

1) Write an antiderivative for each of the followings functions, using method of inspection :

(i) $\cos 2x$

(ii) $3x^2 + 4x^3$

(iii) $\frac{1}{x}, x \neq 0$

2) Find the following integrals:

(i) $\int \frac{x^3-1}{x^2} dx$

(ii) $\int (x^{2/3} + 1) dx$

(iii) $\int (x^{3/2} + 2e^x - \frac{1}{x}) dx$

3) Find the anti derivative F of f defined by

$f(x) = 4x^3 - 6$, where $F(0) = 3$.

4) Find the following integrals:

(i) $\int \frac{dx}{x^2-16}$

(ii) $\int \frac{dx}{\sqrt{2x-x^2}}$.

5) Find: $\int \frac{1}{(x+1)(x+2)} dx$

6) Find: $\int \frac{x^2+1}{x^2-5x+6} dx$

7) Find: $\int \frac{x^2}{(x^2+1)(x^2+4)} dx$

8) Find: $\int \frac{(3 \sin \theta - 2) \cos \theta}{5 - \cos^2 \theta - 4 \sin \theta} d\theta$

9) Find: $\int \frac{x^2+x+1}{(x+2)(x^2+1)} dx$.

10) Find: $\int x \cos x dx$.

11) Find: $\int \log x dx$.

12) Find: $\int x e^x dx$.

13) Find: $\int \frac{x \sin^{-1} x}{\sqrt{1-x^2}} dx$.

14) Integrate: $\int e^x \sin x dx$.

15) Find: $\int \sqrt{x^2 + 2x + 5} dx$.

16) Find: $\int \sqrt{3 - 2x - x^2} dx$.

17) Find: $\int_0^2 e^x dx$ as the limit of a sum.

18) Evaluate $\int_0^1 \frac{\tan^{-1} x}{1+x^2} dx$.

19) Evaluate: $\int_{-1}^2 |x^3 - x| dx$.

20) Evaluate $\int_{-\pi/4}^{\pi/4} \sin^2 x dx$.

21) Evaluate: $\int_{-1}^1 \sin^5 x \cos^4 x dx$.

22) Evaluate: $\int_0^{\pi/2} \frac{\sin^4 x}{\sin^4 x + \cos^4 x} dx$.

23) Find: $\int_{\pi/6}^{\pi/3} \frac{dx}{1+\sqrt{\tan x}}$

24) Find: $\int \cos 6x \sqrt{1 + \sin 6x} dx$.

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25) Find $\int \frac{(x^4 - x)^{1/4}}{x^5} dx$.

26) Find: $\int \frac{x^4}{(x-1)(x^2+1)} dx$.

27) Find: $\int \frac{\sin 2x \cos 2x}{\sqrt{9 - \cos^4(2x)}} dx$.

28) Integrate the following functions w.r.t.x:

(i) $\sin mx$

(ii) $2x \sin(x^2 + 1)$

(iii) $\frac{\tan^4 \sqrt{x} \sec^2 \sqrt{x}}{\sqrt{x}}$

(iv) $\frac{\sin(\tan^{-1} x)}{1-x^2}$

29) Find

(i) $\int \cos^2 x \, dx$

(ii) $\int \sin^2 x \cos^3 x \, dx$

(iii) $\int \sin^3 x \, dx$

30) Find an anti derivative (or integral) of the following by the method of inspection: $\sin 2x$

31) Find an anti derivative (or integral) of the following by the method of inspection: $\cos 3x$

32) Find an anti derivative (or integral) of the following by the method of inspection e^{2x}

33) Find an anti derivative (or integral) of the following by the method of inspection $(ax + b)^3$

34) Find an anti derivative (or integral) of the following by the method of inspection $\sin 2x - 4e^{3x}$,

35) Find the integral $\int (4e^{3x} + 1) dx$

36) Find the integral $\int x^2 \left(1 - \frac{1}{x^2}\right) dx$.

