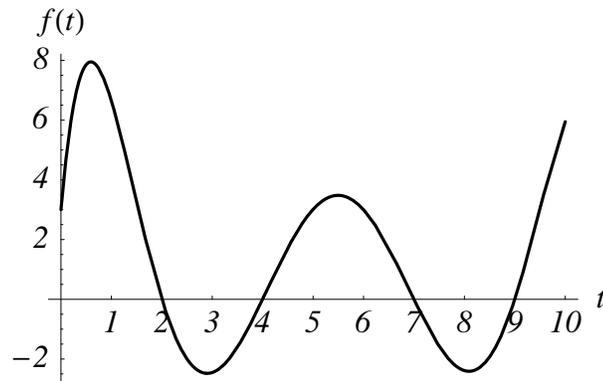


Math Xb Spring 2004
Worksheet: The Area Function
April 14, 2004

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. Let $r(t)$ be the rate (in barrels per hour) of oil flowing through an oil pipeline pumping station t hours after noon on a particular day. Describe each of the following expressions and equations in terms of oil flow.

(a) ${}_0A_r(5)$

(b) ${}_2A_r(5)$

(c) ${}_0A_r(x)$

(d) $\frac{{}_0A_r(5)}{5}$

(e) ${}_2A_r(x) = 1000$