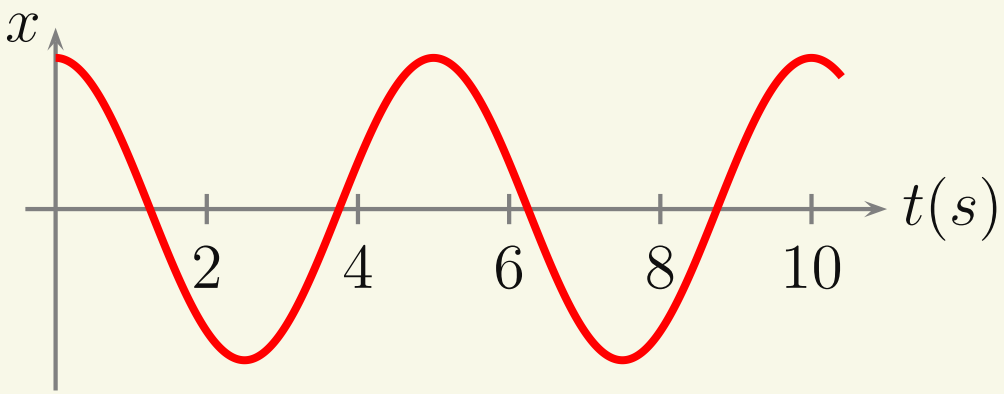

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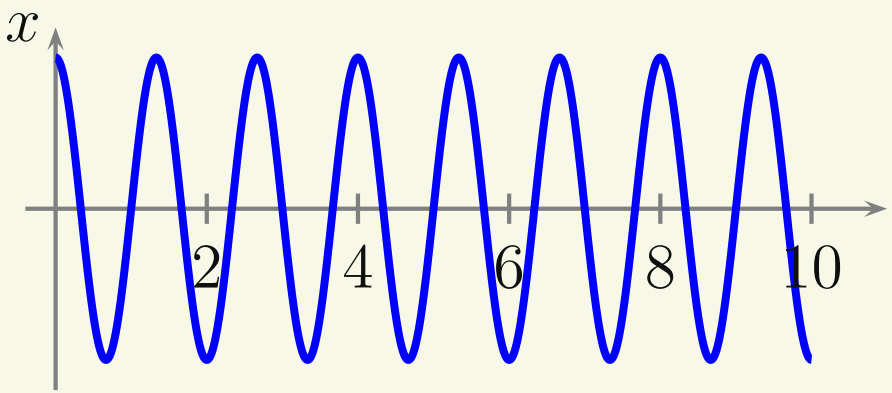

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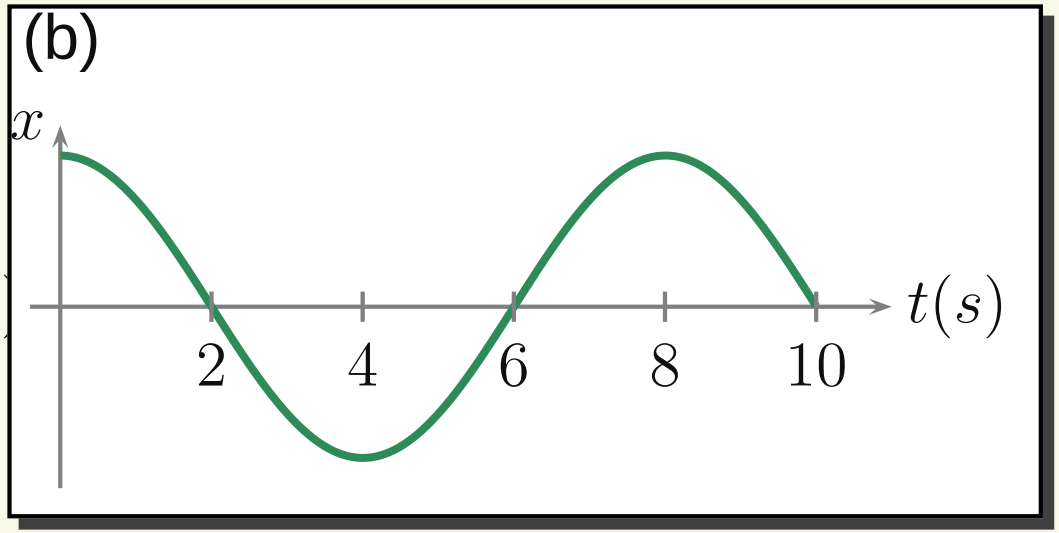

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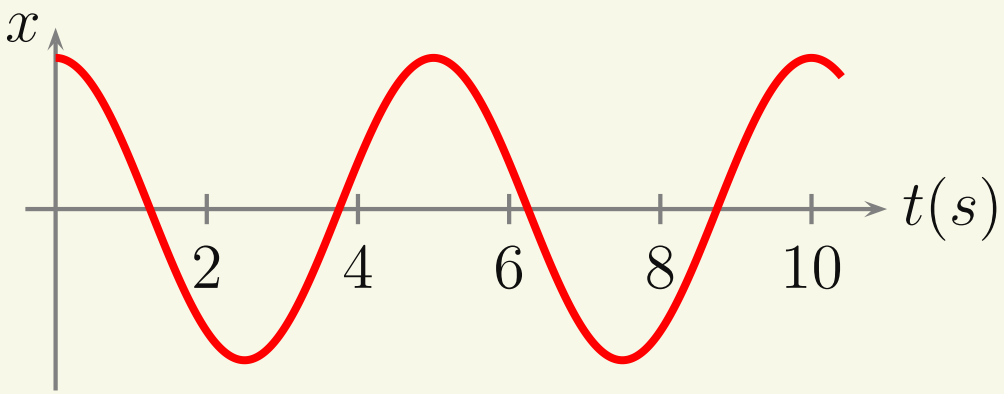

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There are three types of waves:

- Transverse Waves - Energy propagates perpendicular to medium's oscillation
- Longitudinal Waves - Energy propagates parallel to medium's oscillation
- Rolling Waves - A combination of transverse and longitudinal

Sinusoidal Waves

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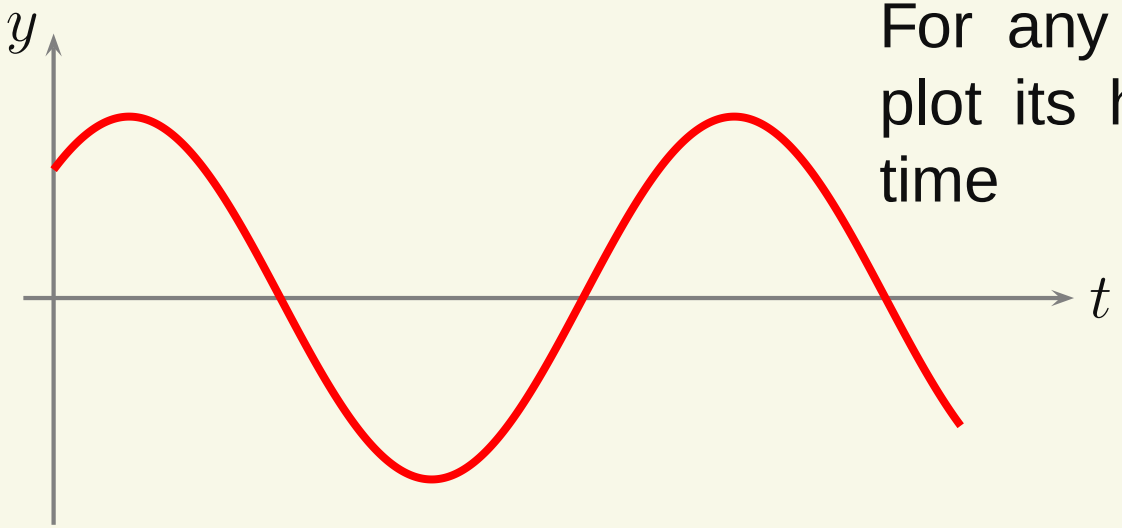