37) Find the integral: $\int (ax^2 + bx + c) dx$

38) Find the integral: $\int (2x^2 + e^x) dx$

39) Find the integral: $\int \left(\sqrt{x} - \frac{1}{\sqrt{x}}\right)^2 dx$

40) Find the integral: $\int \frac{x^3 + 5x^2 - 4}{x^2} dx$

41) Find the integral: $\int \left(\frac{x^3 + 3x + 4}{x^2}\right) dx$

42) Find the integral: $\int \left(\frac{x^3 + x^2 + x - 1}{x - 1}\right) dx$

43) Find the integral: $\int (1 - x)\sqrt{x} dx$

44) Find the integral: $\int \sqrt{x} (3x^2 + 2x + 3) dx$.

45) Find the integral : $\int (2x - 3 \cos x + e^x) dx$

46) Find the integral: $\int (2x^2 - 3 \sin x + 5\sqrt{x}) dx$

47) Find the integral: $\int \sec x (\sec x + \tan x) dx$

48) Find the integral: $\int \frac{\sin^2 x}{\cos \sec^2 x} dx$

49) Find the integral: $\int \frac{2 - 3 \sin x}{\cos^2 x} dx$

50) The anti-derivative of $\left(\sqrt{x} + \frac{1}{\sqrt{x}}\right)$ equals.

(a) $\frac{1}{3}x^{\frac{1}{3}} + 2x^{\frac{1}{2}} + C$

(b) $\frac{2}{3}x^{\frac{2}{3}} + \frac{1}{2}x^2 + C$

(c) $\frac{2}{3}x^{\frac{3}{2}} + 2x^{\frac{1}{2}} + C$

(d) $\frac{3}{2}x^{\frac{3}{2}} + \frac{1}{2}x^{\frac{1}{2}} + C$

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51) If $\frac{d}{dx} f(x) = 4x^3 - \frac{3}{x^4}$ such that $f(2) = 0$, then $f(x)$ is:

- (a) $x^4 + \frac{1}{x^2} - \frac{129}{8}$
- (b) $x^3 + \frac{1}{x^4} + \frac{129}{8}$
- (c) $x^4 + \frac{1}{x^3} + \frac{129}{8}$
- (d) $x^3 + \frac{1}{x^4} - \frac{129}{8}$

52) Integrate $\frac{2x}{1+x^2}$.

53) Integrate : $\frac{(\log x)^2}{x}$

54) Integrate $\frac{1}{x+x \log x}$

55) Integrate $\sin x \sin (\cos x)$

56) Integrate $\sin (ax + b) \cos (ax + b)$

57) Integrate $\sqrt{ax + b}$

58) Integrate $x\sqrt{x+2}$

59) Integrate $x\sqrt{1+2x^2}$.

60) integrate $(4x+2)\sqrt{x^2+x+1}$.

61) integrate $\frac{1}{x-\sqrt{x}}$

62) Integrate $\frac{x}{\sqrt{x+4}}$, $x > 0$.

63) Integrate $(x^3 - 1)^{\frac{1}{3}} x^5$.

64) Integrate $\frac{x^2}{(2+3x^3)^3}$

65) Integrate $\frac{1}{x(\log x)^m}$, $x > 0$.

