



INSTITUTE OF ACTUARIAL
& QUANTITATIVE STUDIES

Subject:

Calculus

Chapter:

Unit 3

Category:

Practice
Questions

Evaluate the given integrals

$$1. \int z^7 - 48z^{11} - 5z^{16} dz$$

$$2. \int \sqrt{x^7} - 7\sqrt[6]{x^5} + 17\sqrt[3]{x^{10}} dx$$

$$3. \int \frac{7}{3y^6} + \frac{1}{y^{10}} - \frac{2}{\sqrt[3]{y^4}} dy$$

$$4. \int \frac{z^8 - 6z^5 + 4z^3 - 2}{z^4} dz$$

$$5. \int t^3 - \frac{e^{-t} - 4}{e^{-t}} dt$$

$$6. \text{ Determine } f(x) \text{ given that } f'(x) = 12x^2 - 4x \text{ and } f(-3) = 17.$$

$$7. \int (7y - 2y^3)e^{y^4 - 7y^2} dy$$

$$8. \int_{-2}^1 5z^2 - 7z + 3 dz$$

$$9. \int_1^4 \frac{8}{\sqrt{t}} - 12\sqrt{t^3} dt$$

$$10. \text{ Evaluate the following integral } \int_0^4 f(t) dt \text{ where } f(t) = \begin{cases} 2t & t > 1 \\ 1 - 3t^2 & t \leq 1 \end{cases}$$

11. $\int_{-1}^2 x^3 + e^{\frac{1}{4}x} dx$

12. Use an appropriate change of variables to find the integral $\int (x + 1)(x - 2)^9 dx$

13. $\int x^3 e^{2x} dx$

14. $\int \frac{1}{\sqrt{x^2 + 2x - 3}} dx$

15. $\int_{\ln \frac{1}{2}}^2 (e^t - e^{-t}) dt$

16. Find the value of the constant k , $0 < k < 9$, such that $\int_k^9 \frac{6}{\sqrt{x}} dx = 20$

17. Evaluate $\int_1^2 (2\sqrt{x} + 3)^2 dx$

18. Find y in terms of x :

$$\frac{dy}{dx} = 5x^{1/2} + x\sqrt{x} \quad x > 0$$

19. The curve with equation $y = f(x)$ passes through the point $(1, 6)$. Given that

$$f'(x) = 3 + \frac{5x^2 + 2}{x^{1/2}} \quad x > 0$$

find $f(x)$ and simplify your answer.

20. Find a

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PRACTICE QUESTIONS

$$\int_5^{10} \frac{3 \, dx}{(x-1)(3+2\sqrt{x-1})} = \ln \ln a$$



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