

M274 Review Problems

- 1) $\frac{dy}{dx} = \frac{x^3 - 2y}{x}$ $\frac{c}{x^2} + \frac{x^3}{5}$
- 2) $\frac{dy}{dx} = \frac{2x + y}{3 + 3y^2 - x}$, $y(0) = 0$ $x^2 + xy - 3y - y^3 = 0$
- 3) $\frac{dy}{dx} = \frac{x + y}{x - y}$ $\arctan(y/x) - \ln|x| = c$
- 4) $x\frac{dy}{dx} + xy = 1 - y$, $y(1) = 0$ $\frac{1}{x}(1 - e^{1-x})$
- 5) $(3y^2 + 2xy)dx - (2xy + x^2)dy = 0$ $\frac{y^2}{x^3} + \frac{y}{x^2} = c$
- 6) $\frac{dy}{dx} - \frac{y}{x} = \frac{1}{x}\sqrt{xy}$ $2\sqrt{y/x} - \ln|x| = c$
- 7) $(x + y)dx + (x + 2y)dy = 0$, $y(2) = 3$ $x^2 + 2xy + 2y^2 = 34$
- 8) $x^2\frac{dy}{dx} + \frac{1}{2}xy - y^3 = 0$ $\pm\sqrt{\frac{x}{1 + cx^2}}$
- 9) $(e^x + 1)\frac{dy}{dx} = y - ye^x$ $\frac{c}{\cosh^2(x/2)}$
- 10) $\frac{dy}{dx} = e^{x+y}$ $e^x + e^{-y} = c$
- 11) $\frac{dy}{dx} = \frac{x^2 + 2y^2}{2x^2}$ $y = \frac{1}{2}x + \frac{1}{2}x \tan\left(\frac{\ln x + c}{2}\right)$