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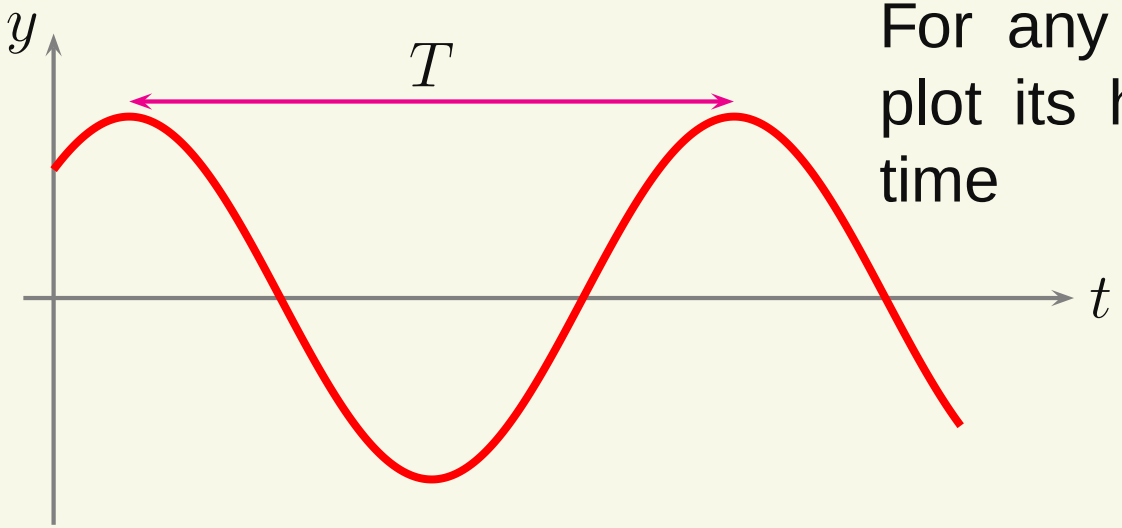

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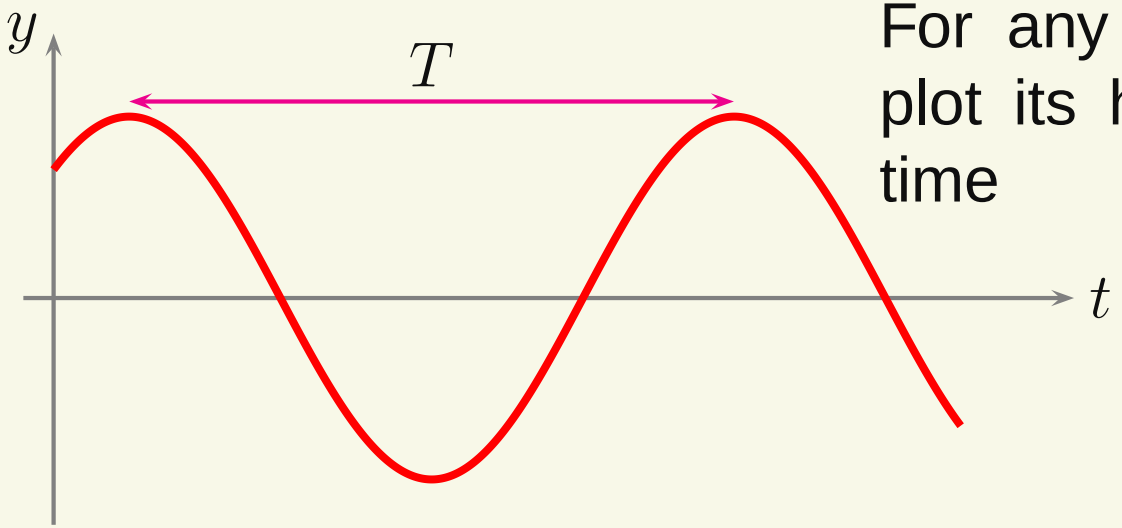

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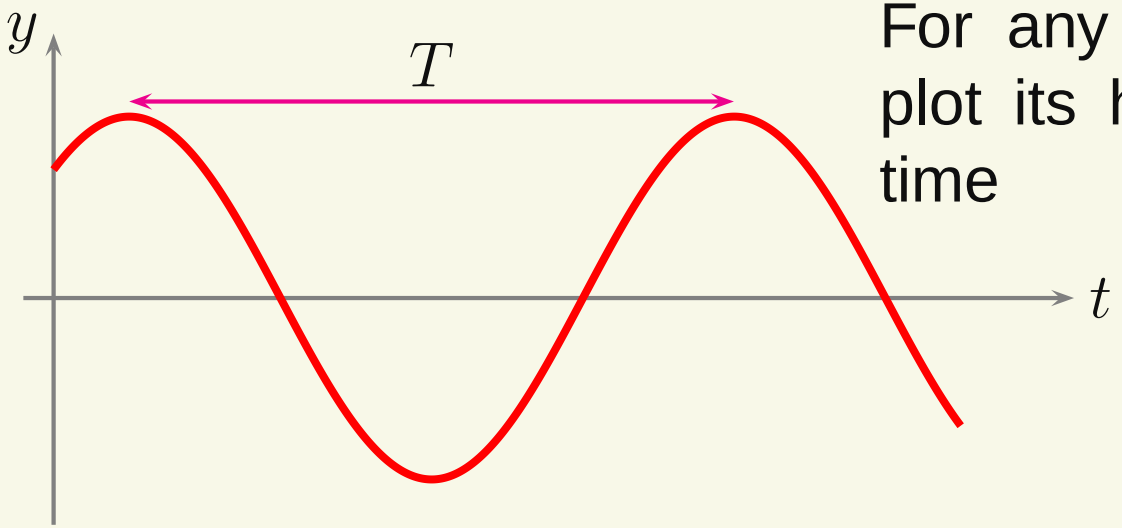

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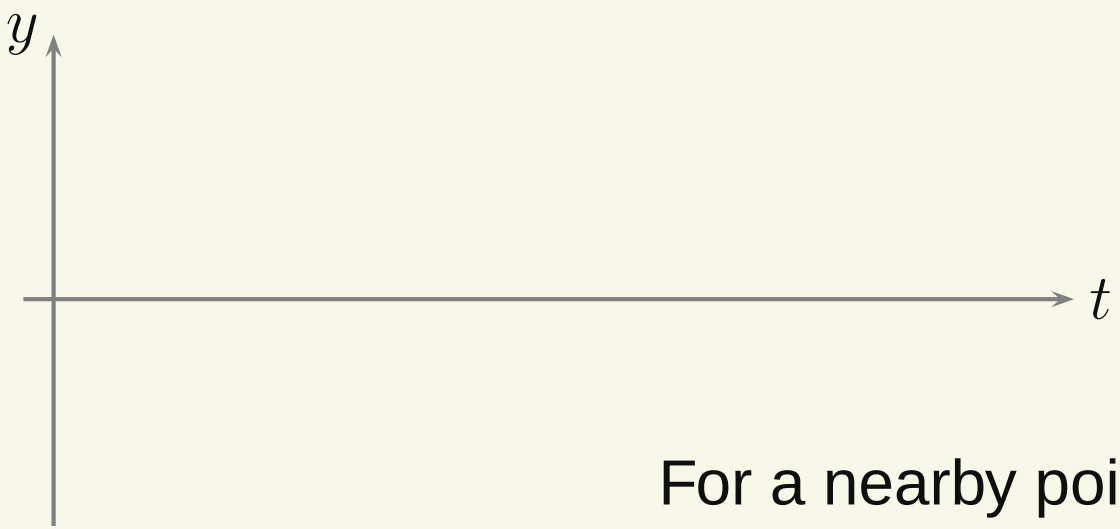

