

Name: _____

Activity # 2

1. Suppose we are given the equation $y = Ce^{kt}$, where C and k are constants, and told that it is a solution of the differential equation $y' = .35y$.

(a) With only this information, is it possible to determine C or k (or both)? Find the values of any constants for which this is possible.

(b) If you determined that it was not possible to find the value of C and/or k with the information given, describe what additional information would be needed to solve for the elusive constant(s).

2. A camera man at a football game has to position his camera at the back of an alcove 4 meters wide and 2 meters deep. He can place it anywhere along the back wall of the alcove, but he wants to choose the spot which will let him see as much of the field as possible. In other words he needs to maximize his viewing angle, which is angle θ in the diagram below.

(a) Write a formula for angle θ in terms of angles α and β .

- (b) Let x be the distance from the camera to the left side of the alcove. Notice that the sides of the alcove, along with the dotted lines of angle θ , form two right triangles. Using these triangles, what information do you know about angle α ? About angle β ?
- (c) Using your answers to parts (a) and (b), write express θ as a function of x . (You should not have α or β in your function now.) Then, find the value of x in the interval $(0, 4)$ which maximizes θ .