# COLLEGE ALGEBRA

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**GPS # 11** **2.1 QUADRATIC FUNCTIONS; PARABOLAS** Class Time: 11:30 -12:45 Date: 1-31-08

**Useful Guidelines:**

* Quadratic Function: $f(x) = ax^2 + bx + c, (a \neq 0)$, where $a$, $b$ and $c$ are real numbers.
* The vertex of the graph of $f(x) = ax^2 + bx + c, (a \neq 0)$ has coordinates $(x, y) = \left(\frac{-b}{2a}, f\left(\frac{-b}{2a}\right)\right)$.
* The axis of symmetry of the parabola has equation $x = \frac{-b}{2a}$.
* To graph a quadratic function:
  Step 1: Determine whether the parabola opens up or down.
  Step 2: Find the vertex.
  Step 3: Find the $x$-intercepts (if any) and $y$-intercept.
  Step 4: Plot the graph. [Find additional points as needed.]

20/20 Good Math.

Graph each parabola, Give the vertex, axis, domain, and range.

1. a) $f(x) = x^2 - 4x + 3$

a=1
b=-4
c=3

f(2)=(2)²-4(2)+3
f(2)=-1

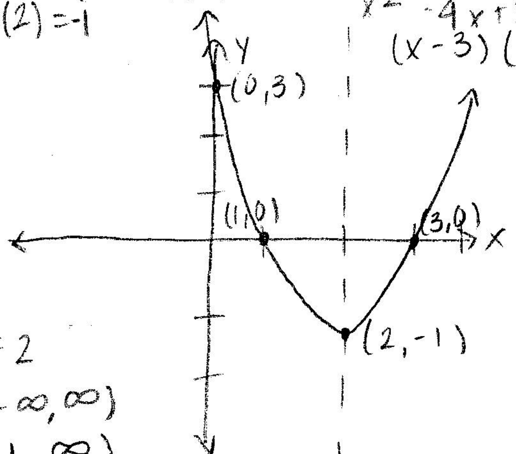
x=0 f(0)=3

x² -4x+3=0
(x-3)(x-1)

V=(2,-1)
AOS=2

x= -(-4) / 2(1) =2

domain: (-∞,∞)
range: [-1, ∞)




b) $f(x) = -4x^2 + 8x - 5$

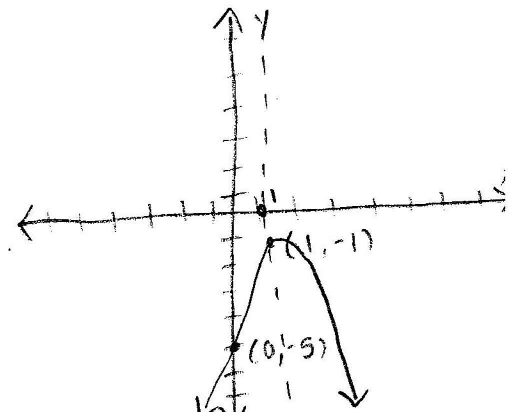
a= -4
b= 8
c= -5

f(1) = -4(1)²+8(1)-5
x=0 f(0)=-5

x= -8 / 2(-4) = 1

V= (1,-1)
AOS = x=1

domain:
(-∞,∞)
range:
(-∞, -1]




2. A rocket is fired upward. After $t$ hour, the height of the rocket is given by $S(t) = -2t^2 + 64t$. Find the time required in hours for the rocket to reach maximum height, and find the maximum height in kilometers.

a= -2
b=64
c=0

S(t)= -2t² +64t

t= -64 / 2(-2) = -64 / -4 = 16

S(16) = -2(16)² + 64(16)

=16 Hours
=512 Kilometers

3. The monthly total revenue for a beverage is given by $R(x) = 4000x - 0.1x^2$ dollars, where x is the number of units sold.

a) To maximize the monthly revenue, how many units must be sold?

a=-0.1
b=4000

-4000 / 2(-0.1) = 20,000 units

b) What is the maximum possible monthly revenue?

R(20,000) = 4000(20,000) - 0.1(20,000) =

$40,000,000