

Millersville University
Department of Mathematics
MATH 365, Ordinary Differential Equations, Homework 2
January 23, 2004

Please answer the following questions. Answers without justifying work will receive no credit. Partial credit will be given as appropriate, do not leave any problem blank. Each problem is worth 10 points. Your completed assignment is due at class time on Wednesday, January 28, 2004.

1. Solve the following ordinary differential equations and initial value problems.

(a) $y' = \frac{t + ty^2}{4y}$; with $y(1) = 0$

(b) $t \frac{dy}{dt} = y^2 + 1$

(c) $t\sqrt{1 + y^2} = y\sqrt{1 + t^2}y'$

(d) $\frac{dy}{dt} = -\frac{3t + ty^2}{2y + t^2y}$; with $y(2) = 1$

2. Water at temperature 10°C takes 5 minutes to warm up to 20°C in a room at temperature 40°C . How long does it take for the temperature of the water to become 25°C ?
3. An element decays exponentially by radioactive disintegration. If m_1 grams of the element are present at time t_1 and m_2 grams of the element are present at time t_2 , find an expression for the half-life of the element.