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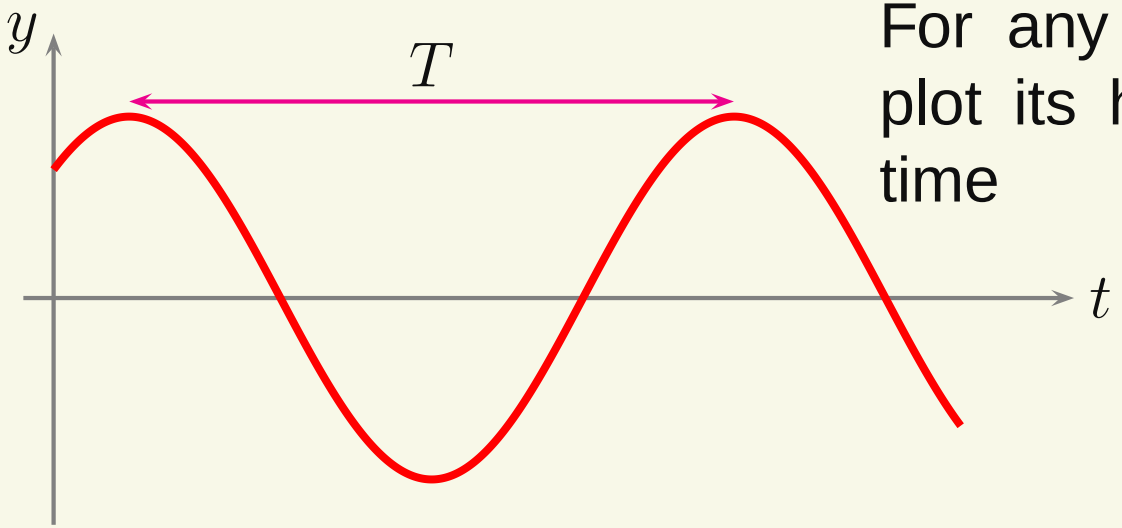

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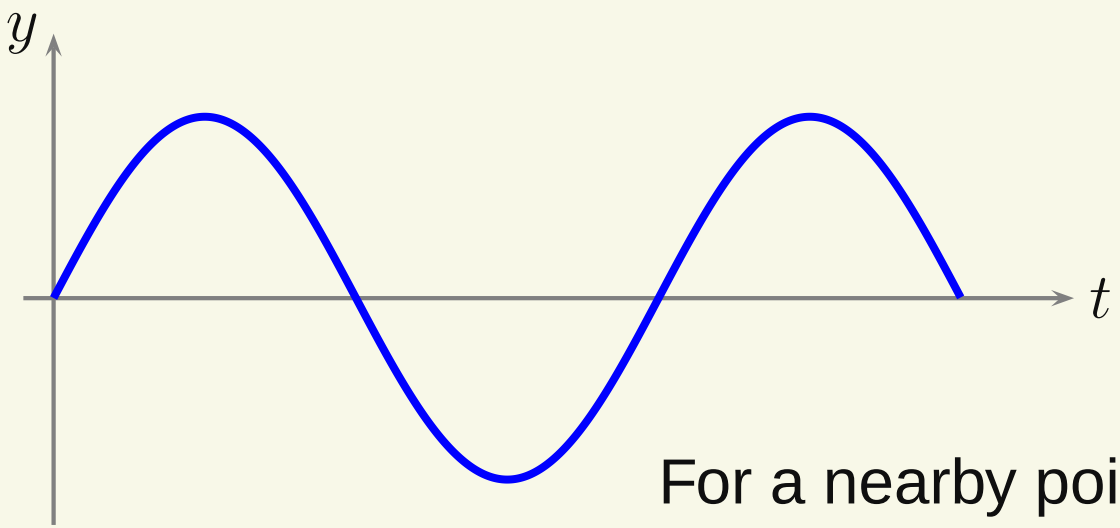

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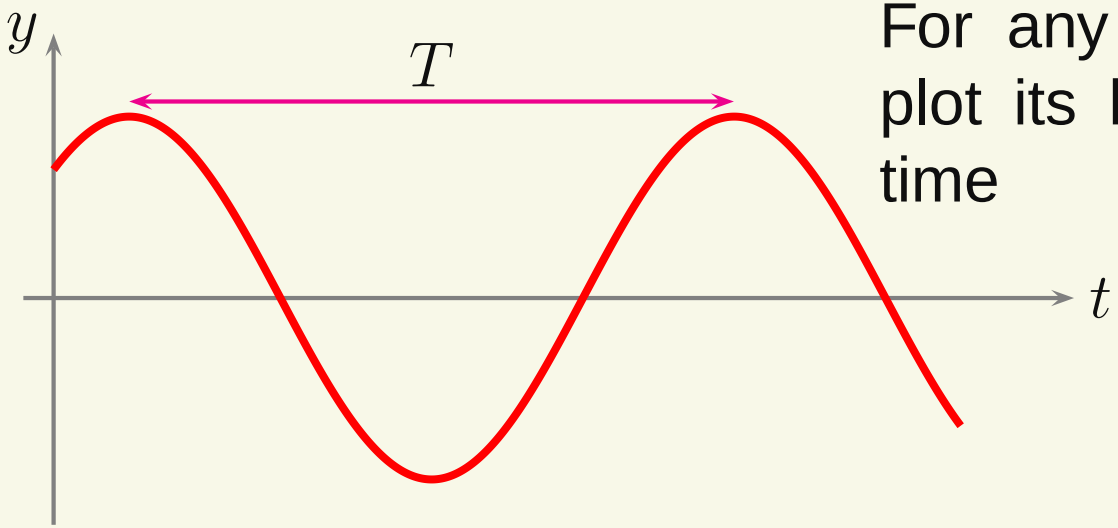

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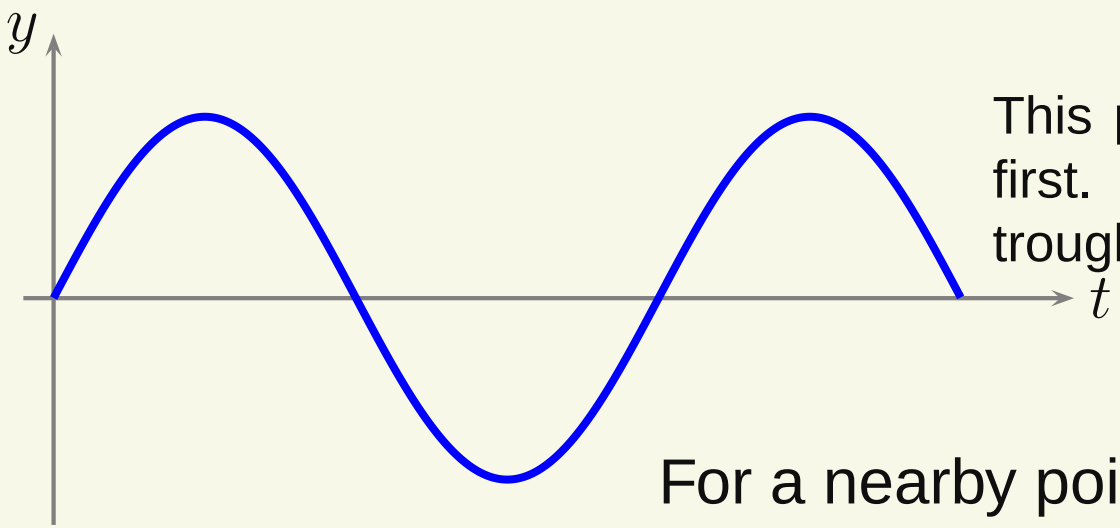

