

Homework #1
Due Wednesday, September 2
No late papers accepted! No excuses!

1. Determine which of the five types of differential equations we have studied the given equation falls into, and use the appropriate technique to find the general solution.

a)
$$\frac{dy}{dx} = \frac{\sin y + y \cos x + 1}{1 - x \cos y - \sin x}$$

b) $(3y^2 + x^2)dx - 2xydy = 0$

c) $y' - x^2 y = x^2$
 $y(0) = 5$

2. The temperature of an object at time t is governed by the linear differential equation

$$\frac{dT}{dt} = -k(T - 5 \cos(2t)).$$

At $t = 0$, the temperature of the object is 0° F and is, at that time, increasing at a rate of 5° F/min.

- a) Determine the value of the constant k .
- b) Determine the temperature of the object at time t .
- c) Describe the behavior of the temperature of the object for large values of t .