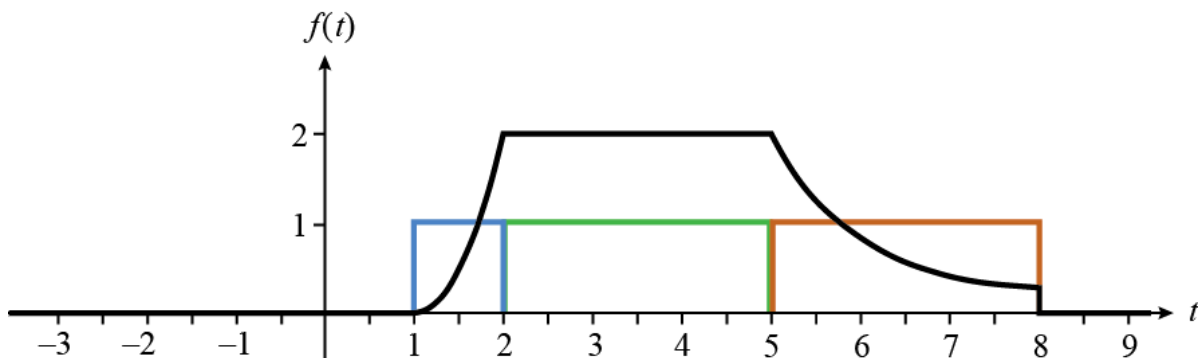


Ex: Sketch each of the following functions and then express each of them as a summation of products of common functions and step functions.

$$\text{a) } f(t) = \begin{cases} 0 & t \leq 1 \\ 2(t-1)^2 & 1 \leq t \leq 2 \\ 2 & 2 \leq t \leq 5 \\ 2e^{5-t} & 5 \leq t \leq 8 \\ 0 & 8 < t \end{cases}$$

$$\text{b) } f(t) = \begin{cases} 0 & t < 1 \\ 4e^{-t/3} \cos(\pi t) & 1 \leq t \leq 4 \\ 0 & 4 < t \end{cases}$$

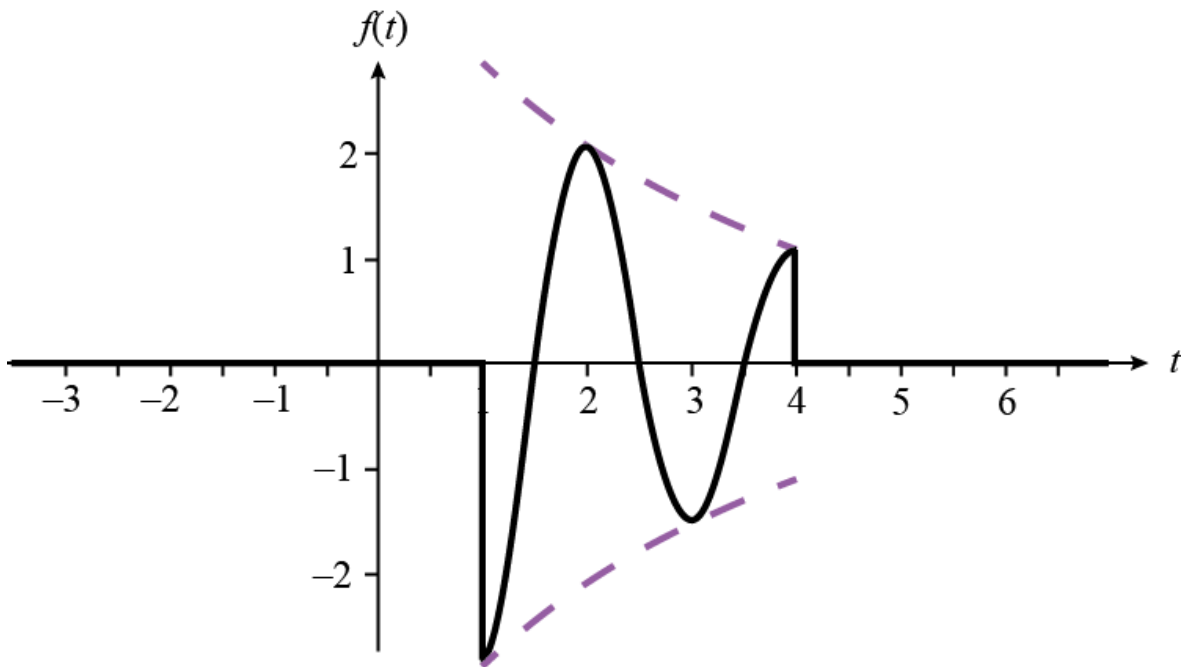
SOL'N: a)



We use the pulses, shown in color, to turn on the three nonzero segments of  $f(t)$ .

$$\begin{aligned} f(t) &= 2(t-1)^2 [u(t-1) - u(t-2)] \\ &\quad + 2[u(t-2) - u(t-5)] \\ &\quad + 2e^{5-t} [u(t-5) - u(t-8)] \end{aligned}$$

b)



We use a single pulse from 1 to 4.

$$f(t) = 4e^{-t/3} \cos(\pi t) [u(t-1) - u(t-4)]$$