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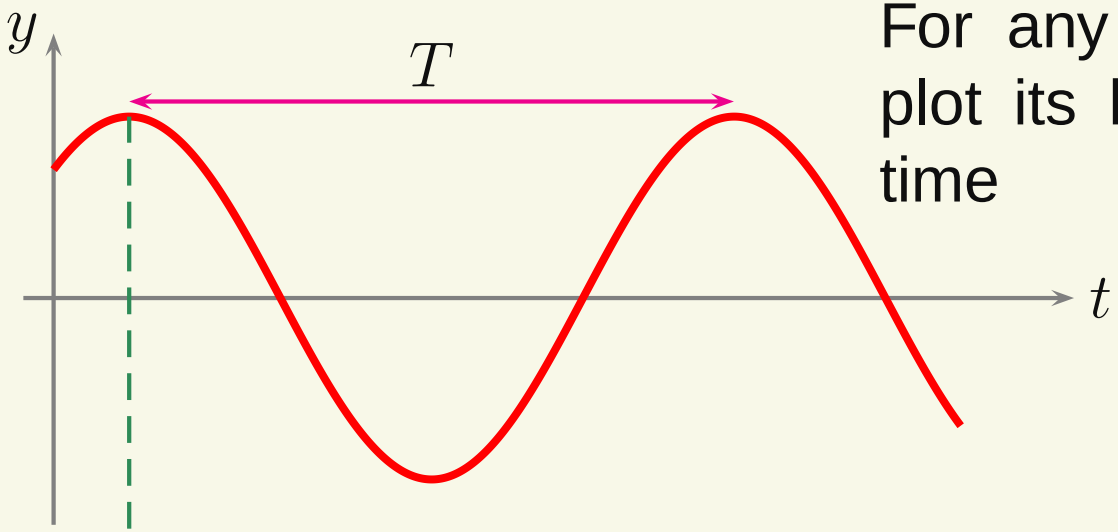

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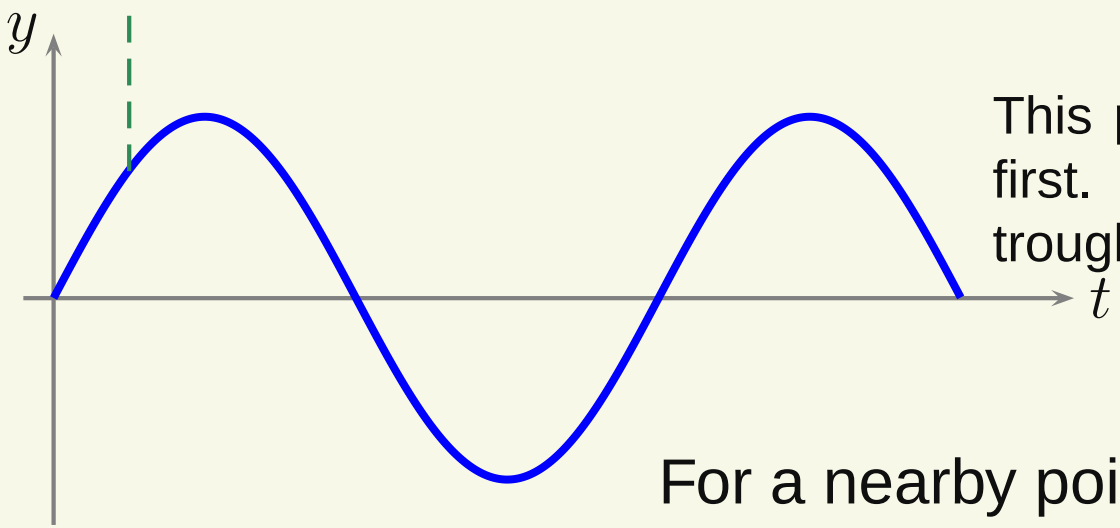

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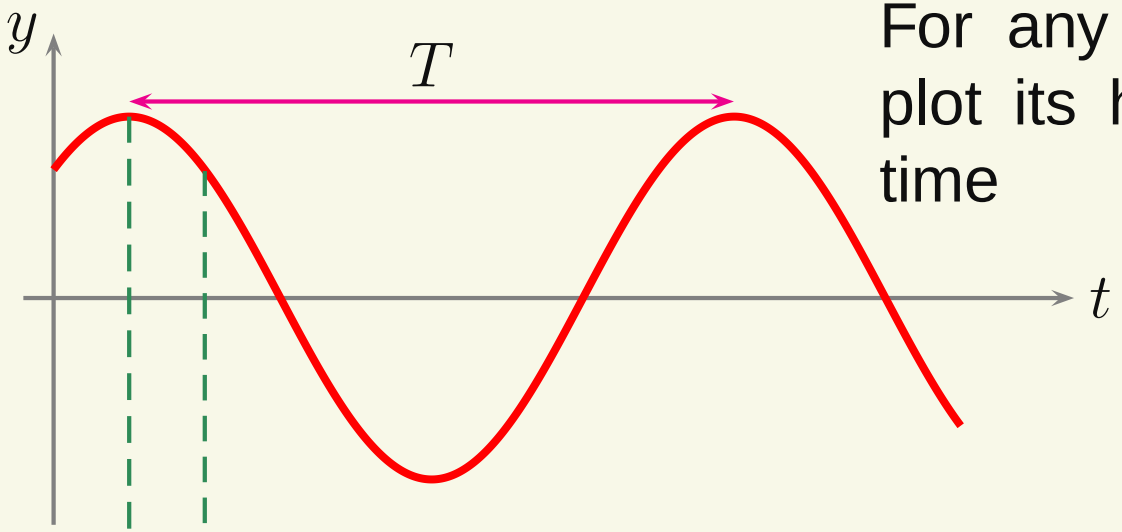

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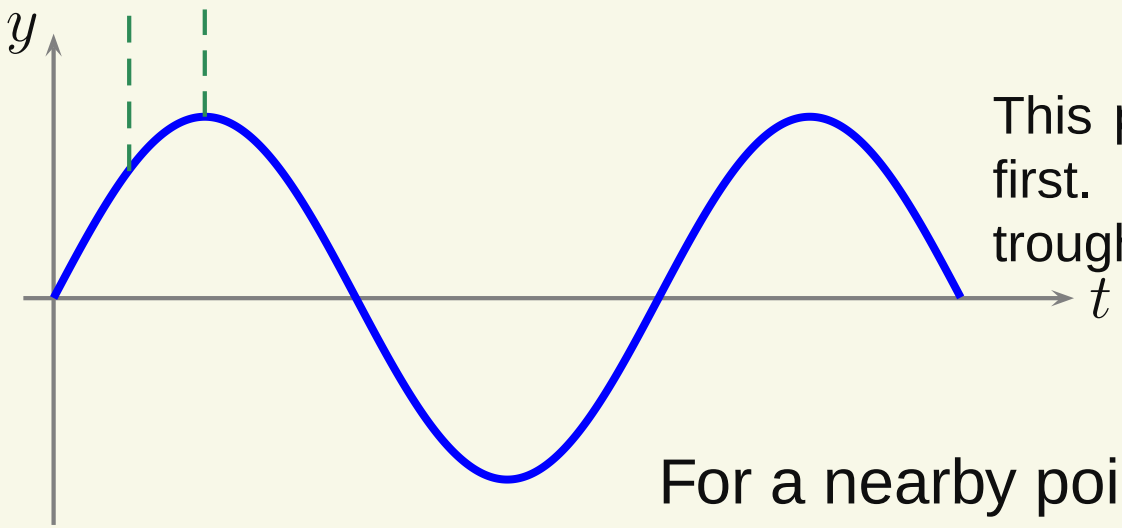

