2) $u = x^2 + 4$
$du = 2x\,dx$
$\frac{1}{2}du = x\,dx$
$\frac{1}{2}\cdot\int \frac{1}{u}\,du$

$\int \frac{x^2}{\sqrt{2x^3+5}}\,dx$

3) $u = 2x^3 + 5$
$du = 6x^2\,dx$
$\frac{1}{6}du = x^2\,dx$

$\frac{1}{6}\int u^{-1/2}\,du$

$2\cdot\frac{1}{6}u^{1/2}$

$\frac{1}{3}u^{1/2}$

4) $u = \cos^3 x$
$du = -3\sin x\,dx$

$-2\int u^2\,du$

5) $u = e^x$
$du = e^x dx$

$\int \cos u\,du$

$=$

6) $u = \sin x$
$du = \cos x\,dx$

$\int e^u\,du$

e^u

7) $u = x + \cos x$
$du = (1 - \sin x)\,dx$

$\int \frac{1}{u}\,du$

8) $u = 4 - 3x$
$du = -3\,dx$
$-\frac{1}{3}du = dx$

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

$-\frac{1}{3}\int \frac{1}{u}\,du$

9) $u = 1 + 4e^x$
$du = 4e^x dx$
$\frac{1}{4}du = e^x dx$

$\frac{1}{4}\int u^{1/2}\,du$

$= \frac{2}{3}\cdot\frac{1}{4}u^{3/2}$

10) $\int x^2\sqrt{1+x}\,dx$
$u = 1 + x$ $\quad x = u - 1$
$du = dx$ $\quad x = u - 1$

$\int (u-1)^2 \cdot u^{1/2}\,du$

$= (u^2 - 2u + 1)\cdot u^{1/2}$

$u^{5/2} - 2u^{3/2} + u^{1/2}$

$\frac{2}{7}u^{7/2} - \frac{2\cdot 2}{5}u^{5/2} + \frac{2}{3}u^{3/2}$

11) $u = \pi x$
$du = \pi\,dx$
$\frac{1}{\pi}du = dx$

$\frac{1}{\pi}\int \sin u\,du$

12) $u = \sec x$
$du = \sec x \tan x\,dx$

$\int u^2\,du$

13) $u = 1 + x^{3/2}$
$du = \frac{3}{2}x^{1/2}\,dx$
$du = \frac{3}{2}\sqrt{x}\,dx$
$\frac{2}{3}du = \sqrt{x}\,dx$

$\frac{2}{3}\int \sin u\,du$