

Separable Differential Equations Practice

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Find the general solution of each differential equation.

1) $\frac{dy}{dx} = \frac{x^3}{y^2}$

2) $\frac{dy}{dx} = \frac{1}{\sec^2 y}$

3) $\frac{dy}{dx} = 3e^{x-y}$

4) $\frac{dy}{dx} = \frac{2x}{e^{2y}}$

For each problem, find the particular solution of the differential equation that satisfies the initial condition.

5) $\frac{dy}{dx} = \frac{2x}{y^2}, y(2) = \sqrt[3]{13}$

6) $\frac{dy}{dx} = 2e^{x-y}, y(-3) = \ln \frac{3e^3 + 2}{e^3}$

7) $\frac{dy}{dx} = \frac{1}{\sec^2 y}, y(3) = 0$

8) $\frac{dy}{dx} = \frac{e^x}{y^2}, y(-1) = \frac{\sqrt[3]{e^3 + 3e^2}}{e}$

9) $\frac{dy}{dx} = -\frac{1}{\sin y}, y(3) = \frac{\pi}{2}$

10) $\frac{dy}{dx} = \frac{2x}{e^{2y}}, y(2) = \frac{\ln 5}{2}$

11) $\frac{dy}{dx} = \frac{3x^2}{e^{2y}}, y(1) = 0$

12) $\frac{dy}{dx} = \frac{1+x^2}{y^2}, y(-1) = -\sqrt[3]{4}$

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$$y = \sqrt[3]{\frac{3x^4}{4} + C}$$

$$2) \tan y = x + C$$
$$y = \tan^{-1}(x + C)$$

$$3) e^y = 3e^x + C$$
$$y = \ln(3e^x + C)$$

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