

QUIZ SOLUTIONS

Note Title

9/21/2009

$$1) \quad y' = y^2 \quad y(0) = 3 \quad y'(0) = 3^2 = 9$$

$$y'' = 2yy' \quad y''(0) = 2(3)(9) = 54$$

$$y = 3 + 9x + \frac{54}{2}x^2 + \dots$$

$$2) \quad y = \sum_0^n a_n x^n \quad y' = \sum_1^{n-1} a_n n x^{n-1}$$

$$k = n$$

$$k = n-1$$

$$n = k+1$$

$$k = 0$$

$$\sum_0 (a_{k+1} (k+1) + 3a_k) x^k = 0$$

$$a_{k+1} = -\frac{3a_k}{k+1} \quad k = 0, 1, \dots$$

$$k=0 \quad a_1 = -\frac{3a_0}{1} = -3a_0$$

$$k=1 \quad a_2 = -\frac{3a_1}{2} = \frac{9}{2}a_0$$

$$y = a_0 + a_1 x + a_2 x^2 + \dots$$

$$= a_0 - 3a_0 x + \frac{9}{2} a_0 x^2 + \dots$$

$$= a_0 (1 - 3x + 4.5x^2 + \dots)$$

$$y(0) = 2 \quad \text{so} \quad a_0 = 2$$

$$y = 2 - 6x + 9x^2 + \dots$$