

Problem 1

Evaluate the following:

- (i) $\int \cos(2x - 5) dx$
- (ii) $\int e^{2x} \sin 2x dx$
- (iii) $\int \sin^3(2x) dx$
- (iv) $\int \frac{dx}{\sqrt{x^2 - 3^2}} dx$
- (v) $\int \frac{8x - 1}{x^2 + x - 6} dx$
- (vi) $\int \frac{2x^2 - 16}{x^3 + 6x^2 + 8x} dx$
- (vii) $\int \frac{13x - 24}{(x - 3)^2(x + 2)} dx$
- (viii) $\int \frac{4x^2 - 6x + 6}{x^3 - 3x^2 + 3x - 9} dx$
- (ix) $\int \frac{3x^3 + 4x^2 - 5x + 4}{x^2 + x - 2} dx$
- (x) $\int_1^3 \frac{dx}{x - 2}$
- (xi) $\int \frac{3}{2x - 5} dx$
- (xii) $\int x^2(2 + x^3)^2 dx$
- (xiii) $\int \frac{\ln x}{x^2} dx$
- (xiv) $\int \sin^3 x \cos^4 x dx$
- (xv) $\int \frac{x^5}{\sqrt{x^2 + 2}} dx$
- (xvi) $\int \frac{x + 1}{x^2 + x - 2} dx$
- (xvii) $\int \frac{5x - 8 - 3x^2}{x^3 - x^2 + x - 1} dx$
- (xviii) $\int_0^\infty e^{-x} dx$
- (xix) $\int \frac{x - 5}{x + 1} dx$
- (xx) $\int \sin^{-1} x dx$
- (xxi) $\int \sin^4 5x dx$
- (xxii) $\int \frac{dx}{x\sqrt{1 + 4x^2}} dx$
- (xxiii) $\int \frac{3x + 12}{x^2 + 2x} dx$
- (xxiv) $\int \frac{6x^2 + 8x - 2}{3x^3 + 3x^2 - 6x} dx$
- (xxv) $\int \frac{13x + 3 - x^2}{x^3 + 5x^2 + 4x + 20} dx$
- (xxvi) $\int \frac{x^5 + x^4 + 3x^3 + x^2}{x^3 - x^2 + 2x - 2} dx$
- (xxvii) $\int_0^\infty \frac{dx}{x^2 + 3}$
- (xxviii) $\int (2x - 1)^7 dx$
- (xxix) $\int (1 - 5x)^{3/2} dx$
- (xxx) $\int x \tan x \sec x dx$
- (xxxi) $\int \sec^4 x \tan^2 x dx$
- (xxxii) $\int \sec^3 x \tan^5 x dx$
- (xxxiii) $\int \frac{x}{\sqrt{3 - 2x - x^2}} dx$

$$\begin{array}{ll}
\text{(xxxiv)} \int \sqrt{5+4x-x^2} dx & \text{(liii)} \int \frac{12x+5-2x^2}{x^3-4x^2+5x-20} dx \\
\text{(xxxv)} \int \frac{x+4}{x^2-x-6} dx & \text{(liv)} \int \frac{x^4-x^3+3x^2-2x}{x^2+2} dx \\
\text{(xxxvi)} \int \frac{2x^2-12x-126}{(x+6)(x+5)(x-3)} dx & \text{(lv)} \int_{-\infty}^{\infty} \frac{dx}{e^x+e^{-x}} \\
\text{(xxxvii)} \int \frac{6x-x^2+6}{(x+5)(x-2)^2} dx & \text{(lvi)} \int \frac{e^{\sqrt{x}}}{\sqrt{2}} dx \\
\text{(xxxviii)} \int \frac{6x^2-x+18}{x^3-2x^2+4x-8} dx & \text{(lvii)} \int 3xe^{x^2+3} dx \\
\text{(xxxix)} \int \frac{dx}{x^{2016}-x} & \text{(lviii)} \int 3x^2 \ln(x^3+2) dx \\
\text{(xl)} \int_0^{\infty} xe^{-2x} dx & \text{(lix)} \int x^3 \cos x dx \\
\text{(xli)} \int \frac{x}{x+1} dx & \text{(lx)} \int x^3 \ln x dx \\
\text{(xlii)} \int \frac{x^2}{(x+1)^3} dx & \text{(lxi)} \int e^x \cos x dx \\
\text{(xliii)} \int \frac{x+3}{x-2} dx & \text{(lxii)} \int \tan^4 x dx \\
\text{(xliv)} \int \left(\frac{x-2}{2}\right)^3 \sin 2x dx & \text{(lxiii)} \int \frac{\tan^3 x}{\sqrt{\sec x}} dx \\
\text{(xlv)} \int \ln x dx & \text{(lxiv)} \int \frac{\sec x}{\tan^2 x} dx \\
\text{(xlvi)} \int \arctan 2x dx & \text{(lxv)} \int x^3 \sqrt{x^2+16} dx \\
\text{(xlvii)} \int \cos^2(5x) dx & \text{(lxvi)} \int \frac{\sqrt{1+x^2}}{x} dx \\
\text{(xlviii)} \int \frac{\sqrt{9-x^2}}{x^2} dx & \text{(lxvii)} \int \frac{\cos x}{\sqrt{4+\sin^2 x}} dx \\
\text{(xlix)} \int \frac{dx}{x^2 \sqrt{x^2+4}} dx & \text{(lxviii)} \int \frac{x+68}{x^2+x-20} dx \\
\text{(l)} \int \frac{29-x}{x^2+2x-35} dx & \text{(lxix)} \int \frac{5x^2+17x+30}{x^3+3x^2-10x} dx \\
\text{(li)} \int \frac{x^2+x-14}{(x+2)(x-1)(x-2)} dx & \text{(lxx)} \int \frac{4x^2+3x+2}{x^3+x^2} dx \\
\text{(lii)} \int \frac{4x+7}{(x+1)^2(x+2)} dx & \text{(lxxi)} \int \frac{2x^2+x+5}{x^3+3x^2+x+3} dx
\end{array}$$

