Solution

a) Let f be the input image, g_1 the output after the first convolution, and g_2 the output after the second convolution. Then,

$$g_1(x,y) = f(x,y) * h_1(x,y)$$

$$g_2(x,y) = g_1(x,y) * h_2(x,y)$$

$$= \{f(x,y) * h_1(x,y)\} * h_2(x,y)$$

$$= f(x,y) * \{h_1(x,y) * h_2(x,y)\}$$

$$= f(x,y) * h_3(x,y)$$