12) $\int \frac{x^2}{\sqrt{x+1}}\,dx$

13) $\int \cos 4x\,dx$

$u = 4x$

$du = 4\,dx$

$\frac{1}{4}\int 4\cos 4x\,dx$

$= \frac{1}{4}\int \cos u\,du$

$= \frac{1}{4}\sin u + C$

$= \frac{1}{4}\sin 4x + C$

14) $\int 3\sin(1-3x)\,dx$

$u = 1-3x$

$du = -3\,dx$

$= -\int \sin u\,du$

$= -(-\cos u) + C$

$= \cos(1-3x) + C$

15) $\int \sin^3 x \cos x\,dx$

$u = \sin x$

$du = \cos x\,dx$

$= \int u^3\,du$

$= \frac{u^4}{4} + C = \frac{\sin^4 x}{4} + C$

$\int \sin^3 x \cos x\,dx$

$u = \cos x$

$du = -\sin x\,dx$

16) $\int \tan 10x \sec 10x \, dx$

$u = 10x$

$du = 10\,dx$

$= \frac{1}{10} \int \tan u \sec u \, du$

$= \frac{1}{10} \sec u + C$

$= \frac{1}{10} \sec 10x + C$

17) $\int \tan^2 x \sec^2 x \, dx$

$u =$

$\int (\tan x \sec x)^2 \, dx$

$u = \sec x \tan x \, dx$

$du = \sec$

$u = \tan x$

$du = \sec^2 x \, dx$

$= \int u^2 \, du$

$= \frac{u^3}{3} + C$

$= \frac{\tan^3 x}{3} + C$

18) $-\int \sin x\sqrt{\cos x}\,dx$

$u = \cos x$

$du = -\sin x\,dx$

$= -\int u^{1/2}\,du$

$= -\frac{2}{3}u^{3/2} + C$

$= -\frac{2}{3}(\cos x)^{3/2} + C$

19) $-\int \frac{-\cos x}{\sqrt{1-\sin x}}\,dx$

$u = 1 - \sin x$

$du = -\cos x\,dx$

$= -\int u^{-1/2}\,du$

$= -2u^{1/2} + C$

$= -2(1-\sin x)^{1/2} + C$