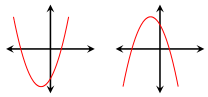
Section 1.1
Quadratic Functions
$y = ax^2 + bx + c$

i) Xavier Method – Finding roots by factoring, vertex and axis of symmetry by average of roots
ii) Domain and Range of QF
iii) Quadratic Formula
iv) Discriminant and the number of roots

Review: Linear and Quadratic Functions

- Linear Functions

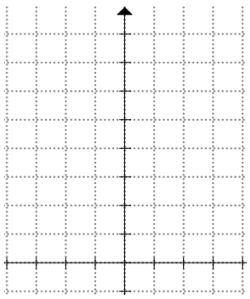
- Quadratic Functions



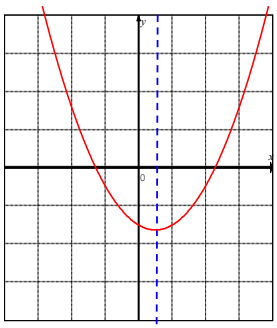
I) Why is a Quadratic Function U-shaped?

- If we make a TOV,

x	y
0	
1	
2	
3	
−1	
−2	
−3	



II) Components of a Parabola



Vertex:

Axis of Symmetry:

X intercepts:

Y intercept:

Graphing Parabolas with Xavier's Method

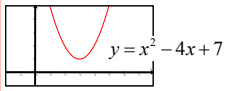
- First find the vertex using X.A.V.

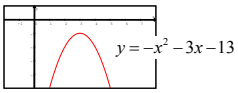
X:

A:

V:

-
-
-





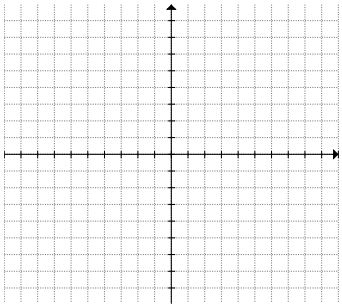
Ex: Find the x intercepts, Axis of Symmetry, Vertex and Graph $y = x^2 - x - 6$

1st Factor: X intercepts

2nd Axis of Symmetry (Equation)

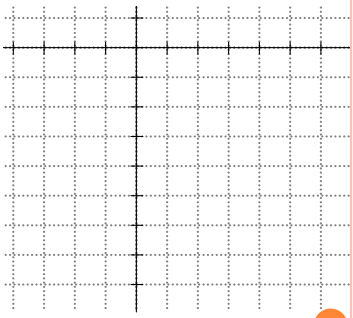
3rd Vertex: (Coordinates)

GRAPH: $y = x^2 - x - 6$



PRACTICE: FIND THE X INTERCEPTS, AXIS OF SYMMETRY, VERTEX AND GRAPH $y = 2x^2 + 3x - 9$

GRAPH: $y = 2x^2 + 3x - 9$



III) The Quadratic Formula:

- We need to factor a quadratic equation in order to
- To do this, use either the
- However, if a quadratic equation can not be factored, use the

Ex: Use the Quadratic Formula to find the exact values of "x" $3x^2 - 7x - 8 = 0$

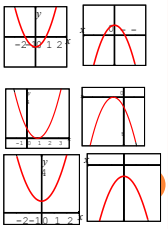
Ex: Solve for "x"

i) $3x^2 + 4x + 7 = 0$ *ii*) $(x+3)(5x+1) = (2x+1)(x+7)$

IV) Discriminant and Nature of the Roots

- To determine the "Nature of the Roots" of a QF (aka: the Number of X-intercepts),

- A Quadratic function can have either
  - 2 distinct roots
  - 2 equal roots
  - No real roots



Ex: Determine the nature of the roots for each equation: (Do not Solve)

i) $4x^2 - 7x + 8$ *ii*) $-3x^2 + 5x + 12$

III) Where does the QF come From?

- Take the equation: $ax^2 + bx + c = 0$ and Complete the Square. Then Isolate "x"