$50x(5x^2+3)^4\,dx$

2) $\int (6x^2+3)\cos(6x^3+9x)dx$

$\frac{5}{3}(4x^2+2x+1)^{-1/6}(4x+1)dx$

4) $\int 8\sin(\sin(5x))\cos(5x)dx$

$\sec^2(3x+2)dx$

6) $\int x^{1/2}\sin\left(x^{3/2}+1\right)dx$

1) $\int 50x(5x^2+3)^4\,dx$

$5x^2+3=u$

$10x\,dx=du$

$dx=du/10x$

$\int 50\cancel{x}(u)^4\,\frac{du}{10\cancel{x}}$

$\int 5u^4\,du$

$y=u^5+c$

$y=(5x^2+3)^5+c$

2) $\int (6x^2+3)\cos(6x^3+9x)\,dx$

$6x^3+9x=u$

$18x^2+9\,dx=du$

$dx=du/18x^2+9$

$\int \cancel{(6x^2+3)}\cos(u)\,\frac{du}{3\cancel{(6x^2+3)}}$

$\int \frac{1}{3}\cos(u)\,du$

$y=\frac{1}{3}\sin(6x^3+9x)+c$

3) $\int \frac{5}{3}(4x^2+2x+1)^{-1/6}(4x+1)\,dx$

$4x^2+2x+1=u$

$8x+2\,dx=du$

$dx=du/8x+2$

$\int \frac{5}{3}(u)^{-1/6}(4\cancel{x+1})\frac{du}{2(4\cancel{x+1})}$

$\int \frac{5}{6}(u)^{-1/6}\,du$

$u^{5/6}+C$

$(4x^2+2x+1)^{5/6}+C$

4) $\int 8\sin(\sin(5x))\cos(5x)\,dx$

$u=\sin(5x)$

$du=5\cos(5x)\,dx$

$\frac{du}{5\cos(5x)}=dx$

$\int 8\sin(u)\cdot\cancel{\cos(5x)}\cdot\frac{du}{5\cancel{\cos(5x)}}$

$\int \frac{8}{5}\sin(u)\,du$

$y=-\frac{8}{5}\cos(\sin(5x))+C$

5) $\int 5\sec^2(3x+2)\,dx$ $\quad U = 3x+2$

$$\int 5\sec^2(u)\,\frac{du}{3} \qquad du = 3\,dx$$

$$\frac{du}{3} = dx$$

$$\int \frac{5}{3}\sec^2(u)\,du$$

$$y = \frac{5}{3}\tan(u) + c$$

$$y = \frac{5}{3}\tan(3x+2) + C$$

6) $\int x^{1/2}\sin\left(x^{3/2}+1\right)\,dx$

$$U = x^{3/2} + 1$$

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

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

$$\int \cancel{x^{1/2}}\sin(u)\,\frac{du}{\tfrac{3}{2}\cancel{x^{1/2}}}$$

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

$$y = -\frac{2}{3}\cos\left(x^{3/2}+1\right) + C$$

$$\int \sin\theta = -\cos\theta$$

$$\int \cos\theta = \sin\theta$$

$$\int \sec^2\theta = \tan\theta$$

$$\int \csc^2\theta = -\cot\theta$$

$$\int \sec\theta\tan\theta = \sec\theta$$

$$\int \csc\theta\cot\theta = -\csc\theta$$