$y = h(x)$

College Algebra
§4.4 Building Quadratic Models
    From Verbal Descriptions
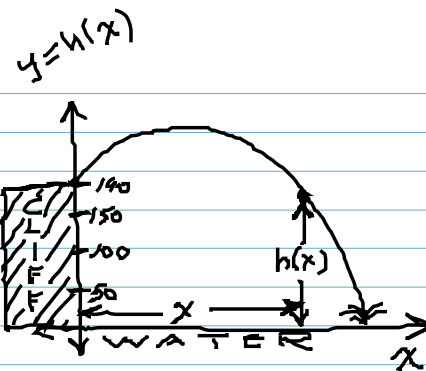
Additional Solved Problems

AACMMLSP7
A projectile is fired from a cliff 190 feet above
the water at an inclination of 45° to the horizon-
tal, with a muzzle velocity of 55 feet per second.
The height h of the projectile above the water is
given by

$$h(x) = \frac{-32x^2}{(55)^2} + x + 190$$

where x is the horizontal distance of the projectile
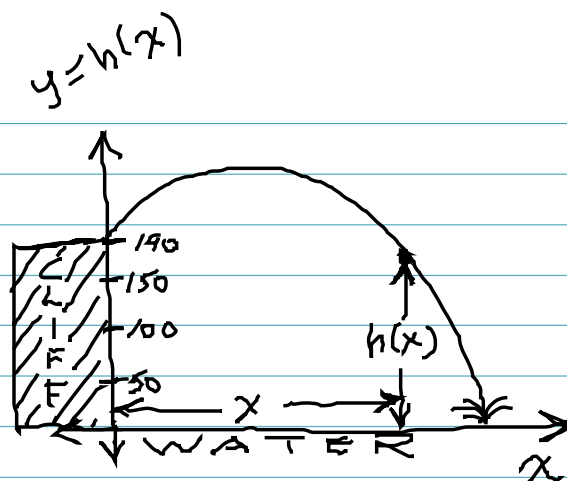from the face of the cliff.

→ (a) Using a graphing utility, graph the function $h(x)$,
     where $0 \le x \le 200$

→ (b) At what horizontal distance from the face of the
     cliff is the height of the projectile a maximum?
     [Use calculator. Set [WINDOW] $X_{min} = 0$ $X_{max} = 200$ then
     [Zoom] [0] (Zoomfit)

→ (c) Find the maximum height of the projectile.

→ (d) At what horizontal distance from the face of the
     cliff will the projectile strike the water?

→ (e) When the height of the projectile is 100 feet
     above the water, how far is it from the cliff?

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(a)

Clear memory

2nd [+] [7] [1] [2]

[Y=] [(] [(-)] [3] [2] [X,T,θ,n] [x^2] [)] [÷] [(] [6] [5] [x^2] [)] + [X,T,θ,n] + [1] [9] [0] [ENTER]

$0 \leq x \leq 200$

[WINDOW] $X_{min} = 0$ $X_{max} = 200$

[ZOOM] [0]

(b) 2nd [TRACE] (CALC) [4] [←] [Enter] [→] [Enter] [←] [Enter]

$x = 47.265617$ $y = 213.63281$
horizontal distance   height above water

$x = 47$ feet

(c) $y = 214$ feet

(d) The water line is the x-axis. ($y = 0$)
[Y=] ○ [enter]
2nd [TRACE] (CALC) [5] [Enter] [Enter] [→] [Enter]

$x = 189.37466$ $y = 0$
$x = 189$ feet

(e) [Y=] [1] [0] [0] [enter]
2nd [TRACE] (CALC) [5] [Enter] [Enter] [→] [Enter]

$x = 150.90853$ $y = 100$
$x = 151$ feet