Additional question on differential equations

Solve the following D.E.

Question

1. $\frac{dy}{dx} = \frac{1+y}{1-x}$

2. $\frac{dy}{dx} + \frac{1+\cos 2y}{1-\cos 2x} = 0$

3. $(e^x + 1)Y\,dy + (Y+1)e^x dx = 0^8$

4. $\left(1-x^2\right)\frac{dy}{dx}-xy=5y$

5. $\left(e^Y+1\right)\cos x\ dx+e^Y\sin x\,dy=0$

6. $x^{-1}\cos^2 y\ dy+y^{-1}\cos^2 x\,dx=0$

7. $Y-x\frac{dy}{dx}=a\left(y^2+\frac{dy}{dx}\right)$

8. $\frac{dy}{dx}=\frac{x\left(2\log x+1\right)}{\sin y+y\cos y}$

9. $\frac{dy}{dx} = 3x + 4y + 6xy + 2$

10. $\frac{dy}{dx} = e^{x+y} + x^2 \ e^{Y}$

11. $2xy\,dy = (1 + x^2)dx$; when $x = 2, y = 3$

12. $xy(1 + x^2)\frac{dy}{dx} - y^2 = 1$; given when $x = 1, y = 0$

13. $(1 - x^2)dy + xy\,dx = xy^2\,dx$

14. $\dfrac{dy}{dx} = \sin(x + y)$

15. $(x - y)^2 \dfrac{dy}{dx} = a^2$

Definite Integrals

1) $S.T \int_{\partial}^{\infty} \frac{x}{(1+x)(1+x^2)} dx = \frac{\pi}{4}$

2) $S.T \int_{0}^{\frac{1}{2}} \frac{sinx - cosx}{1 + sinx.cosx} dx = 0$

3) $S.T \int_{0}^{\frac{\pi}{2}} log_e(tanx) dx = 0$

4) $S.T \int_{0}^{\frac{\pi}{4}} log(1 + tanx) dx = \frac{\pi}{8} log2$

5) $S.T \quad \int_0^{\pi} x\tan^2 x\,dx = \frac{-\pi^2}{2}$

6) $S.T \int_0^{\pi} \frac{x\tan x}{\sec x + \cos x}dx = \frac{\pi^2}{4}$

7) $S.T \quad \int_0^{\pi} \frac{x}{1+\sin x}dx = \pi$

8) $P.T \int_0^{\frac{\pi}{2}} \log(\sin x)dx = -\frac{\pi}{2}\log 2$

9) $Evaluate \quad \int_{-1}^{1} \log\left(\frac{2-x}{2+x}\right)dx$

10) $\boldsymbol{Evaluate}\ \int_{-1}^{1}\left(x^{99}+x^{77}+x^{55}\right)dx$

11) $\boldsymbol{S.T}\quad \int_{0}^{2}\frac{\sqrt{x+3}}{\sqrt{x+3}+\sqrt{5-x}}dx=1$

12) $\boldsymbol{S.T}\quad \int_{0}^{3}\frac{\sqrt{x}}{\sqrt{3-x}+\sqrt{x}}dx=\frac{3}{2}$

13) $\int_{0}^{1}x(1-x)^{n}dx=\frac{1}{(n+1)(n+2)}$