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# f(x)=1 on x<L/6, f(x)=3 on L/6<x<L/2, f(x)=0 elsewhere
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> L:=1;
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$$L := 1 \quad (1)$$

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> f:=x->piecewise(x<0,0, x<L/6,1,x<L/2, 3, 0);
```

$$f := x \rightarrow \text{piecewise}\left(x < 0, 0, x < \frac{1}{6}L, 1, x < \frac{1}{2}L, 3, 0\right) \quad (2)$$

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> convert(f(x),piecewise,x);
```

$$\begin{cases} 0 & x < 0 \\ 1 & x < \frac{1}{6} \\ 3 & x < \frac{1}{2} \\ 0 & \frac{1}{2} \leq x \end{cases} \quad (3)$$

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> # Truncated sine series S(x,n)
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```
> B:=n->eval((2/L)*int(f(x)*sin(n*Pi*x/L),x=0..L));
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$$2 \left( \int_0^L f(x) \sin\left(\frac{n\pi x}{L}\right) dx \right)$$