?If

If[condition, t, f] gives t if condition evaluates to True, and f if it evaluates to False. If[condition, t, f, u] gives u if condition evaluates to neither True nor False. More...

f[t_] = If[t < T/2, h, 0];

These are rules for assigning numerical values to h and T.

r = {h -> 3, T -> 1};
rh = {h -> 3};
rt = {T -> 1};

?RGBColor

RGBColor[red, green, blue] is a graphics directive which specifies that objects which follow are to be displayed, if possible, in the color given. More...

pl = Plot[f[t] /. r, {t, 0, T /. r}, PlotStyle -> RGBColor[1, 0, 0]]

w = 2 π / T /. r

2 π

a[p_] = 2 / T Integrate[Cos[p w t] f[t], {t, 0, T}] /. rt

\[ \frac{h \sin[p \pi]}{p \pi} \]

a[1]

0

a[2]

0
\textbf{a[0]}

Power::infy : Infinite expression \( \frac{1}{0} \) encountered. \texttt{More...}

\texttt{:indet : Indeterminate expression \( \frac{0 \cdot \text{ComplexInfinity}}{\pi} \) encountered. More...}

Indeterminate

\textbf{?Limit}

Limit[expr, x\to x0] finds the limiting value of expr when x approaches x0. \texttt{More...}

\texttt{a0 = Limit[a[p], p \to 0]}

\texttt{h}

\texttt{b[p_] = 2/T Integrate[Sin[p w t] f[t], \{t, 0, T\}] / . rt}

\[ \frac{2 h \sin \left(\frac{p \pi}{t}\right)^2}{p \pi} \]

\texttt{b[1]}

\[ \frac{2 h}{\pi} \]

\texttt{b[2]}

\texttt{0}

\texttt{b[3]}

\[ \frac{2 h}{3 \pi} \]

\texttt{b[4]}

\texttt{0}

\texttt{g[t_, n_] = a0/2 + Sum[b[p] Sin[p w t], \{p, 1, n\}];}

\texttt{p2 = Plot[g[t, 1] / . r, \{t, 0, T / . r\}, PlotStyle \to \text{RGBColor}[0, 1, 0]];}

\text{Graph showing a periodic function plotted from t = 0 to t = 1.}
Show[p1, p2];

p2 = Plot[g[t] /. r, {t, 0, T /. r}, PlotStyle -> RGBColor[0, 1, 0]];
```
p2 = Plot[g[t, 200] /. r, {t, 0, T /. r}, PlotStyle → RGBColor[0, 1, 0]];  
```

```
Show[p1, p2];  
```

```
p2 = Plot[g[t, 200] /. r, {t, 0, T /. r}, PlotStyle → RGBColor[0, 1, 0]];  
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Show[p1, p2];