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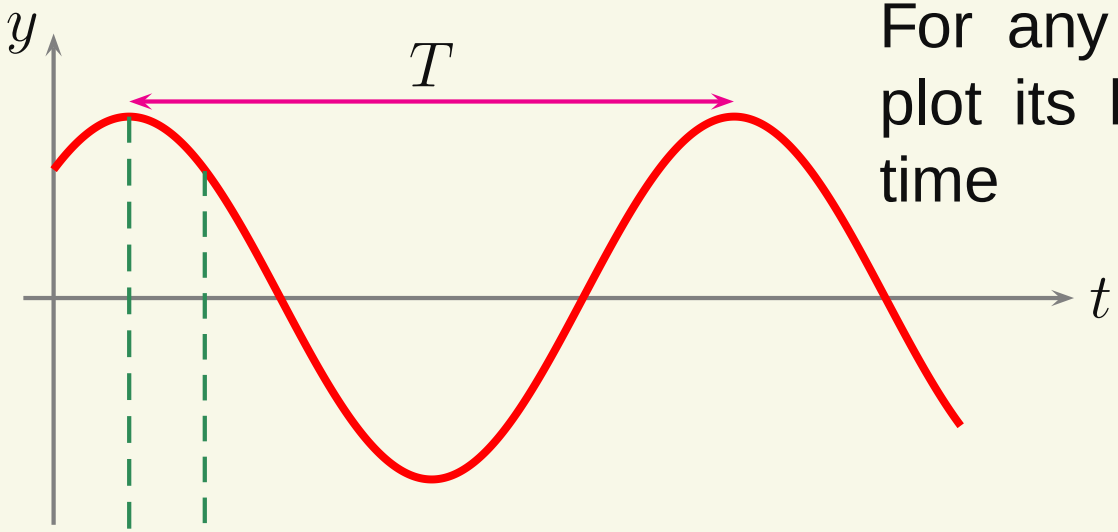

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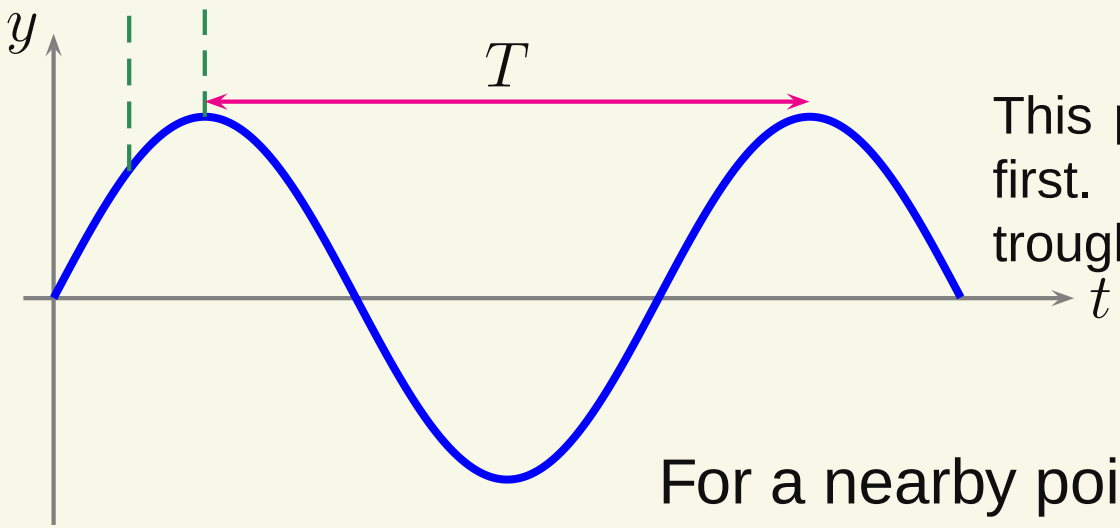

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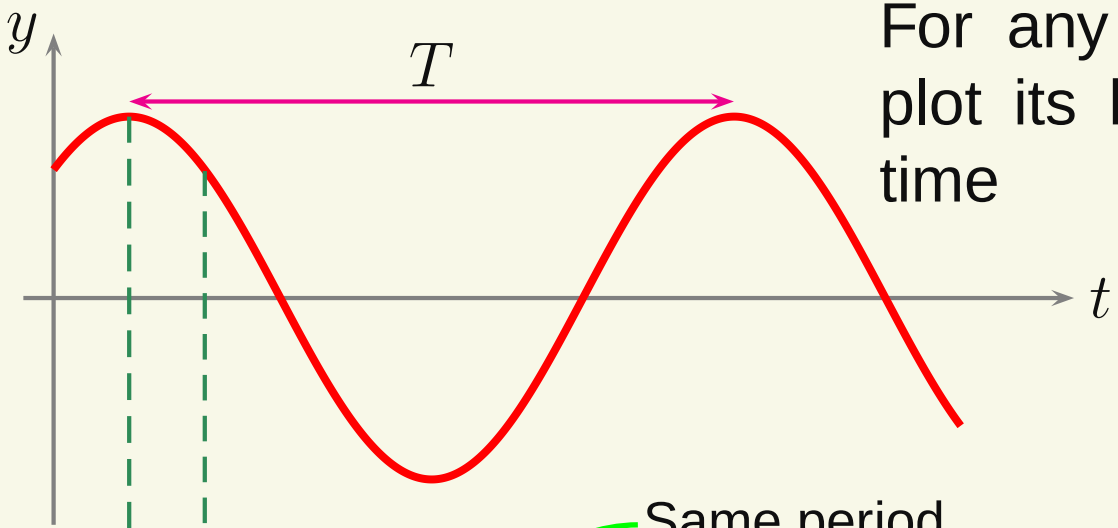

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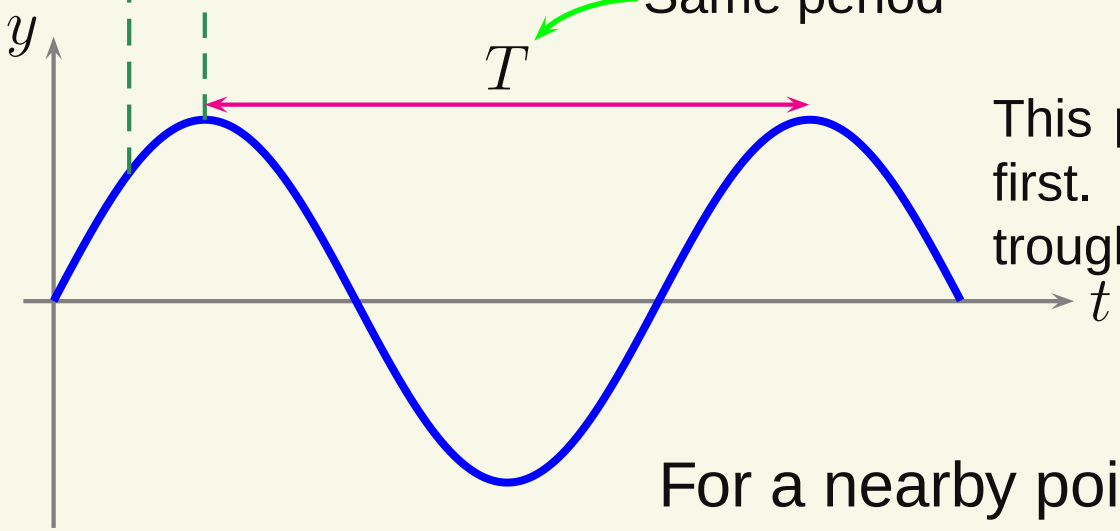

