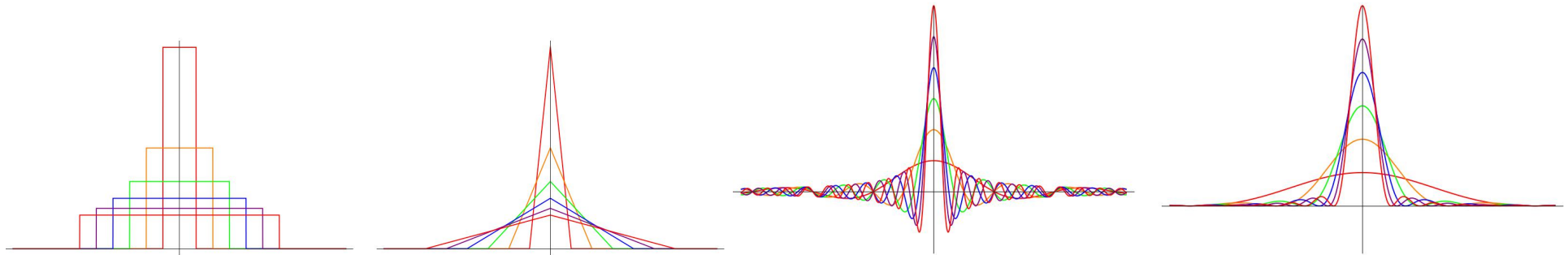
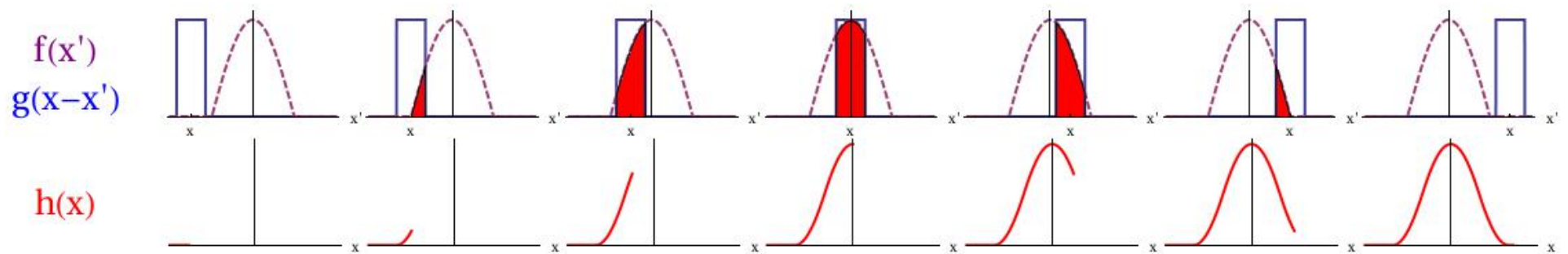


PHYS20672 Complex Variables and Integral Transforms:
Delta sequences and convolutions



The above shows four delta sequences, top-hats, triangles, $(\kappa/\pi)\text{sinc}(\kappa x)$ and $(\kappa/\pi)\text{sinc}^2(\kappa x)$.



This attempts to show a convolution by mapping out the value of $h(x) = \int f(x')g(x-x')dx'$ as a function of x . In the top line, the dashed (purple) function represents $f(x')$ and the solid (blue) one, $g(x-x')$; the horizontal axis is the x' axis and the blue function is centred at x , where x is different in each frame (it is zero in the 4th). The shaded (red) area is the integral of the product, which also gives the value of the endpoint of the (red) line in the frame below. Thus the (red) graphs in the lower line sketch out the convolution as a function of x . (The red and purple curves are not identical—if you look closely you will see the red curve has longer tails.)