

MATH 246 Homework 1.8
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Directions:

- Work should be done neatly and on separate paper.
- Enough work must be shown so that the steps you are taking is clear.

Solve the following differential equations. One should be treated as explicit, one as separable, one as first-order linear, two as exact and one as exact after an integrating factor. Find explicit solutions if reasonable and use initial values if given. Some of them may need rearranging. Don't let the use of x and/or t direct you.

1. $\left(\frac{1}{2\sqrt{x}} + \frac{1}{y}\right) = \frac{x}{y^2} \frac{dy}{dx}$

2. $y^2 \frac{dy}{dt} + 1 = e^{2y} \frac{dy}{dt} + \frac{1}{t}$ with $y(2) = 0$

3. $\frac{dy}{dx} = 5y + e^{-2x} + 1$

4. $y^2 + \left(2xy + \frac{2}{y^3}\right) \frac{dy}{dx} = 0$

5. $\frac{1}{t^2+t} \frac{dy}{dt} = 3$ with $y(1) = -1$

6. $4x + 3y^4 + 4xy^3 \frac{dy}{dx} = 0$