NAME	FORMULA
d'Alembert's Formula	$u(x,t)=\frac{1}{2}\left[\varphi(x-ct)+\varphi(x+ct)\right]+\frac{1}{2c}\left[\int_{x-ct}^{x+ct}\psi(s)ds\right]$
Laplace Transform	$L\left[f(x)\right](w)=\int_0^\infty e^{-wx}f(x)dx$
Fourier Transform	$F\left[f(x)\right](w)=\int_{-\infty}^\infty e^{-iwx}f(x)dx$ $F\left[f^{(n)}\right](w)=(iw)^n\hat{f}(w)$
Inverse Fourier Transform	$F^{-1}\left[\hat{f}(w)\right](x)=\int_{-\infty}^\infty e^{iwx}\hat{f}(w)dw$
Separation of Variables or Fourier method for Solving Wave Equation	$u_n(x,t)=\sum_{n=1}^{\infty}[a_n\cos(\frac{n\pi ct}{L})+b_n\sin(\frac{n\pi ct}{L})]\sin(\frac{n\pi x}{L})$ $a_n=\frac{2}{L}\int_0^L\varphi(\xi)\sin(\frac{n\pi\xi}{L})d\xi$ $b_n=\frac{2}{n\pi c}\int_0^L\psi(\xi)\sin(\frac{n\pi\xi}{L})d\xi$
Finite Difference Method for Poisson Equation	$u_{xx}(x,y)\approx\frac{u(x+h,y)-2u(x,y)+u(x-h,y)}{h^2}$ $u_{yy}(x,y)\approx\frac{u(x,y+h)-2u(x,y)+u(x,y-h)}{h^2}$ $\Delta\, U=\frac{U_{i+1,j}+U_{i-1,j}-4U_{i,j}+U_{i,j+1}+U_{i,j-1}}{h^2}=0$
Fourier Transform(Dirichlet Problem) for the Upper Half-Plane	$u(x,y)=\frac{y}{\pi}\int_{-\infty}^{\infty}\frac{f(\xi)}{y^2+(\xi-x)^2}d\xi$
Green's First Identity in R^2	$\oint_{\partial\Omega}g\frac{\partial h}{\partial n}ds=\iint_{\Omega}(g\nabla^2h+\nabla g\cdot\nabla h)dA$