\[ f_1 := x \cdot \text{Heaviside}(x); f_2 := x^2 \cdot \text{Heaviside}(x) \]
\[ f_1 := x \text{ Heaviside}(x) \]
\[ f_2 := x^2 \text{ Heaviside}(x) \] (1)

\[ \text{plot}([f_1, f_2], x=-2..2, \text{color} = ['\text{red}', '\text{blue}']) \]

\[ f_3 := \text{Heaviside}(x + 1) - \text{Heaviside}(x - 1); f_4 := (\text{Heaviside}(x + 1) - \text{Heaviside}(x - 1)) \cdot x^2 \]
\[ f_3 := \text{Heaviside}(x + 1) - \text{Heaviside}(x - 1) \]
\[ f_4 := (\text{Heaviside}(x + 1) - \text{Heaviside}(x - 1)) \cdot x^2 \] (2)

\[ \text{plot}([f_3, f_4], x=-2..2, \text{color} = ['\text{red}', '\text{blue}']) \]
\begin{align*}
  f_5 &:= \sin(\text{Heaviside}(x)) ; \\
  f_6 &:= \text{Heaviside}(\sin(x)) ; \\
  f_7 &:= f_6 \cdot \sin(x) ; \\
  f_5 &:= \sin(\text{Heaviside}(x)) \\
  f_6 &:= \text{Heaviside}(\sin(x)) \\
  f_7 &:= \text{Heaviside}(\sin(x)) \cdot \sin(x)
\end{align*}

\texttt{plot([f5,f6,f7], x=-4*Pi..4*Pi, color = ['red','blue','green'])}
For Q2 I build the function out of what I know from Q1.

\[ f_{pc1} := (x + 1) \cdot \text{Heaviside}(x + 1); \text{plot}(f_{pc1}, x = -3 .. 3) \]

\[ f_{pc1} := (x + 1) \text{Heaviside}(x + 1) \]
\texttt{fpc1b := (x + 1) \cdot (\text{Heaviside}(x + 1) - \text{Heaviside}(x))}; \texttt{plot(fpc1b, x = -3..3)}

\texttt{fpc1b := (x + 1) \cdot (\text{Heaviside}(x + 1) - \text{Heaviside}(x))}
\[ fpc2 := (1 - x) \cdot (\text{Heaviside}(x) - \text{Heaviside}(x - 1)) \]

\[ \text{plot}(fpc2, x = -3..3) \]


```
> ftry1 := fpc1b + fpc2; plot(ftry1, x = -3 .. 3)

ftry1 := (x + 1) (Heaviside(x + 1) - Heaviside(x)) + (1 - x) (Heaviside(x) - Heaviside(x - 1))
```
\texttt{> f1final := 5 \cdot ( fpc1b + fpc2); plot(f1final, x = -3..3)}

\texttt{f1final := 5 \cdot (x + 1) \cdot (\text{Heaviside}(x + 1) - \text{Heaviside}(x)) + 5 \cdot (1 - x) \cdot (\text{Heaviside}(x) - \text{Heaviside}(x - 1))}
\[ f_{\text{final}} := \sum_{n=0}^{10} \text{Heaviside}(x - n) \]

\[ f_{\text{final}} := \text{Heaviside}(x) + \text{Heaviside}(x - 1) + \text{Heaviside}(x - 2) + \text{Heaviside}(x - 3) \]
\[ + \text{Heaviside}(x - 4) + \text{Heaviside}(x - 5) + \text{Heaviside}(x - 6) + \text{Heaviside}(x - 7) \]
\[ + \text{Heaviside}(x - 8) + \text{Heaviside}(x - 9) + \text{Heaviside}(x - 10) \]

\[ \text{plot}(f_{\text{final}}, x = 0 .. 10) \]