6

$= -(u^2+8u)\cos u + (2u+8)\sin u + C = -((x-1)^2+8(x-1))\cos(x-1) + (2(x-1)+8)\sin(x-1)$

$\int (x^2+2x)\sqrt{x^2+2x}\,dx = \int [(x+1)^2-1]\sqrt{(x+1)^2-1}\,dx \overset{u=x+1}{=} \int (u^2-1)\sqrt{u^2-1}\,du =$

$= \int u^2\sqrt{u^2-1} - \int \sqrt{u^2-1}\,du \overset{\text{by 39 and 40 in the back of the book}}{=} \frac{u}{8}(2u^2-1)\sqrt{u^2-1} - \frac{1}{8}\ln(u+\sqrt{u^2-1}) -$

$- \frac{u}{2}\sqrt{u^2-1} - \frac{4}{2}\ln(u+\sqrt{u^2-1}) + C = \left(\frac{u^3}{4} - \frac{5u}{8}\right)\sqrt{u^2-1} - \frac{5}{8}\ln(u+\sqrt{u^2-1}) + C$

$= \left[\frac{(x+1)^3}{4} - \frac{5(x+1)}{8}\right]\sqrt{x^2+2x} - \frac{5}{8}\ln(x+1+\sqrt{x^2+2x}) + C$