(lxxii) $\int_1^{\infty} \frac{dx}{\sqrt[5]{x}}$	(xci) $\int \frac{2x}{e^x} dx$
(lxxiii) $\int_1^{\infty} \frac{dx}{x^3}$	(xcii) $\int \sec^3 x dx$
(lxxiv) $\int \sin(2/3x + 1) dx$	(xciii) $\int x^3 e^{x^2} dx$
(lxxv) $\int e^{3/2x+1} dx$	(xciv) $\int \sin^2 x \cos^3 x dx$
(lxxvi) $\int \frac{\pi}{7x-2} dx$	(xcv) $\int \frac{\cos^3 x}{\sqrt{\sin x}} dx$
(lxxvii) $\int e^{x/2} \cos 3x dx$	(xcvi) $\int \frac{\sqrt{x^2-5}}{x} dx$
(lxxviii) $\int x^3 \sqrt{4-x^2} dx$	(xcvii) $\int \frac{dx}{(x^2+1)^2}$
(lxxix) $\int x^2 \sqrt{x-1} dx$	(xcviii) $\int \frac{6x^2-x+3}{x^3+2x^2-3x} dx$
(lxxx) $\int \sec^2 x \tan x dx$	(xcix) $\int \frac{x^2+3x-2}{x^3+x^2+x+1} dx$
(lxxxii) $\int \frac{dx}{\sec x \tan x}$	(c) $\int \frac{x^2+7x+13}{x+2} dx$
(lxxxiii) $\int \tan x dx$	(ci) $\int_0^1 \frac{x}{\sqrt{1-x^2}} dx$
(lxxxiiii) $\int \frac{dx}{\sqrt{x^2+2x-3}}$	(cii) $\int_0^e \ln x dx$
(lxxxv) $\int \frac{dx}{\sqrt{x^2-4x+13}}$	(ciii) $\int \left(\frac{2x+3}{5}\right)^{5/2} dx$
(lxxxvi) $\int \frac{\sqrt{9-x^2}}{x^2} dx$	(civ) $\int \frac{4x}{\sqrt{3x^2+7}} dx$
(lxxxvii) $\int \frac{2x-3}{2x^2+6x} dx$	(cv) $\int \frac{\sin x}{2+\cos x} dx$
(lxxxviii) $\int \frac{5x^2+13x+4}{5x^3+15x^2+10x} dx$	(cvi) $\int (\ln x)^2 dx$
(lxxxix) $\int \frac{dx}{\sqrt{x}(1+\sqrt{x})^2}$	(cvii) $\int \frac{\ln x}{x} dx$
(xc) $\int \sin^2(3x) \cos(3x) dx$	(cviii) $\int \cos^5(3x) dx$
	(cix) $\int \sin^4 x \cos^4 x dx$

(cx)	$\int \cos^4 3x \, dx$	(cxix)	$\int x\sqrt{x+3} \, dx$
(cxi)	$\int \frac{x^3}{(4x^2+1)^{3/2}} \, dx$	(cxx)	$\int \frac{x}{\sqrt{3x+2}} \, dx$
(cxii)	$\int \frac{dx}{\sqrt{x^2+9}}$	(cxxi)	$\int \frac{x^3 e^{x^2}}{(x^2+1)^2} \, dx$
(cxiii)	$\int \frac{8x+5}{8x^2+40x} \, dx$	(cxxii)	$\int \frac{x e^{3x}}{(3x+1)^2} \, dx$
(cxiv)	$\int \frac{5x^2-23x+20}{(x+1)(x-3)^2} \, dx$	(cxxiii)	$\int \sin^2(2x) \, dx$
(cxv)	$\int \frac{2x^2+x-2}{x-1} \, dx$	(cxxiv)	$\int \frac{x}{\sqrt{2x-1}} \, dx$
(cxvi)	$\int_1^3 \frac{dx}{(x-2)^2}$	(cxxv)	$\int \sec x \, dx$
(cxvii)	$\int_0^3 \frac{dx}{(x-1)^{2/3}}$	(cxxvi)	$\int e^x \sqrt{4-e^{2x}} \, dx$
(cxviii)	$\int \frac{x^2}{(x-2)^2} \, dx$		