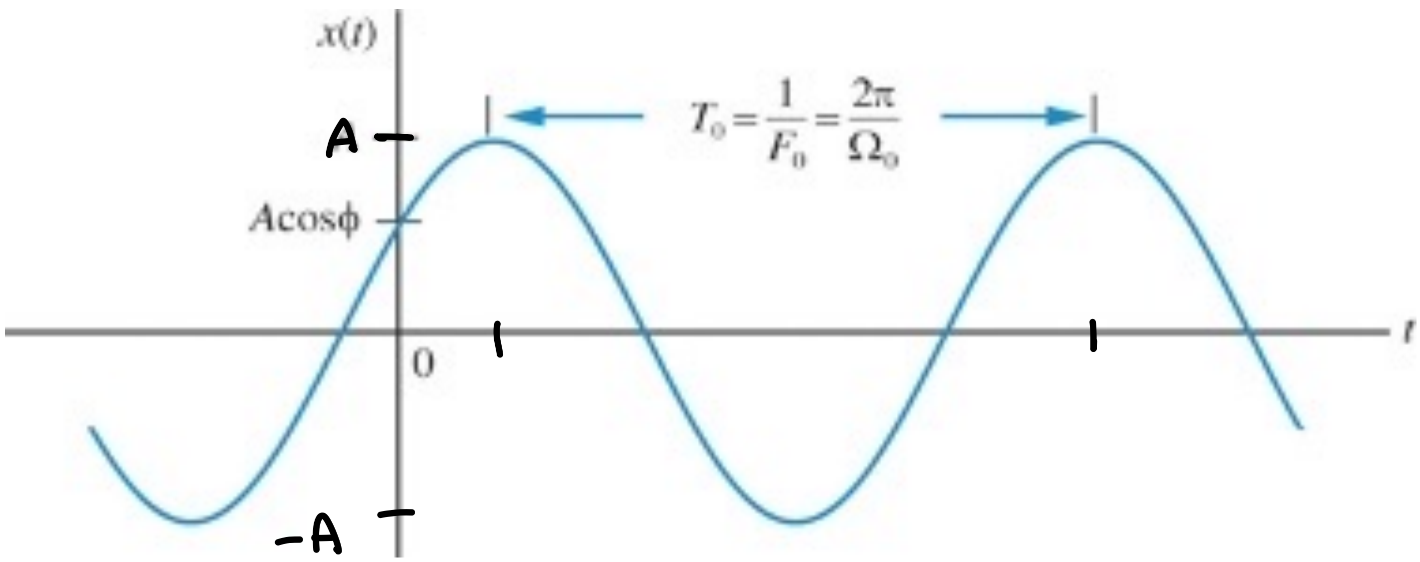
Fundamental period of $x(t)$ is T_0

$T_0 = \frac{1}{F_0}$, where F_0 is the fundamental frequency

$\Omega_0 = 2\pi F_0$ is the fundamental angular frequency

$x(t) = x(t+T_0) = x(t+2T_0) = x(t+3T_0) \ldots$



Fundamental period of $x[n]$ is N_0

$$x[n] = x[n+N_0] = x[n+2N_0] = x[n+3N_0] \ldots$$

We can also use "$N_0 = \frac{1}{f_0}$" in discrete-time but with some care

f_0 is the normalized frequency $= \dfrac{F_0}{F_s}$

$\uparrow$ sampling frequency

So its possible for $f_0 = \frac{4}{5}$, then

$$\frac{1}{f_0} = \frac{5}{4}$$

But N_0 can not be $\frac{5}{4}$ since it has to be an integer value. $x[n+\frac{5}{4}]$ doesn't make sense

$N_0 = \frac{k}{f_0}$ where k is what ever value

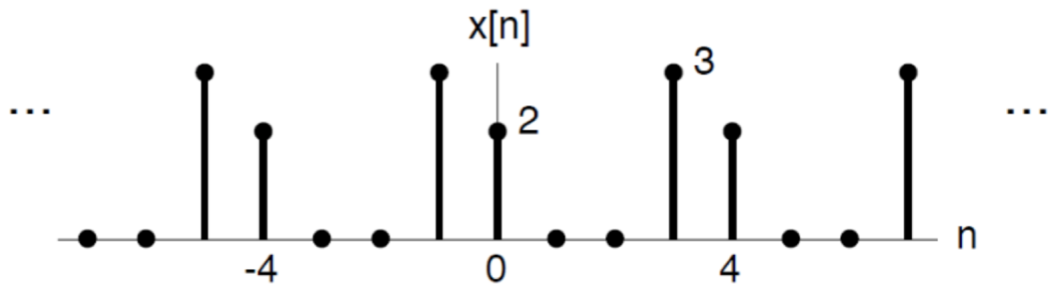
makes N_0 can integer

$k=1$, $\frac{1}{f_0} = \frac{5}{4}$

$k=2$, $\frac{2}{f_0} = (2)\left(\frac{5}{4}\right) = \frac{5}{2}$

$k = 4$, $\frac{4}{f_0} = (4)\left(\frac{5}{4}\right) = 5 = N_0$

If $f_0 = \frac{1}{20}$, then $N_0 = 20$



x[n]
3
2
...
...
n
-4
0
4