1) $\int e^{ax}\,dx = \frac{e^{ax}}{a} + c$

3) $\int \frac{1}{\sqrt{a^2 - x^2}}\,dx \quad , a > 0$

$= \int \frac{1}{\sqrt{a^2\left(1 - \frac{x^2}{a^2}\right)}}\,dx$

$= \int \frac{1}{a\sqrt{1 - \left(\frac{x}{a}\right)^2}}\,dx$

$= \int \frac{1}{a\sqrt{1-u^2}} \cdot a\,du$

$u = \frac{x}{a}$

$du = \frac{1}{a}\,dx$

$dx = a\,du$

$= \sin^{-1}(u) + c$

$= \sin^{-1}\left(\frac{x}{a}\right) + c$

14) $\int \frac{4x+4}{5+2x+x^2}\,dx$

$= \int \frac{2(2x+2)}{5+2x+x^2}\,dx$

$= 2\ln|5+2x+x^2| + C$

15) $\int \frac{4t}{5+2t+t^2}\,dt$

$\int \frac{4t+4-4}{5+2t+t^2}\,dt$

$\int \frac{4t+4}{5+2t+t^2} - \int \frac{4}{5+2t+t^2}\,dt$

$= \int \frac{2(2t+2)}{5+2t+t^2} - \int \frac{4}{t^2+2t+1+4}\,dt$

$= 2\ln|5+2t+t^2| - 2\tan^{-1}\left(\frac{t+1}{2}\right) + C$

6) $\int \sec 2t \tan 2t \, dt$

$u = 2t$

$\int \sec u \tan u \cdot \frac{du}{2}$ $\quad du = 2dt$

$dt = \frac{du}{2}$

$= \frac{1}{2} \sec 2t + c$

7) $\int (x^2+4)^2 \, dx$

$= \int (x^4 + 8x^2 + 16) \, dx$

$= \frac{x^5}{5} + \frac{8}{3}x^3 + 16x + c$

9) $\int \frac{3}{16+x^2} dx = \int \frac{3}{16\left(1+\left(\frac{x}{4}\right)^2\right)} dx$

$= \frac{3}{16} \int \frac{dx}{1+\left(\frac{x}{4}\right)^2}$ $\quad u = \frac{x}{4}$

$du = \frac{1}{4} dx$

$dx = 4\,du$

$= \frac{3}{16} \int \frac{4\,du}{1+u^2}$

$= \frac{3}{4} \tan^{-1}\left(\frac{x}{4}\right) + c$

17) $\int e^{3-2x}\,dx = -\frac{1}{2}e^{3-2x} + c$

19) $u = 1 + x^{2/3}$

$du = \frac{2}{3}x^{-1/3}\,dx$

$\frac{3}{2}\int \frac{4}{x^{1/3}\cdot u}\cdot\frac{du}{x^{-1/3}}$

$= 6\int \frac{1}{u}\,du = 6\ln|1+x^{2/3}| + c$

21) $\int \frac{\sin\sqrt{x}}{\sqrt{x}}\,dx$

$u = \sqrt{x}$

$du = \frac{1}{2\sqrt{x}}\,dx$

$dx = 2\sqrt{x}\,du$

$\int \frac{\sin u}{\sqrt{x}}\cdot 2\sqrt{x}\,du$

$-2\cos u + c = -2\cos\sqrt{x} + c$

11) $$\int \frac{1}{\sqrt{3-2x-x^2}}\,dx$$

$$= \int \frac{1}{\sqrt{3-(x^2+2x+1)+1}}\,dx$$

$$= \int \frac{dx}{\sqrt{4-(x+1)^2}}$$

$$= \int \frac{dx}{2\sqrt{1-\left(\frac{x+1}{2}\right)^2}}$$

$$u = \frac{x+1}{2}$$

$$du = \frac{1}{2}dx$$

$$dx = 2\,du$$

$$= \int \frac{2\,du}{2\sqrt{1-u^2}} = \sin^{-1}u + c$$

$$= \sin^{-1}\left(\frac{x+1}{2}\right) + c$$