Solve $y'' + 4y = \frac{3}{\sin x}$.

Use $y_p = -y_1 \int \frac{y_2 g}{W} dx + y_2 \int \frac{y_1 g}{W} dx$. (as "shown").

Note $y_1 = \cos 2x$ $\Rightarrow$ $W = \begin{vmatrix} \sin 2x & \cos 2x \\ 2\cos 2x & -2\sin 2x \end{vmatrix} = -2$.
$y_2 = \sin 2x$.

Thus $y_p = -\cos 2x \int \frac{3 \sin 2x}{\sin x}\left(-\frac{1}{2}\right) dx + \sin 2x \int \frac{3\cos 2x}{\sin x}\left(-\frac{1}{2}\right) dx$

$= \frac{3}{2} \cos 2x \int dx \cos x - \frac{3}{2} \sin 2x \int \frac{1 - 2\sin^2 x}{\sin x} dx$.

$= \frac{3}{2} \cos 2x \sin x - \frac{3}{2} \sin 2x \left[\int \csc x \, dx - 2\int \sin x \, dx\right]$.

$= \frac{3}{2} \cos 2x \sin x - \frac{3}{2} \sin 2x \left[\ln(\csc x + \cot x) + 2\cos x\right]$.

Not sure if this is correct but you get the idea.