Problem Set 1   Calculus 1   Due 8/30/19

You are encouraged to work in groups of two to four on this assignment and make a single group submission. Each problem is worth 5 points.

1. A dog is at the beach standing 30 feet north from the shoreline, which runs east-west. His owner throws a frisbee so that it lands in the water 60 feet south and 40 feet east from the dog's starting location. The dog can run 20 feet per second and swim 10 feet per second.
    a) Find the time required for the dog to reach the frisbee along a straight line.
    b) Find the time required for the dog to reach the frisbee by first running to the point on the beach closest to it, then swimming to it.
    c) Express the time required for the dog to reach the frisbee by first running to the point x feet west of the point on the beach nearest to the frisbee, then swimming to it.

2. An aid organization is building wells in remote areas, and then maintaining them, in order to improve the standard of living for people in the region. If a well initially costs $10,000 for materials, and on average $500 each year for maintenance after the first year, how many wells can be sustained after t years with a budget of $200,000 per year? With a budget of $$x$ per year?