COLLEGE ALGEBRA

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GPS # 11 **2.1 QUADRATIC FUNCTIONS; PARABOLAS**

Class Time: 11:30 Date: 1-31-08

Useful Guidelines:

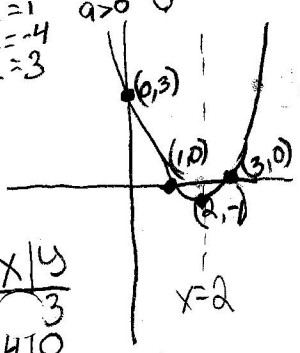
* Quadratic Function: $f(x)=ax^2+bx+c,(a\neq 0)$, where a, b and c are real numbers.
* The vertex of the graph of $f(x)=ax^2+bx+c,(a\neq 0)$ has coordinates $(x,y)=\left(\frac{-b}{2a},f\left(\frac{-b}{2a}\right)\right)$.
* The axis of symmetry of the parabola has equation $x=\frac{-b}{2a}$.
* To graph 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 job!

Graph each parabola, Give the vertex, axis, domain, and range. ax^2+bx+c $x=\frac{-b}{2a}$

1. a) $f(x)=x^2-4x+3$ $\frac{-(-4)}{2(1)}$ $x=2$ (2,-1) v+x

a=1 a>0 ∪
b=-4
c=3



D: (-∞,∞)
R: [-1,∞)

$2^2-4(2)+3=-1$

$x=0, f(0)=3$

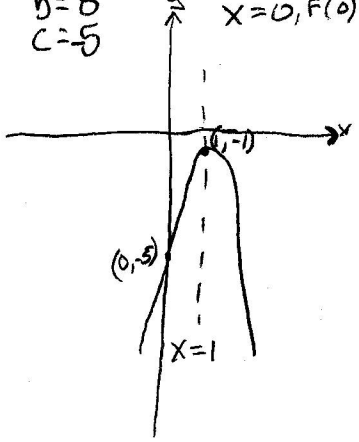
$x^2-4x+3=0$

$(x-3)(x-1)=0$ $x=1,3$

x	y
3	0
4	0

b) $f(x)=-4x^2+8x-5$ $x=-\frac{8}{2(-4)}$ $x=1$

a=-4 a<0 ∩ (1,-1) v+x
b=8
c=-5



$x=0, f(0)=-5$ $-4(1)^2+8(1)-5$

$-4+8-5=-1$

D: (-∞,∞)
R: (-∞,-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 a<0 $t=\frac{-64}{2(-2)}$ $t=16$ hours $2(16)^2+64(16)$ $-512+1024$ mh=512km

b=64
c=0

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=-.1 b=4000 a<0 ∩ $\frac{-4000}{2(-.1)}$ $x=20000$

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

$\frac{-b}{2a}$ $\frac{-4000}{2(-.1)}$ $x=20000$ units

b) What is the maximum possible monthly revenue?

$4000(20000)-.1(20000)^2=\$40,000,000$

$80,000,000-40,000,000=\$40,000,000$

So neat!