66) Integrate $\frac{x}{9-4x^2}$

67) Integrate e^{2x+3}

68) Integrate $\frac{x}{e^{x^2}}$

69) Integrate $\frac{e^{\tan^{-1} x}}{1+x^2}$

70) Integrate $\frac{e^{2x}-1}{e^{2x}+1}$

71) integrate $\frac{e^{2x}-e^{-2x}}{e^{2x}+e^{-2x}}$

72) Integrate $\tan^2 (2x - 3)$

73) Integrate $\sec^2 (7 - 4x)$

74) Integrate $\frac{\sin^{-1} x}{\sqrt{1-x^2}}$

75) Integrate $\frac{2 \cos x - 3 \sin x}{2 \sin x + 3 \cos x}$

76) Integrate $\frac{1}{\cos^2 x (1 - \tan x)^2}$

77) Integrate $\frac{\cos \sqrt{x}}{\sqrt{x}}$

78) Integrate $\sqrt{\sin 2x} \cos 2x$

79) Integrate $\frac{\cos x}{\sqrt{1+\sin x}}$

80) Integrate $\cot x \log \sin x dx$

81) Integrate $\frac{\sin x}{1+\cos x}$

82) Integrate $\frac{\sin x}{(1+\cos x)^2}$

83) Integrate $\frac{1}{1+\cot x}$

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- 84) Integrate $\frac{1}{1-\tan x}$
- 85) Integrate $\frac{\sqrt{\tan x}}{\sin x \cos x}$
- 86) Integrate $\frac{(1+\log x)^2}{x}$
- 87) Integrate $\frac{(x+1)(x+\log x)^2}{x}$
- 88) Integrate $\frac{x^3 \sin(\tan^{-1} x^4)}{1+x^8}$
- 89) Find the integral of the functions in $\sin^2(2x+5)$.
- 90) Find the integral of the functions in $\sin 3x \cos 4x$
- 91) Find the integral of the functions in $\cos 2x \cos 4x \cos 6x$
- 92) Find the integral of the functions in $\sin^3(2x+1)$
- 93) Find the integral of the functions in $\sin^3 x \cos^3 x$
- 94) Find the integral of the functions in $\int \sin x \sin 2x \sin 3x$
- 95) Find the integral of the functions in $\sin 4x \sin 8x$
- 96) Find the integral of the functions in $\frac{1-\cos x}{1+\cos x}$
- 97) Find the integral of the functions in $\frac{\cos x}{1+\cos x}$
- 98) Find the integral of the functions in $\sin^4 x$
- 99) Find the integral of the functions in $\cos^4 2x$
- 100) Find the integral of the functions in $\frac{\sin^2 x}{1+\cos x}$
- 101) Find the integral of the functions in $\frac{\cos 2x - \cos 2a}{-\cos x - \cos a}$
- 102) Find the integral of the functions in $\frac{\cos x - \sin x}{-1 + \sin 2x}$
- 103) Find the integral of the functions in $\tan^3 2x \sec 2x$
- 104) Find the integral of the functions in $\tan^4 x$
- 105) Find the integral of the functions in $\frac{\sin^3 x + \cos^3 x}{\sin^2 x \cos^2 x}$
- 106) Find the integral of the functions in $\frac{\cos 2x + 2 \sin^2 x}{\cos^2 x}$
- 107) Find the integral of the functions in $\frac{1}{\sin x \cos^3 x}$
- 108) Find the integral of the functions in $\frac{\cos 2x}{(\cos x + \sin x)^2}$
- 109) Find the integral of the functions in $\sin^{-1}(\cos x)$
- 110) Find the integral of the functions $\frac{1}{\cos(x-a) \cos(x-b)}$
- 111) Integrate the functions in $\frac{3x^2}{x^6+1}$
- 112) Integrate the functions in $\frac{1}{\sqrt{1+4x^2}}$
- 113) Integrate the functions in $\frac{1}{\sqrt{(2-x)^2+1}}$
- 114) Integrate the functions in $\frac{1}{\sqrt{9-25x^2}}$
- 115) Integrate the functions in $\frac{3x}{1+2x^4}$
- 116) Integrate the functions in $\frac{x^2}{1-x^6}$
- 117) Integrate the functions in $\frac{x-1}{\sqrt{x^2-1}}$
- 118) Integrate the functions in $\frac{x^2}{\sqrt{x^6+a^6}}$
- 119) Integrate the functions in $\frac{\sec^2 x}{\sqrt{\tan^2 x+4}}$

120) Integrate the functions in $\frac{1}{\sqrt{x^2+2x+2}}$

121) Integrate the functions in $\frac{1}{9x^2+6x+5}$

122) Integrate the functions in $\frac{1}{\sqrt{7-6x-x^2}}$

123) Integrate the functions in $\frac{1}{\sqrt{(x-1)(x-2)}}$

124) Integrate the functions $\frac{1}{\sqrt{8+3x-x^2}}$

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