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Consider the following wave equation:

**utt = c2 uxx,**  0<x<a, 0<y<b

Subject to the following boundary conditions:

u(0,y, t) = 0, u(a, y, t) = 0, 0<y<b, t>0

u(x,0, t) = 0, u(x, b, t) = 0, 0<x<a, t>0

Find an expression for the solution if the initial conditions are:

1. u(x, y, 0) = xy(a-x)(b-y), ut(x,y) = 0
2. u(x, y) = 0, ut(x,y) = sin(5πx/a) sin(7πy/b)
3. u(x, y, 0) = xy(a-x)(b-y), ut(x,y) = sin(5πx/a) sin(7πy/b)