PHYS 1406

$V_{\text{sound in air}} \approx 340 \text{ m/s}$ (meter / second)

$V \approx 340$ m/s (at room temp. 70°F ≈ 25C)

$V \approx 1000$ ft/s

Math review:

$\frac{1}{2\pi} = 0.159$

$\pi = 3.14$

$(1 \div 2) + \pi = 1.57$

$1 \div (2 \times \pi) = 0.159$

$2 \div (3/2) = \frac{4}{3}$

$\frac{2}{1.5} =$

$\frac{\left(\frac{2}{1}\right)}{\left(\frac{3}{2}\right)} = \frac{2}{1} \times \frac{2}{3} = \frac{4}{3}$

$2^4 = 2 \times 2 \times 2 \times 2 = 16$

$10^3 = 1000$

$10^{-2} = \frac{1}{100} = \frac{1}{10^2}$

gigabyte $= 1000$ megabyte $= 1000 \times 10^6$ byte $= 10^9$ byte

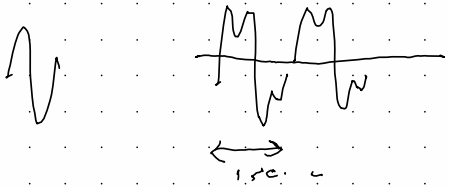
kilometers $= 1000$ m

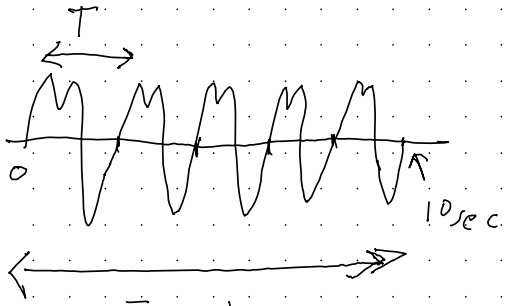
$\frac{\text{Megabits}}{\text{sec}} = \frac{10^6 \text{ bit}}{\text{sec}}$

millisec $= 10^{-3}$ sec $= \frac{1}{1000}$ sec $= 0.001$ sec

f: 20 Hz – 20,000 Hz

$\frac{1 \text{ cycle}}{\text{sec}}$





5 cycles
10 sec

$$f = \frac{\#\text{ cycles}}{\text{time interval}} = \frac{5 \text{ cycles}}{10 \text{ sec}}$$

$$= 0.5 \text{ Hz}$$

$T = 2 \text{ sec}$
= time for 1 cyle

$$f = \frac{1 \text{ cycle}}{T}$$

$$\boxed{f = \frac{1}{T}} \leftrightarrow \boxed{T = \frac{1}{f}}$$

A_4 : Concert $\begin{cases} f = 440 \text{ Hz} \\ T = 0.0023 \text{ s} = \boxed{2.3 \text{ ms}} \end{cases}$

7.86 ms
↑
start

10.136 ms
↑
Finish

$\rightarrow$ (10.136 − 7.86) ms
$= \boxed{2.28 \text{ ms}}$

Compare two numbers

Joe: $5.5\ \cancel{ft}\left(\frac{12\ in}{1\ \cancel{ft}}\right) = 66$ inches

Bob: 72 inches

Bob is 6 inches taller than Joe

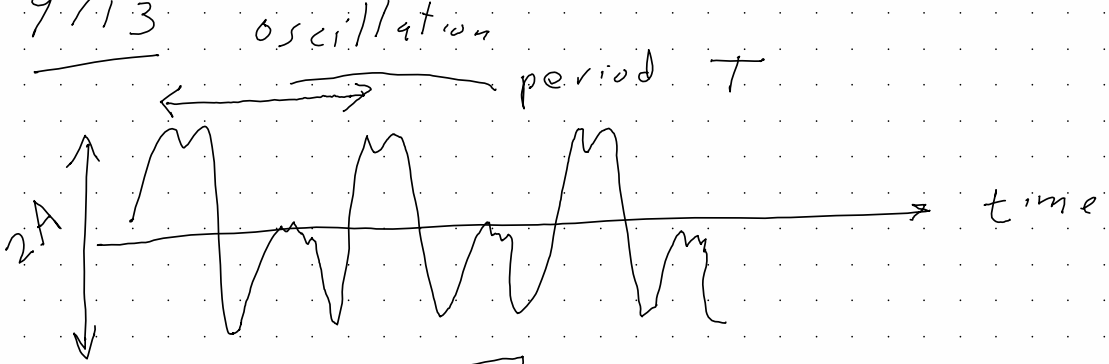
$72 - 66$

$\frac{72\ in}{66\ in} = 1.09$

$12\ in = 1\ ft$

$\frac{12\ in}{1\ ft} = 1 = \frac{1\ ft}{12\ in}$

9/13



frequency: $f = \frac{\#\ \text{cycles}}{\text{time interval}} = \frac{1}{T}$

Amplitude: A

Wave shape / waveform

Frequency (period) — Pitch

Amplitude — volume or loudness

Waveshape — timbre