HW2

In Problems 1–6, determine whether the given differential equation is separable.

1. $\dfrac{dy}{dx} - \sin(x+y) = 0$

3. $\dfrac{ds}{dt} = t\ln(s^{2t}) + 8t^2$

5. $(xy^2 + 3y^2)\,dy - 2x\,dx = 0$

In Problems 7–16, solve the equation.

7. $x\dfrac{dy}{dx} = \dfrac{1}{y^3}$

9. $\dfrac{dx}{dt} = \dfrac{t}{xe^{t+2x}}$

11. $x\dfrac{dv}{dx} = \dfrac{1-4v^2}{3v}$

15. $(x + xy^2)\,dx + e^{x^2}y\,dy = 0$

In Problems 17–26, solve the initial value problem.

19. $\dfrac{1}{2}\dfrac{dy}{dx} = \sqrt{y+1}\cos x, \qquad y(\pi) = 0$

23. $\dfrac{dy}{dt} = 2t\cos^2 y, \qquad y(0) = \pi/4$

25. $\dfrac{dy}{dx} = x^2(1+y), \qquad y(0) = 3$