Integrate using U-Substitution

1. $\int x^2 \cos(x^3) dx$

2. $\int (3x+4)^3 dx$

3. $\int 3e^{3x} dx$

4. $\int 5(x+3)^4 \sqrt{(x+3)^5}\, dx$

5. $\int \frac{6x^3}{\sqrt[4]{1+x^4}} dx$

6. $\int (7x-x^5)^5 (7-5x^4) dx$

7. $\int \sqrt{\tan x}(\sec^2 x) dx$

8. $\int \frac{\cos x}{\sqrt{2+\sin x}} dx$

9. $\int \frac{dx}{(1-x)^2}$

10. $\int (1-\sin(2t)^{3/2} \cos(2t)) dt$

1. $\frac{1}{3}\sin(x^3) + c$

2. $\frac{(3x+4)^4}{12} + c$

3. $e^{3x} + c$

4. $\frac{2}{3}((x+3)^5)^{3/2} + c$

5. $2(1+x^4)^{3/4} + c$

6. $\frac{1}{6}(7x - x^5)^6 + c$

7. $\frac{2}{3}(\tan(x))^{3/2} + c$

8. $2(2 + \sin x)^{1/2} + c$

9. $\frac{1}{1-x} + c$

10. $-\frac{1}{5}(1 - \sin(2t))^{5/2} + c$

Integrate using Trig Substitution

1. $\int \frac{4}{\sqrt{4-x^2}}\,dx$

2. $\int \frac{9}{\sqrt{16+x^2}}\,dx$

3. $\int \sqrt{25-x^2}\,dx$

4. $\int \frac{x-2}{\sqrt{5+4x-x^2}}\,dx$

5. $\int \frac{6}{\sqrt{4-(x-1)^2}}\,dx$

6. $\int \frac{dy}{y^2-2y+5}$

7. $\int \frac{dx}{8+2x^2}$

8. $\int \frac{dx}{\sqrt{9-9x^2}}$

1. $4\arcsin\left(\frac{x}{2}\right)+c$

2. $9\ln\left|\sec\left(\arctan\left(\frac{x}{4}\right)\right)+\frac{x}{4}\right|+c$
$=9\ln\left|\frac{\sqrt{16+x^2}}{4}+\frac{x}{4}\right|+\mathrm{c}$

3. $\frac{5x\cos\left(\arcsin\left(\frac{x}{5}\right)\right)}{2}+\frac{25\arcsin\left(\frac{x}{5}\right)}{2}+c$
$=\frac{x\sqrt{25-x^2}}{2}+\frac{25\arcsin\left(\frac{x}{5}\right)}{2}+c$

4. $-3\cos\left(\arcsin\left(\frac{x-2}{3}\right)\right)+c$
$=-\sqrt{5+4x-x^2}+c$

5. $6\arcsin\left(\frac{x-1}{2}\right)+c$

6. $\frac{1}{2}\arctan\left(\frac{y-1}{2}\right)+c$

7. $\frac{1}{4}\arctan\left(\frac{x}{2}\right)+c$

8. $\frac{1}{3}\arcsin(x)+c$

1. $\int (\sin x)e^x dx$

2. $\int x\cos x dx$

3. $\int x^3 \ln x dx$

4. $\int 4x\sec^2(2x)dx$

5. $\int x^3 e^x dx$

6. $\int (x^2+x+1)e^x dx$

7. $\int x^4 e^{-x} dx$

8. $\int \arcsin x dx$

hint : deivative of arcsin x = $\frac{1}{\sqrt{1-x^2}}$

1. $\frac{\sin(x)e^x}{2} - \frac{e^x\cos(x)}{2} + c$

2. $x\sin(x) + \cos(x) + c$

3. $\frac{x^4 \ln x}{4} - \frac{x^4}{16} + c$

4. $2x\tan(2x) + \ln\left|\cos(2x)\right| + c$

5. $x^3e^x - 3x^2e^x + 6xe^x - 6e^x + c$

6. $(x^2 + x + 1)e^x - (2x+1)e^x + 2e^x + c$

7. $-x^4e^{-x} - 4x^3e^{-x} - 12x^2e^{-x} - 24xe^{-x} - 24e^{-x} + c$

8. $x\arcsin(x) + \sqrt{1-x^2} + c$

Integration using Partial Fraction

1. $\int \frac{5x-13}{(x-3)(x-2)}dx$

2. $\int \frac{x+1}{x^2(x-1)}dx$

3. $\int \frac{y}{y^2-2y-3}dy$

4. $\int \frac{x^4+2x}{x^2+1}dx$

5. $\int \frac{dx}{(x^2-1)^2}$

6. $\int \frac{x^2-4x+4}{x^3+1}dx$

1. $2\ln|x-3|+3\ln|x-2|+c$

2. $-2\ln|x|+\frac{1}{x}+2\ln|x-1|+c$

3. $\frac{3}{4}\ln|y-3|+\frac{1}{4}\ln|y+1|+c$

4. $\frac{1}{3}x^3 - x + \ln|x^2+1| + \arctan(x) + c$

5. $-\frac{1}{4}\ln\left|\frac{x-1}{x+1}\right| - \frac{x}{2(x^2-1)} + c$

6. $3\ln|x+1|-\ln|x^2-x+1|+c$