# Sheet 3-Integration

# Fall 25/26

Evaluate the following integrals

① $\int \frac{x^2}{\cot x^3}\,dx$

② $\int \frac{3+e^{5\tan x}}{1-\sin^2 x}\,dx$

③ $\int \frac{x-e^{\sin^{-1}x}}{\sqrt{1-x^2}}\,dx$

④ $\int \sin^2 x \cos x\,dx$

⑤ $\int (\sqrt{x}+x^{-1}-5^{2x+3})\,dx$

⑥ $\int \frac{\log_2 x}{x\sqrt{(\ln x)^2+1}}\,dx$

⑦ $\int \frac{\sin 2x}{\sqrt{1+\cos 2x}}\,dx$

⑧ $\int \frac{x-2}{x^2-4x+4}\,dx$

⑨ $\int \frac{1}{x^2} e^{\frac{1}{x}} \sec(1+e^{\frac{1}{x}})\,dx$

⑩ $\int \frac{x}{(5-3x^2)^6}\,dx$

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

⑫ $\int (9x^2-6x+1)^5\,dx$

(13) $\int \frac{\sqrt{2+\tan x}}{1-\sin^2 x}\,dx$

(14) $\int \frac{e^{3x}+x^2}{e^{3x}+x^3}\,dx$

(15) $\int \frac{5-x^2+x^4}{x^4}\,dx$

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

(17) $\int t\sec^2(1-t^2)\,dt$

(18) $\int -5\cos \pi x\,dx$

(19) $\int \frac{\tan x}{\ln(\cos x)}\,dx$

(20) $\int \frac{\csc x \cot x}{1+\csc^2 x}\,dx$

(21) $\int \frac{1-\tan^2 x}{1+\tan^2 x}$

(22) $\int \frac{\sin 8x}{\sqrt{1-(\cos^2 4x)^2}}\,dx$

(23) $\int \frac{\pi\,dx}{\sqrt{\pi-x^2}}$

(24) $\int \frac{4dx}{2+3x^2}$

(25) $\int \cot^2 x\,dx$

(26) $\int e^x(1-e^x)(1+e^x)^{10}\,dx$

(27) $\int \frac{\sinh x}{1+\cosh x}\,dx$

(28) $\int \coth\frac{x}{3}\,dx$

(29) $\int \tanh 2x\,dx$

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

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

(32) $\int \sinh^3 x \cosh x\,dx$

(33) $\int \frac{e^x}{\sqrt{e^{2x}-1}}\,dx$

(34) $\int \frac{dx}{3-x^2}$

(35) $\int \frac{e^{-x}}{4-e^{-2x}}\,dx$

(36) $\int \frac{e^{\sqrt{x}}}{\sqrt{x}\,(1+e^{\sqrt{x}})}\,dx$

(37) $\int \frac{dx}{(x+\frac{1}{3})^2+\frac{2}{9}}$

(38) $\int \frac{\sec 3x}{\sin 3x+\cos 3x}\,dx$

(39) $\int \frac{\sin x}{\cos^2 x\sqrt{1+\sec x}}\,dx$

(40) $\int \frac{(1+\cot x)^3}{1-\cos^2 x}\,dx$

(41) $\int (x+1)^3(x-1)^3\,dx$

(42) $\int (x^2-\frac{1}{x})^6 x^8\,dx$

(43) $\int \frac{dx}{x+x\ln^2 x}$

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

(45) $\int \frac{\sin x(\cos x+1)}{\sqrt{2+\cos^2 x}}$

(46) $\int (e^{4x}+5^x)\,dx$

(47) $\int \frac{\sec^2 x\tan x\,dx}{4+\sec^2 x}$

48) $\int x\,(x^2-1)^3\,dx$

49) $\int e^{2x}(1-e^{2x})^3\,dx$

50) $\int \frac{\left(1+\sin^{-1}\sqrt{x}\right)^4}{\sqrt{x-x^2}}\,dx$

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

52) $\int \frac{dx}{2x\sqrt{\ln x}}$

53) $\int \frac{(e^{2x}+x)}{(e^{2x}+x^2)}\,dx$

54) $\int \frac{(x+3)}{x^2+6x+4}\,dx$

55) $\int \frac{e^{\frac{1}{x}}}{x^2}\,dx$

56) $\int (e^{3x+2}+5^{2x+3})\,dx$

57) $\int \frac{(5+4\cot^{-1}(3x))^5}{1+9x^2}\,dx$

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

59) $\int \frac{x}{\tan x^2}\,dx$

60) $\int \frac{1+\cos^2 x}{1-\sin^2 x}\,dx$

61) $\int \frac{\cos x}{\sqrt{4-\sin^2 x}}\,dx$

62) $\int \frac{\cos^2 x}{1+\sin x}\,dx$

63) $\int \frac{\cos x}{\sqrt{4-\sin^2 x}}\,dx$

64) $\int \frac{e^x+e^{2x}}{e^{2x}+3}\,dx$

65) $\int \frac{\operatorname{sech}^2 x}{1+\tanh x}\,dx$

66) $\int \sinh^2 x\,dx$

67) $\int \frac{e^x}{\sqrt{e^{2x}-16}}\,dx$

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