

In Problems 1–10 solve the given differential equation by using an appropriate substitution.

5.

$$(y^2 + yx) dx - x^2 dy = 0$$

7.

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

10.

$$x \frac{dy}{dx} = y + \sqrt{x^2 - y^2}, \quad x > 0$$

*Each DE in Problems 15–22 is a Bernoulli equation.*

In Problems 15–20 solve the given differential equation by using an appropriate substitution.

15.

$$x \frac{dy}{dx} + y = \frac{1}{y^2}$$

19.

$$t^2 \frac{dy}{dt} + y^2 = ty$$

In Problems 21 and 22 solve the given initial-value problem.

22.

$$y^{\frac{1}{2}} \frac{dy}{dx} + y^{\frac{3}{2}} = 1, \quad y(0) = 4$$

*Each DE in Problems 23–30 is of the form given in (5).*

In Problems 23–28 solve the given differential equation by using an appropriate substitution.

25.

$$\frac{dy}{dx} = \tan^2(x + y)$$

26.

$$\frac{dy}{dx} = \sin(x + y)$$

27.

$$\frac{dy}{dx} = 2 + \sqrt{y - 2x + 3}$$