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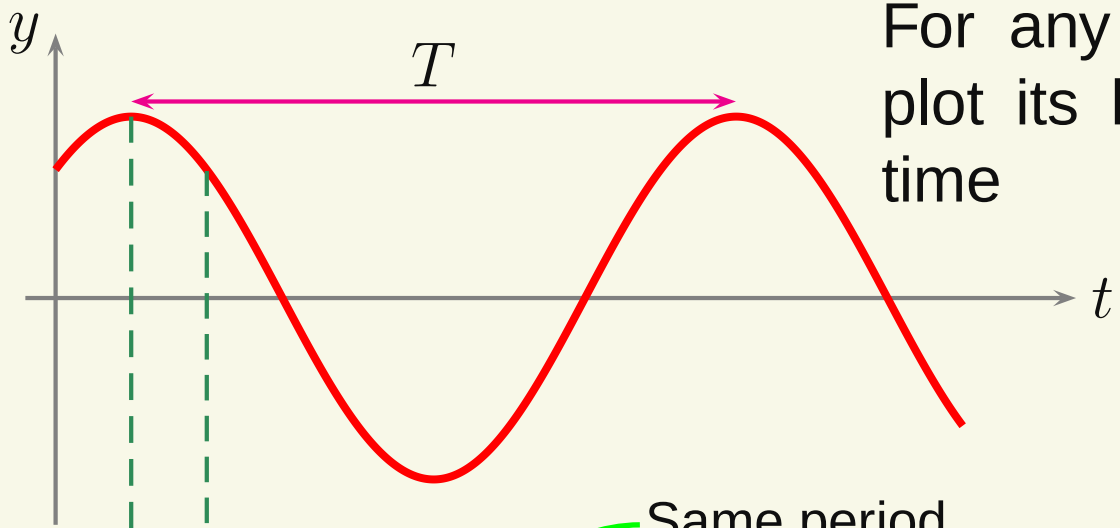

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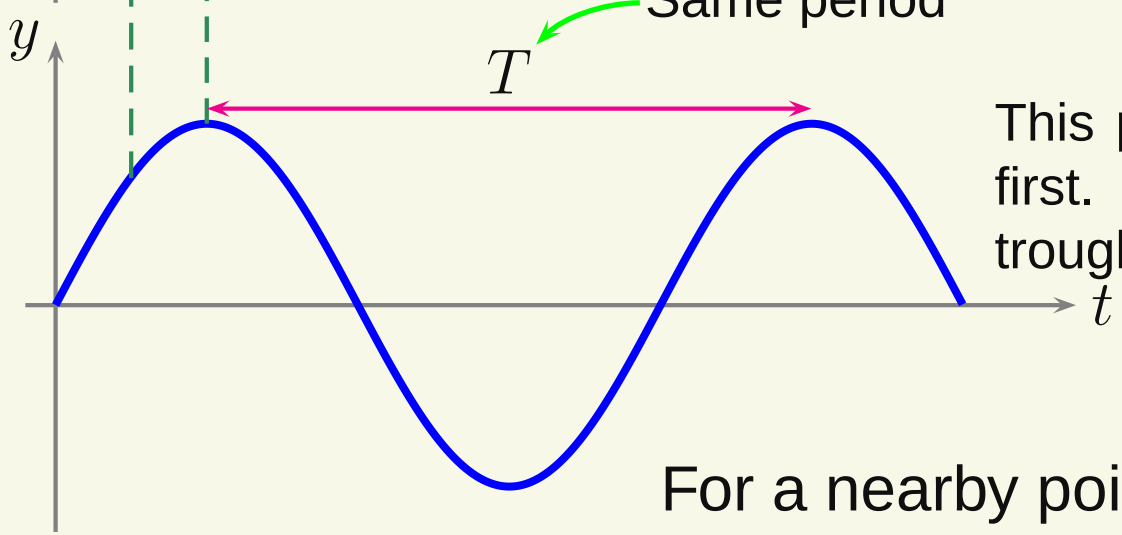

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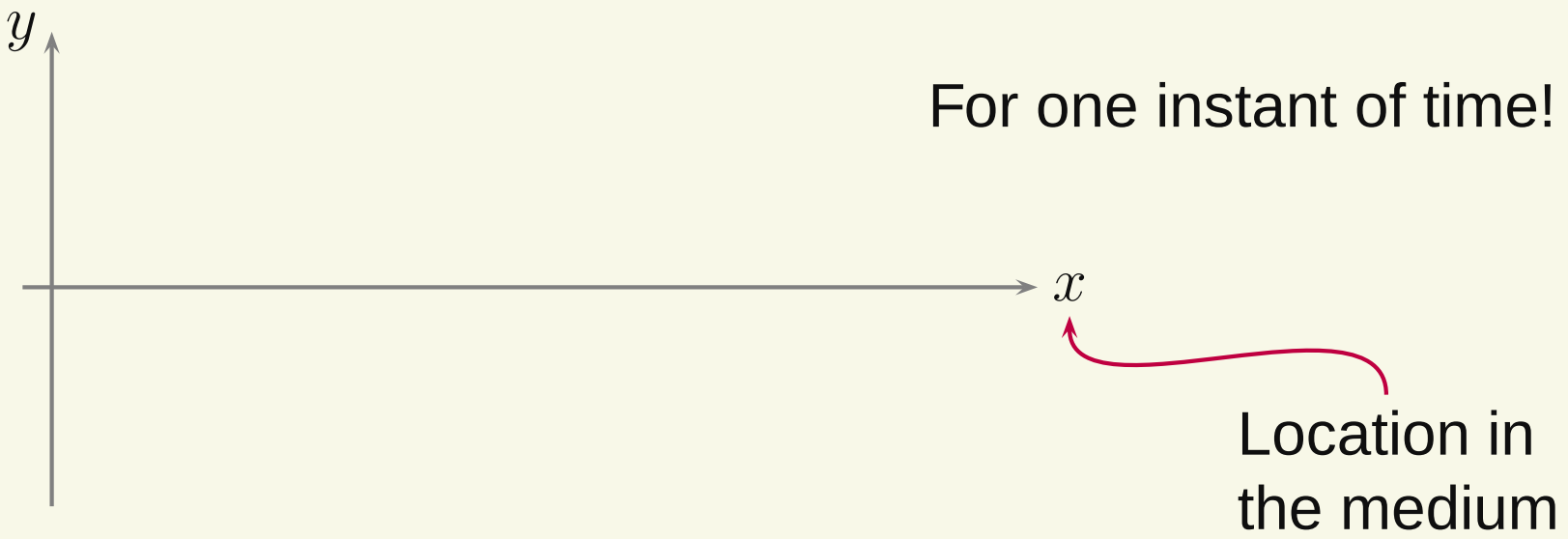

