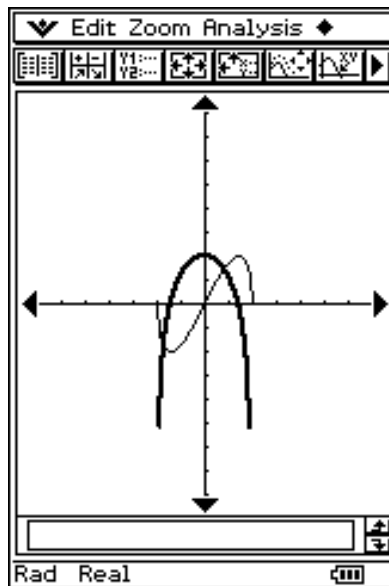
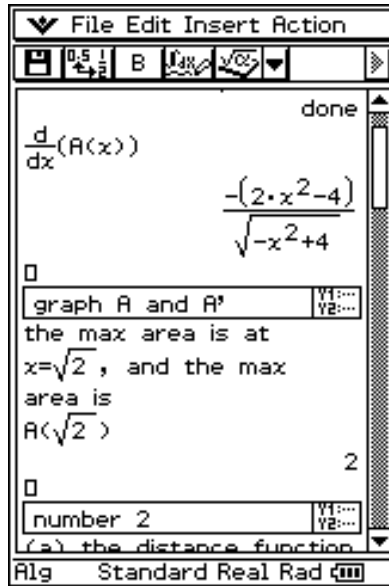
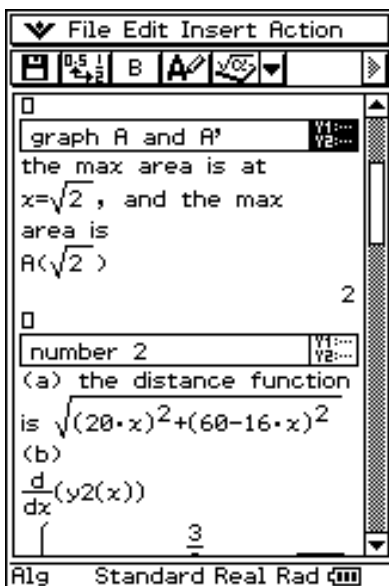


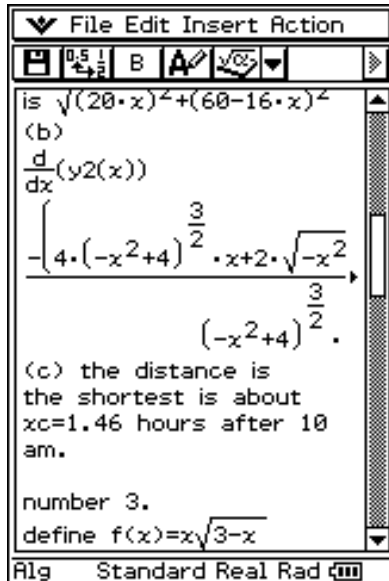
1. Find the largest area of a rectangle in the first quadrant under the curve $y = \sqrt{4 - x^2}$.



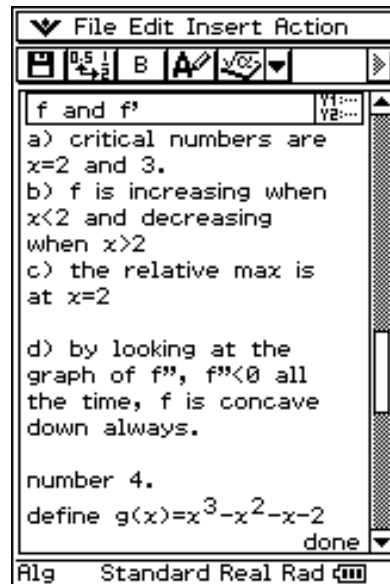
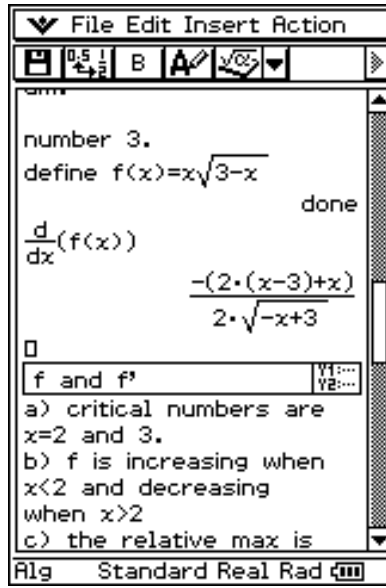
The thin is original, and the thick is derivative.



2. At 10 am, the ship A is 60 miles north of the ship B. We know that the ship A is going eastward at 20 miles per hour and the ship B is going north at 16 miles per hour.
- Set up the distance function between the ship A and the ship B.
 - Set up the rate of change of the distance (between A and B) with respect to time.
 - When is the distance between the ship A and the ship B closest?
- ** See the screen above for setting up the distance function.



3. If $f(x) = x\sqrt{3-x}$, then
- find the critical numbers of f ,
 - find the interval(s) where f is increasing or decreasing,
 - find the relative maximum or relative minimum of f ,



4. If $f(x) = x^3 - x^2 - x + 2$,
- find the critical numbers of f ,
 - find the interval(s) where f is increasing or decreasing,
 - find the relative maximum or relative minimum of f ,
 - find the interval(s) where f is concave upward or concave downward,
 - find the inflection point(s) of f .

File Edit Insert Action

number 4.
 define $g(x)=x^3-x^2-x-2$
 done

$\frac{d}{dx}(g(x))$
 $3 \cdot x^2 - 2 \cdot x - 1$

factor($3 \cdot x^2 - 2 \cdot x - 1$)
 $(3 \cdot x + 1) \cdot (x - 1)$

(a) the critical numbers
 are $x=1$, and $x=-1/3$.
 (b) g is increasing in
 $(-\infty, -1/3)$ or $(1, \infty)$ and
 g is decreasing in
 $(-1/3, 1)$.
 (c) g has a relative
 max at $x=-1/3$ and rel.

Rlg Standard Real Rad

File Edit Insert Action

are $x=1$, and $x=-1/3$.
 (b) g is increasing in
 $(-\infty, -1/3)$ or $(1, \infty)$ and
 g is decreasing in
 $(-1/3, 1)$.
 (c) g has a relative
 max at $x=-1/3$ and rel.
 min at $x=1$.
 (d) Since $g''(x)=6x-2$,
 g is concave upward
 in $(1/3, \infty)$ and
 downward in $(-\infty, 1/3)$
 (e) the inflection point
 of g is at $x=1/3$.

look at the graph

Rlg Standard Real Rad

