Calculus II: Practice with Integration

1. $\displaystyle\int \frac{e^x}{e^x+5}\,dx$
2. $\displaystyle\int \frac{x^2}{\sqrt{1-x^6}}\,dx$
3. $\displaystyle\int \frac{1}{x\sqrt{x^2-4}}\,dx$
4. $\displaystyle\int \frac{\sin(x)}{1+\cos^2(x)}\,dx$
5. $\displaystyle\int \frac{1}{\sqrt{-x^2-4x-1}}\,dx$
6. $\displaystyle\int \frac{5x^4-3x^3+17x^2-3x+5}{x^2+3}\,dx$
7. $\displaystyle\int \frac{2x^3-4x^2+4x+5}{x^2-2x+2}\,dx$
8. $\displaystyle\int e^x\tan(e^x)\,dx$
9. $\displaystyle\int \frac{1}{\sqrt{x}\sqrt{1-x}}\,dx$
10. $\displaystyle\int \frac{\csc(x)\cot(x)}{5-\csc(x)}\,dx$
11. $\displaystyle\int \frac{x^2+2x+10}{x^2+9}\,dx$
12. $\displaystyle\int \tanh(3x)e^{\ln(\cosh(3x))}\,dx$
13. $\displaystyle\int \frac{5}{4x^2+12x+15}\,dx$
14. $\displaystyle\int \frac{x^2(1+\sin(x^3))}{\cos(x^3)}\,dx$
15. $\displaystyle\int \frac{e^x}{\sqrt{6-e^{2x}}}\,dx$
16. $\displaystyle\int e^{\ln(\cosh(4x))}\,dx$
17. $\displaystyle\int \frac{9}{\sqrt{-x^2+6x-7}}\,dx$
18. $\displaystyle\int \frac{e^{4\tan^{-1}(3x)}}{1+9x^2}\,dx$
19. $\displaystyle\int \frac{\csc(\ln(x^5))+\cot(\ln(x^5))}{x}\,dx$
20. $\displaystyle\int \frac{9x^4-12x^3+15x^2-19x+2}{3x^2+5}\,dx$

Solutions:

1. $\ln(e^x + 5) + C$
2. $\frac{1}{3}\sin^{-1}(x^3) + C$
3. $\frac{1}{2}\sec^{-1}\left(\frac{x}{2}\right) + C$
4. $-\tan^{-1}(\cos(x)) + C$
5. $\sin^{-1}\left(\frac{x+2}{\sqrt{3}}\right) + C$
6. $\frac{5}{3}x^3 - \frac{3}{2}x^2 + 2x + 3\ln(x^2+3) - \frac{1}{\sqrt{3}}\tan^{-1}\left(\frac{x}{\sqrt{3}}\right) + C$
7. $x^2 + 5\tan^{-1}(x-1) + C$
8. $\ln|\sec(e^x)| + C$
9. $2\sin^{-1}(\sqrt{x}) + C$;
   another form: $\sin^{-1}(2x-1) + C$
10. $\ln|5 - \csc x| + C$
11. $x + \ln(x^2+9) + \frac{1}{3}\tan^{-1}\left(\frac{x}{3}\right) + C$
12. $\frac{1}{3}\cosh(3x) + C$
13. $\frac{5}{2\sqrt{6}}\tan^{-1}\left(\frac{2x+3}{\sqrt{6}}\right) + C$
14. $\frac{1}{3}\left[\ln\left|\sec(x^3) + \tan(x^3)\right| + \ln\left|\sec(x^3)\right|\right] + C = \frac{1}{3}\left[\ln\left|\sec^2(x^3) + \sec(x^3)\tan(x^3)\right|\right]$
15. $\sin^{-1}\left(\frac{e^x}{\sqrt{6}}\right) + C$
16. $\frac{1}{4}\sinh(4x) + C$
17. $9\sin^{-1}\left(\frac{x-3}{\sqrt{2}}\right) + C$
18. $\frac{1}{12}e^{4\tan^{-1}(3x)} + C$
19. $\frac{1}{5}\left[\ln\left|\csc(\ln(x^5)) - \cot(\ln x^5)\right| + \ln\left|\sin(\ln x^5)\right|\right] + C = \frac{1}{5}\ln\left(1 - \cos(\ln x^5)\right) + C$
20. $x^3 - 2x^2 + \frac{1}{6}\ln(3x^2+5) + \frac{2}{\sqrt{15}}\tan^{-1}\left(\frac{\sqrt{3}\,x}{\sqrt{5}}\right) + C$