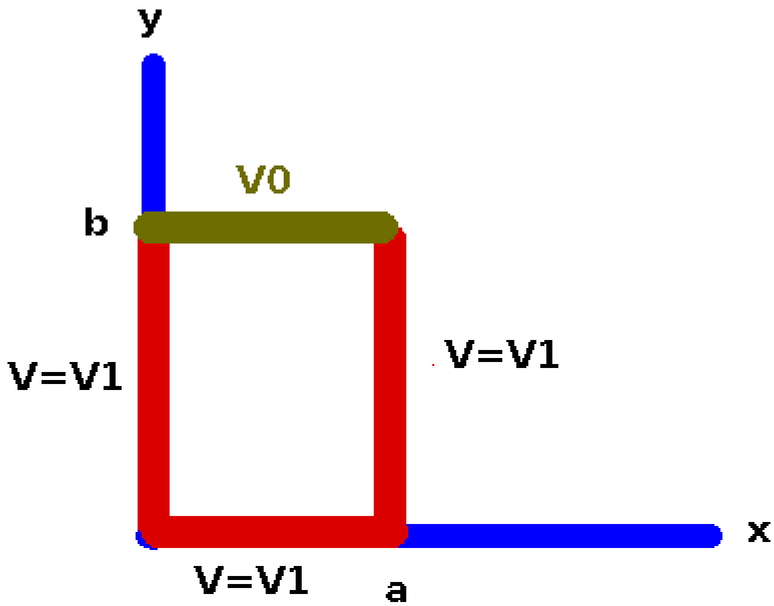

x=0, y=0, x=a V=0. y=b V=V_0

Solution:
Subtract the constant V1 from all potentials. then V0-V1 is the potential at b.
Rewrite as the usual solution, at then end, superimpose the potentials.

$$V(x,y)=(A\sin(kx)+B\cos(kx))(Ce^{ky}+De^{-ky})$$

$$@x=0, V=0 \Rightarrow B=0$$

$$@x=a, V=0 \Rightarrow ka=n\pi \Rightarrow k=\frac{n\pi}{a}$$

$$\text{at } y=0, V=0 \Rightarrow C=-D$$

$$V(x,y)=\sum_{n=0}^{\infty} A_n \sin\left(n\pi\frac{x}{a}\right)\sinh\left(n\pi\frac{y}{a}\right)$$

$$\int_{x=0}^{x=a} V(x,y)\sin\left(m\pi\frac{x}{a}\right)dx=\sum_{n=0}^{\infty} A_n \sinh\left(n\pi\frac{y}{a}\right)\int_{x=0}^{x=a}\sin\left(n\pi\frac{x}{a}\right)\sin\left(m\pi\frac{x}{a}\right)dx=A_m\sinh\left(m\pi\frac{y}{a}\right)\frac{a}{2}$$

$$@y=b;\ V=V_0$$

$$\int_{x=0}^{a}\sin\left(m\pi\frac{x}{a}\right)dx=-\left[\frac{a}{m\pi}\cos\left(m\pi\frac{x}{a}\right)\right]_0^a=\frac{-a}{m\pi}\left[(-1)^m-1\right]=\frac{2a}{m\pi}\begin{bmatrix}1;m\ \text{odd}\\0;m\ \text{even}\end{bmatrix}$$

$$\frac{V_0}{\sinh\left(m\pi\frac{b}{a}\right)}\frac{2a}{m\pi}=A_m(m\ \text{odd})$$

$$V(x,y)=\sum_{n=1,3,5,\ldots}^{\infty}\frac{2aV_0}{n\pi}\frac{\sinh\left(n\pi\frac{y}{a}\right)}{\sinh\left(n\pi\frac{b}{a}\right)}\sin\left(n\pi\frac{x}{a}\right)$$

Now superimpose the potentials

$$V(x,y)=V_1+\sum_{n=1,3,5,\ldots}^{\infty}\frac{2a(V_0-V_1)}{n\pi}\frac{\sinh\left(n\pi\frac{y}{a}\right)}{\sinh\left(n\pi\frac{b}{a}\right)}\sin\left(n\pi\frac{x}{a}\right)$$