#61 $H = -16T^2 + 48T + 32$

MAX HT OCCURS AT VERTEX

$$T = \frac{-B}{2A} = \frac{-48}{2(-16)} = 1.5 \text{ sec}$$

$$H = -16(1.5)^2 + 48(1.5) + 32 = 68 \text{ feet}$$

(a) HITS GROUND WHEN $H = 0$

$$0 = -16T^2 + 48T + 32$$

$$0 = T^2 - 3T + 2$$

USE QUADRATIC FORMULA, $T \approx 3.56$ sec

(b) AVR VELOCITY BETWEEN $T=2$ AND $T=3$

T	H
2	64
3	32

AVR VELOCITY

$$\frac{32-64}{3-2} = \frac{-32}{1} = -32 \text{ ft/sec}$$

(c) INSTANT VELOCITY AT $T=1$

APPROX USING AVR VELOCITY BETWEEN $T=1$ AND, SAY $T=1.01$

T	H
1	64
1.01	64.1584

$$\frac{64.1584 - 64}{1.01 - 1} = 15.84 \text{ ft/sec}$$

(USING CALCULUS, IT CAN BE SHOWN THAT THE ACTUAL INSTANT VELOCITY IS 16 ft/sec)

#62 $P = -1500 + 12x - .0004x^2$

$P = -.0004x^2 + 12x - 1500$

MAX VALUE AT VERTEX

$$x = \frac{-B}{2A} = \frac{-12}{2(-.0004)} = 15{,}000$$

$$P = -.0004(15{,}000)^2 + 12(15{,}000) - 1500$$

$$= 88{,}500$$