

Test 4 (Final) Review

31.1 Order of the Differential Equation - Highest Derivative.

31.2 Separation of Variables $g(x) dx = f(y) dy$
p.937: 3, 5, 9, 13, 17, 19, 21
 $xy \frac{dy}{dx} + \sqrt{1+y^2} = 0$
 $xy dy + \sqrt{1+y^2} dx = 0 \Rightarrow \frac{y}{\sqrt{1+y^2}} dy + \frac{1}{x} dx = 0$

31.3 Integrable Combinations

p. 939: 3, 5, 11, 13, 19, 21

$$d(xy) = x dy + y dx$$

$$d(x^2 + y^2) = 2x dx + 2y dy$$

$$d\left(\frac{y}{x}\right) = \frac{x dy - y dx}{x^2}$$

$$d\left(\frac{x}{y}\right) = \frac{y dx - x dy}{y^2}$$

31.4 First Order Linear Differential Equation (Integrating Factor)

$$dy + Py dx = Q dx \quad \text{Integrating Factor: } e^{\int P dx}$$

$$d(e^{\int P dx} y) = e^{\int P dx} Q dx \quad \text{p.942: 3, 5, 7, 9, 11}$$

31.7 Higher Order Homogeneous Solution

$$\text{Auxiliary Equation then } y = c_1 e^{m_1 x} + c_2 e^{m_2 x}$$

p.954: 3, 5, 7, 9, 13, 15, 27, 31

Test 1 Derivatives Trigonometric, Log, Exp. Functions.

Test 2 Integrals Trig., Log, + Exp. Functions