

Chapter Five/Six Review Questions

1. $\int \frac{e^{2x}}{e^{2x} + 1} dx$

2. $\int \frac{x}{x^4 + 2x^2 + 2} dx$

3. $\int \frac{\arctan\left(\frac{x}{2}\right)}{4 + x^2} dx$

4. Find the general solution of the differential equation. $(2 + x)y' = 3y$

5. $\int \frac{e^{3 \tan x}}{4 \cos^2 x} dx$

6. Find the derivative of $y = x \arcsin(x) + \sqrt{1 - x^2}$

7. Given the initial condition $y(0) = 1$, find the particular solution of the equation.

$$xydx + e^{-x^2}(y^2 - 1)dy = 0$$

8. Find the derivative of $y = \ln \sqrt[3]{\frac{x-1}{x+1}}$.

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

10. Find the function $y = f(x)$ passing through the point $(0, 4)$ that has the first derivative of: $\frac{dy}{dx} = y + 3$

11. A radioactive element has a half-life of 131 days. How much of the 416 grams of substance will be left after 450 days?

12. $\int \frac{\ln \sqrt{x}}{x} dx$

13. $\int \frac{2^{-1/t}}{t^2} dt$

14. Find the particular solution that satisfies the initial condition: $2xy' - (\ln x)^2 = 0$, $y(1) = 2$

Chapter Five Answers

1. $\frac{1}{2} \ln(e^{2x} + 1) + C$

2. $\frac{1}{2} \arctan(x^2 + 1) + C$

3. $\frac{1}{4} \arctan^2\left(\frac{x}{2}\right) + C$

4. $y = C(2 + x)^3$

5. $\frac{1}{12} e^{3 \tan x} + C$

6. $y' = \arcsin x$

7. $y^2 - \ln y^2 + e^{x^2} = 2$

8. $\frac{2}{3(x-1)(x+1)}$

9. $\frac{1}{2} \ln(x^2 + 1) - 3 \arctan x + C$

10. $y = 7e^x - 3$

11. 38.46 grams

12. $\frac{1}{4} (\ln x)^2 + c$

13. $\frac{1}{2^{1/t} \ln 2} + C$

14. $y = \frac{1}{6} (\ln x)^3 + 2$