

MATHEMATICAL MODELING, MATH329, FALL 2010, SHEPHERD UNIVERSITY
ASSIGNMENT 1
DUE TUESDAY, AUGUST 24, 2010

1. Read and understand. Chapter 1 and Section 2.1.

2. List. From your reading of the Science of Beauty list at least 5 individuals (8 for extra credit) that used measurement or mathematics in relation to beauty and art. Briefly describe how or what they did.

3. First order systems and classifications. Write each of the following equations as a system of first order equations. Also be sure to classify the original equation.

a)

$$u'' + \frac{1}{2}u + 2u = 0$$

b)

$$u'' + \frac{1}{2}u + 2u = 3 \sin t$$

c)

$$t^2 u'' + tu' + \left(t^2 - \frac{1}{4}\right)u = 0$$

d)

$$u'''' - u = 0$$

4. Memorize. Know the table on page 5, Table 1.1.1.

5. Direction fields. Produce a direction (slope) field for each of the following equations. Also be sure to classify the equation.

a)

$$y' = y + 2$$

b)

$$y' = -y(5 - y)$$

c)

$$y' = t + 2y$$