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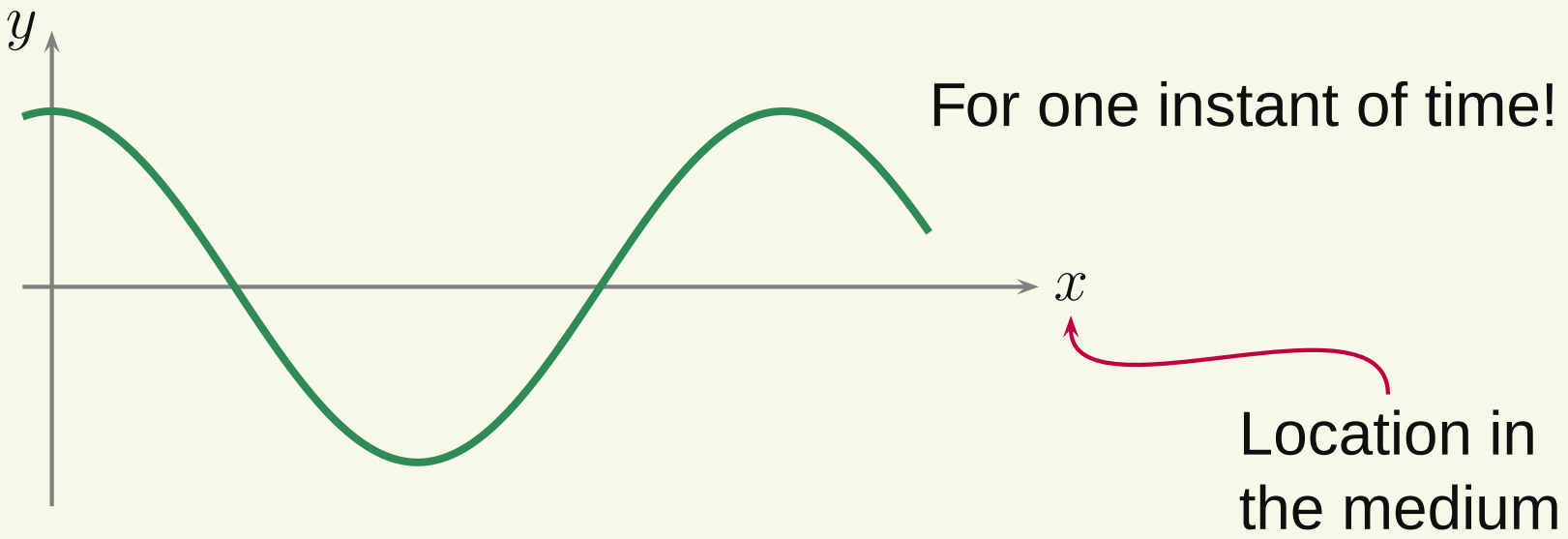

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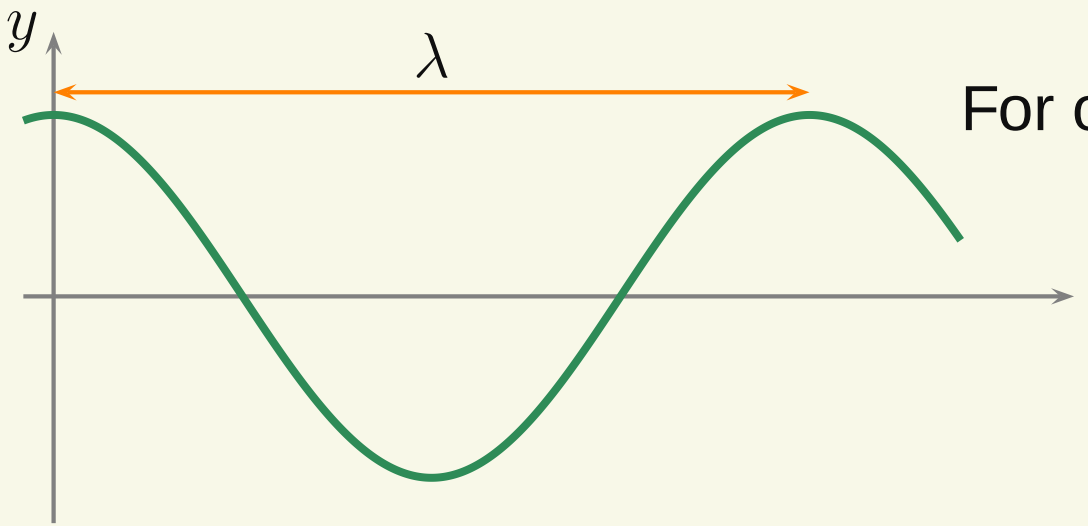

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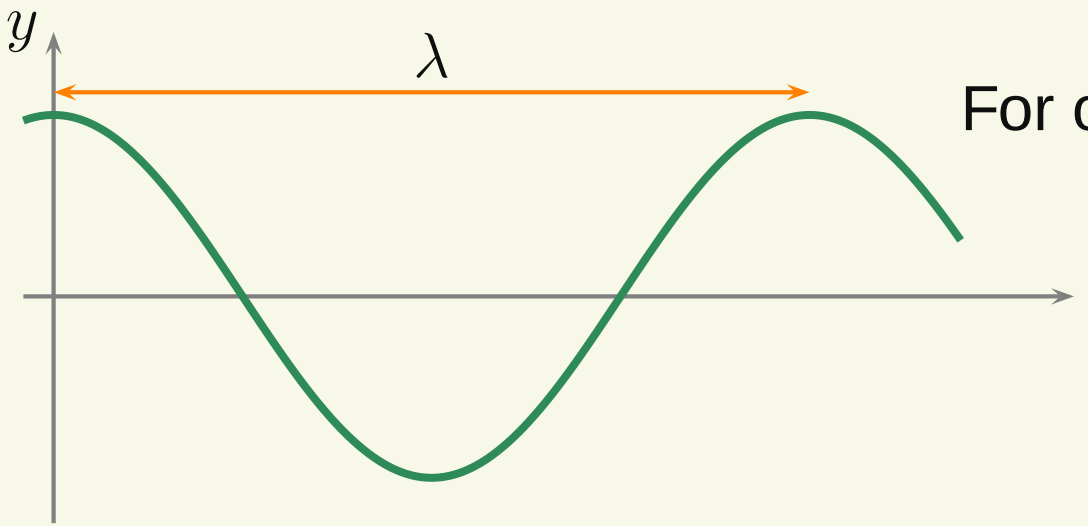

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Location in the medium

Wavelength: λ Units: m

- Distance between points in the medium that are in phase

Wave Speed

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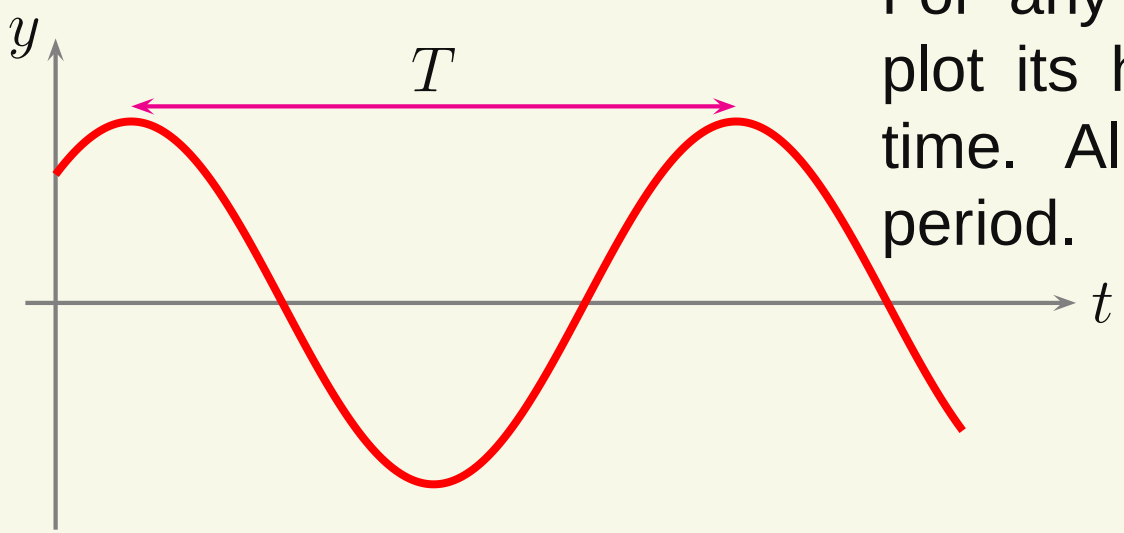

