```
> # Find Fourier sin coefficients for
  # f(x)=1 on x<L/6, f(x)=3 on L/6<x<L/2, f(x)=0 elsewhere
> L:=1;
```

$$L := 1 \tag{1}$$

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

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

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

$$\begin{cases} 0 & x < 0 \\ 1 & x < \frac{1}{6} \\ 3 & x < \frac{1}{2} \\ 0 & \frac{1}{2} \le x \end{cases} \tag{3}$$

```
> # Truncated sine series S(x,n)
> B:=n->eval((2/L)*int(f(x)*sin(n*Pi*x/L),x=0..L));
```

$$B := n \to eval\left(\frac{2\left(\int_0^L f(x)\,\sin\left(\frac{n\pi x}{L}\right)\,dx\right)}{L}\right) \tag{4}$$

```
> B(1);
```

$$-\frac{-2+\sqrt{3}}{\pi} + \frac{3\sqrt{3}}{\pi} \tag{5}$$

```
> B(n) assuming n >0;
```

$$-\frac{2\left(-1+\cos\left(\frac{1}{6}\,n\pi\right)\right)}{n\pi} + \frac{6\left(\cos\left(\frac{1}{6}\,n\pi\right)-\cos\left(\frac{1}{2}\,n\pi\right)\right)}{n\pi} \tag{6}$$