

221. GRAPEFRUIT THROWN

KEY

(from p. 200 = 93)

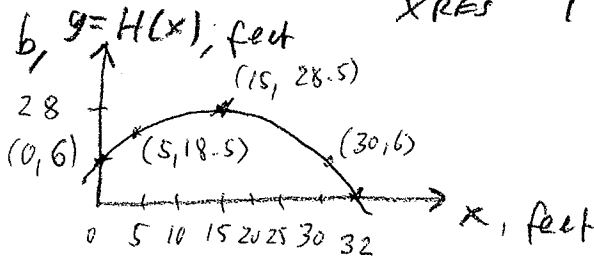
$y = H(x) = \text{Height}$
 $x = \text{Length} \geq 0$

$$y = -\frac{1}{10}x^2 + 3x + 6$$

a, GRAPH ON CALCULATOR

WINDOW

XMIN	-10
XMAX	40
XSCAL	5
YMIN	-10
YMAX	35
YSCAL	5
XRES	1



c, - What is starting height?

- Find height when length = 5

$$H(5) = 18.5 \text{ feet} = \text{Height}$$

d, - Find $H(30)$

- Is it above a child of 5 feet?

$$H(30) = 6 \text{ feet} = \text{Height}$$

yes.

e, Where does the grapefruit hit the ground?

$$x = 31.882 \text{ feet} = \text{Length}$$

f, What is Length at maximum height?

$$x = 15 \text{ feet} = \text{Length (MAX)}$$

$$y = 28.5 \text{ feet} = \text{Height (MAX)}$$

g, What is maximum height?

f, g = Algebraically: $x = \frac{-b}{2a} = \frac{30}{2} = 15 \text{ feet}$
 $y(15) = 28.5 \text{ feet}$

e, Algebraically $-\frac{1}{10}x^2 + 3x + 6 = 0$ $x = \frac{30 \pm \sqrt{900 + 240}}{2} = \frac{30 \pm \sqrt{1140}}{2}$
 $x^2 - 30x + 60 = 0$ $= 15 \pm 16.88 = 31.88 \text{ feet}$