$$\int x^2 \sin x \, dx$$

S(x^2sinx)dx=-x^2cosx-S(-cosx2xdx)=
=-x^2cosx+2S(x cosx dx)=
=-x^2cosx+2(xsinx+cosx)+C

u=x^2
dv=sinxdx
v=-cosx
du=2xdx

S(x cosx dx)=xsinx-S(sinxdx)=
=xsinx+cosx+C
u=x
dv=cosxdx
v=sinx
du=dx

S(x^2sinx)dx=1/3S sinx*dx^3=
=x^3sinx-1/3S(x^3cosxdx)=
=x^3sinx-1/3S(x^3cosxdx)
u=sinx
dv=dx^3
v=x^3
du=cosxdx

S(x^2sinx)dx=x^3cosx-
-2Sx(2xsinx+x^2cosx)dx
u=x^2sinx
dv=dx
v=x
du=(2xsinx+x^2cosx)dx