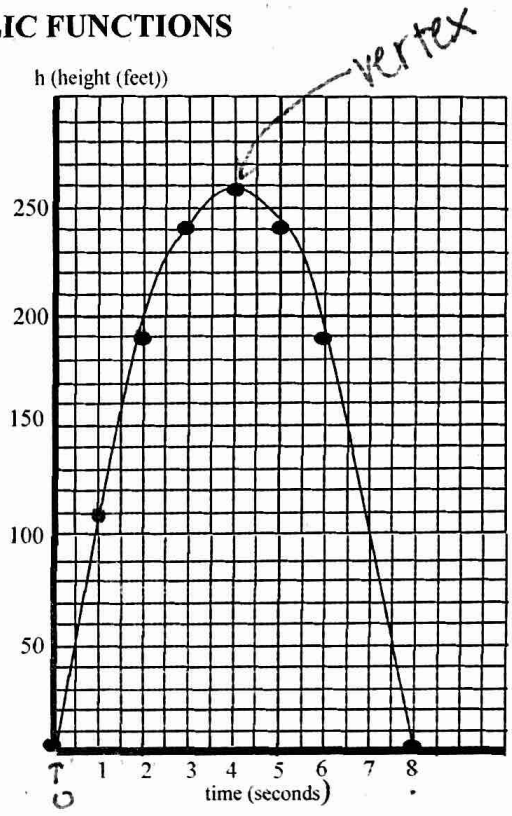
APPLICATIONS WITH PARABOLIC FUNCTIONS

1. Using the graph at the right, It shows the **height *h*** in feet of a small rocket ***t* seconds** after it is launched. The path of the rocket is given by the equation: **$h = -16t^2 + 128t$.**



a. How long is the rocket in the air? 8sec

b. What is the greatest height the rocket reaches? 260ft

c. About how high is the rocket after 1 second? 100-110ft

d. After 2 seconds,
   i. about how high is the rocket? 190ft
   ii. is the rocket going up or going down? up

e. After 6 seconds,
   a. about how high is the rocket? 190ft
   b. is the rocket going up or going down? down

f. Using the equation, find the **exact** value of the height of the rocket at 2 seconds.

$h = -16(2)^2 + 128(2)$
$= -16(4) + 128(2)$
$= -64 + 256$

$\boxed{h = 192\text{ft}}$

2. The height of a baseball coming off the bat can be modeled by the equation $h(t) = -4.9t^2 + 32t + 2$ where t is the time in seconds and height is in meters.

a. Find $h(3)$ and explain the real context of your answer.

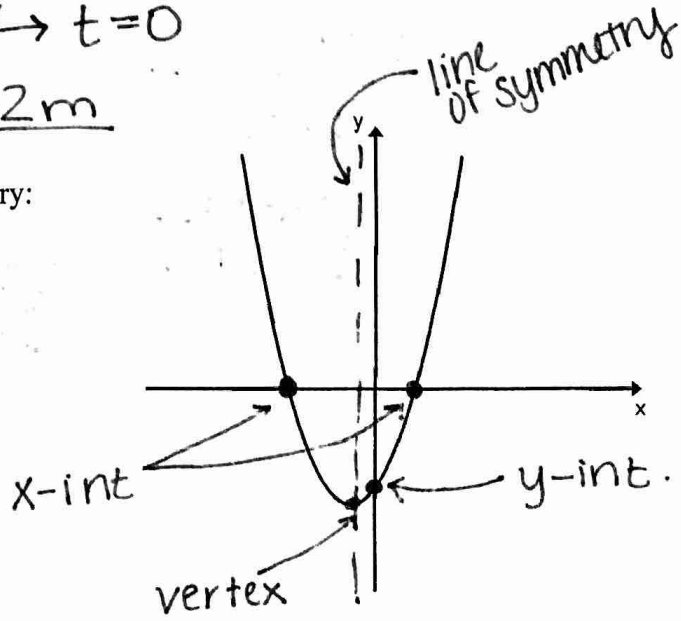
$h(3) = -4.9(3)^2 + 32(3) + 2 = 53.9\text{m}$ height of ball @ 3sec

b. How high was the ball off the ground when it was hit?

↳ $t = 0$

$h(0) = -4.9(0)^2 + 32(0) + 2 = 2\text{m}$

3. Given the following parabola, label the vertex, x-intercept(s), y-intercept(s) and the line of symmetry:



ex 1 vertex form: $y = a(x-h)^2 + k$ → V: (h, k)

$y = (x-7)^2 + 3$

U3, R7

V: (7, 3)

ex 2 $y = 3(x+1)^2 - 5$

V: (−1, −5)

L1
D5
VD by 3

ex 3 $y = -4(x+3)^2 + 8$

V: (−3, 8)

over x
VD by 4
L3
U8

ex 4 use a chart to graph $y = x^2 - x + 2$

X	−2	−1	0	1	2	3
Y	8	4	2	2	4	8

$(-2)^2 + 2 + 2$
$4 + 4$

$(-1)^2 + 1 + 2$
$1 + 1 + 2$

$1^2 - 1 + 2$

$2^2 - 2 + 2$

vertex
$x = 0.5$