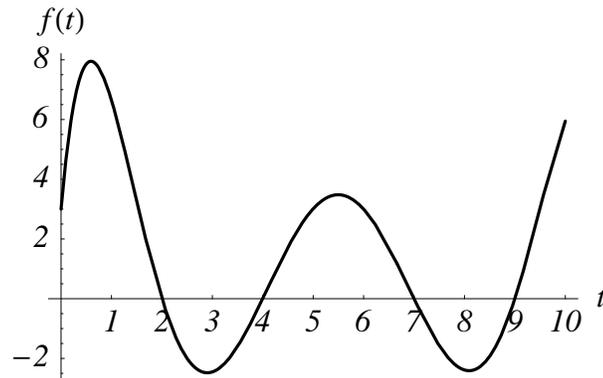


Math Xb Spring 2005
Worksheet: Characteristics of the Area Function

1. The graph of the function f is shown below. Justify your answers for each of the questions below.



- (a) On what intervals is the area function ${}_0A_f$ increasing?
- (b) On what intervals is the area function ${}_0A_f$ decreasing?
- (c) At what values of x does ${}_0A_f$ have a local maximum? local minimum?
- (d) At what values of x does ${}_0A_f$ have an absolute maximum? absolute minimum?
- (e) On what intervals (approximately) is the area function ${}_0A_f$ concave up?
- (f) On what intervals (approximately) is the area function ${}_0A_f$ concave down?

2. Let $f(t) = \cos t$ and consider the area function ${}_0A_f(x)$ on the domain $0 \leq x \leq 4\pi$.

(a) On what intervals is the area function positive?

(b) On what intervals is the area function negative?

(c) At what values of x is the area function zero?

3. During the filming of a movie, a stunt car is remotely controlled by a computer and has been programmed by the special-effects team to travel at certain speeds along a straight road. At time $t = 0$ the car starts and accelerates smoothly until, at time $t = 5$ minutes its speed reaches 55 mph. It cruises at 55mph until $t = 10$ minutes, then it breaks quickly, skids to a stop at $t = 11$ minutes, and then goes into reverse, picking up speed until, at $t = 13$, it is going 30mph in the opposite direction. It cruises at 30mph for 2 minutes and then gradually breaks until it stops 1.5 minutes later.

First, graph the velocity $v(t)$ of the stunt car, and then graph the position $p(t)$ of the stunt car, assuming that the car starts at position $p = 0$.