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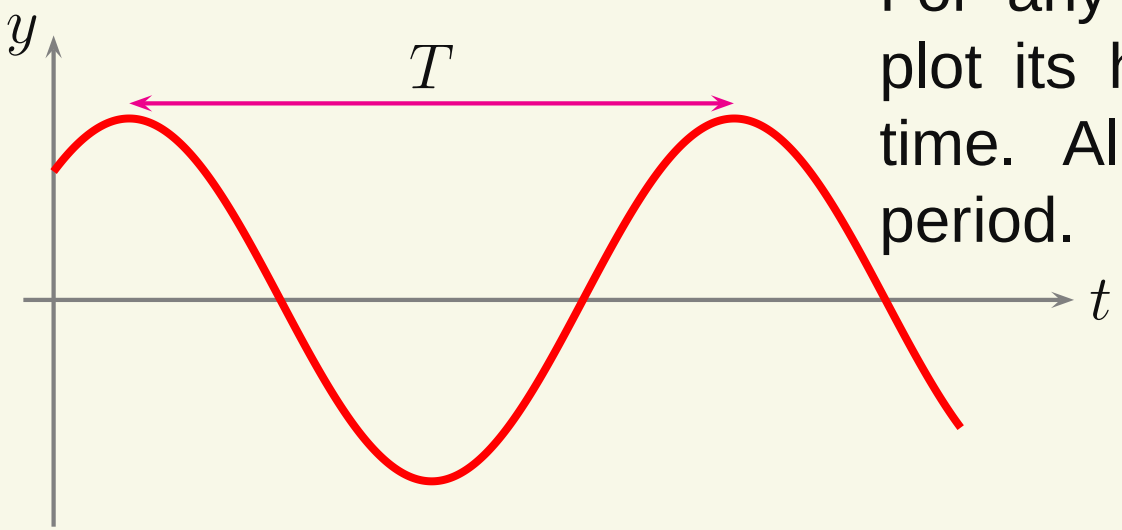

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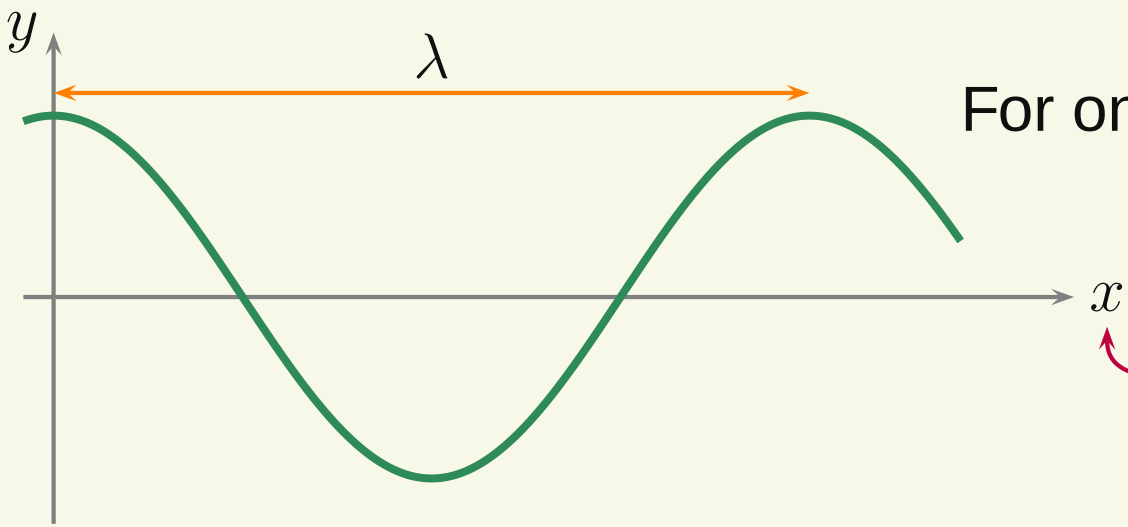

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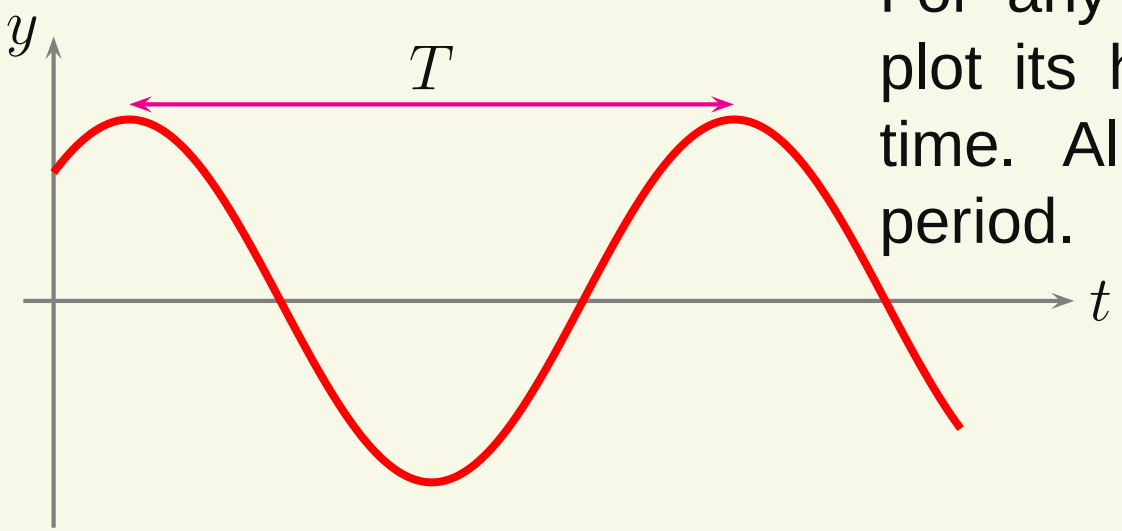

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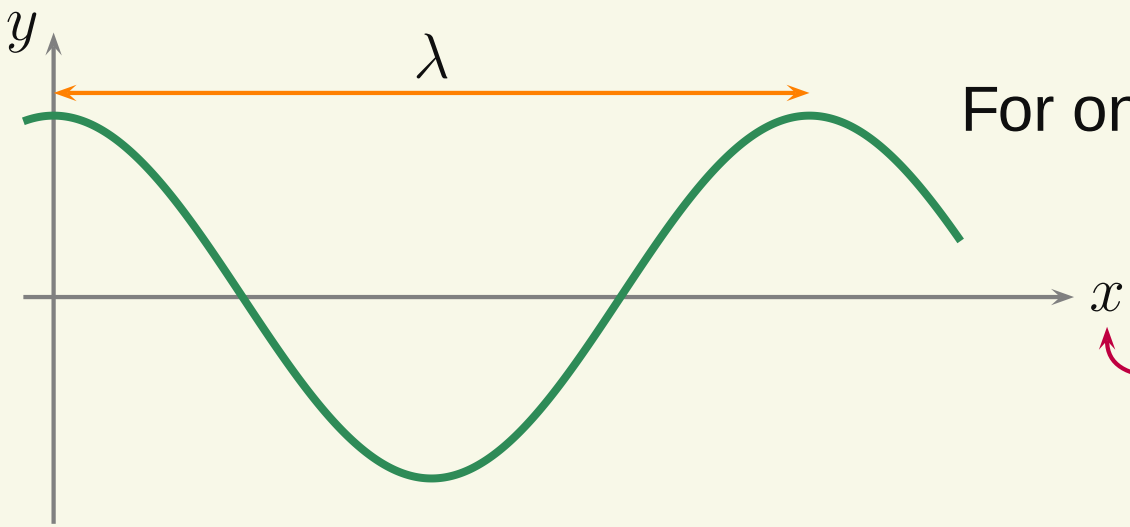
$$v = \frac{\lambda}{T} = \lambda f$$



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