

The following questions should be on your respective teachers' note copy. These questions are necessary but not sufficient. For further practice, please take the reference of your text book. We may ask you these questions for your internal evaluation at any time.

1. Prove that:

$$\int \frac{dx}{1-e^x} = \log |e^x| - \log |1-e^x| + c$$

2. Write the meaning of integral of $f(x)$.

3. Using partial fraction integrate:

$$\int \frac{8}{(2x-1)(2x+1)} dx$$

4. Are there two integrals obtained by $\int \frac{dx}{a+b \cos x}$? Justify. Obtain the result when $a=3, b=2$.

5. Integrate: $\int \frac{1}{a^2-x^2} dx$

6. Write an integral replacing with a numerical value of the type $\int \frac{dx}{\sqrt{x^2-a^2}}$, then evaluate.

7. Evaluate: $\int \frac{dx}{1-3 \sin x}$

8. Integrate: $\int \frac{1}{(4+x^2)(9+x^2)} dx$

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

10. Integrate: $\int \frac{dx}{x(1-x)}$

11. Define proper rational fraction with an example. Integrate $\int \frac{2x^2+3}{x^3+3x^2+2x} dx$ using concept of partial fraction.

12. Evaluate: a) $\int \frac{dx}{(2x-1)\sqrt{4x-3}}$

b) $\int \frac{dx}{4x^2-9}$

13. Evaluate: $\int \frac{x}{\sqrt{3x^2+4}} dx$

14. Evaluate: $\int \frac{dx}{x+\sqrt{x^2-1}}$

16. Define moment of inertia. Derive an expression for it. Show that in rotational motion, power is the product of torque and angular velocity.

15. Evaluate: $\int \frac{dx}{\sqrt{2ax - x^2}}$

17. Evaluate: $\int \frac{dx}{ex + e^{-x}}$

19. Evaluate: $\int \frac{dx}{1 - 2 \cos x}$

21. Find the integral $\int \frac{dx}{1 + 3 \cos 2x}$

23. Find the integral $\int \frac{dx}{\sqrt{x^2 - 6x + 13}}$

25. Evaluate: $\int \frac{\sin 2x}{(\sin x + \cos x)^2} dx$

27. Evaluate: $\int \frac{dx}{\sqrt{(x - \alpha)(x - \beta)}} \quad (\beta > \alpha)$

29. Evaluate: $\int \frac{6x + 1}{x^2 + 9} dx$

31. Show that: $\int \frac{dx}{\sqrt{a^2 - x^2}} = \sin^{-1} \frac{x}{a} + c$

32. Find the integral $\int (2x - 5) \sqrt{x^2 - 5x + 1} dx$

33. Evaluate: $\int \frac{2x + 3}{4x^2 + 1} dx$

35. Evaluate: $\int \frac{5}{(x + 5)(2x^2 + 5)} dx$

37. Evaluate: $\int \frac{dx}{(x - 1)(x^2 + 3)}$

39. Evaluate: $\int \frac{x^2}{x^4 - 2x^2 - 15} dx$

41. Evaluate: $\int (2x + 3) \sqrt{x^2 - 2x - 3} dx$

43. Evaluate: $\int \frac{x^3 dx}{2x^4 - 3x^2 - 5}$

45. Evaluate: $\int \frac{\cos x - \sin x}{\sqrt{\sin 2x}} dx$

16. Evaluate: $\int \sqrt{4x^2 + 4x + 5} dx$

18. Evaluate: $\int \frac{x}{(x - a)(x - b)}$

20. Evaluate: $\int \frac{dx}{\sqrt{2ax - x^2}}$

22. Evaluate: $\int \frac{2x - 11}{x^2 + x - 2} dx$

24. Evaluate: $\int \frac{3x}{(x - a)(x - b)} dx$

26. Evaluate: $\int \frac{dx}{1 - 2 \cos x}$

28. Find the integral $\int \frac{dx}{3 - 2x - x^2}$

30. Evaluate: $\int \frac{dx}{\sqrt{2ax + x^2}}$

34. Evaluate: $\int \frac{dx}{2 + 3 \cos x}$

36. Evaluate: $\int \frac{dx}{3 \sin x + 4 \cos x}$ *(It has different method)*

38. Evaluate: $\int \frac{dx}{1 + \sin x + \cos x}$

40. Evaluate: $\int \frac{dx}{\sin x + \cos x}$

42. Evaluate: $\int \sqrt{\frac{1+x}{1-x}} dx$

44. Evaluate: $\int \frac{dx}{(x - 2)^2 (x - 3)^3}$

