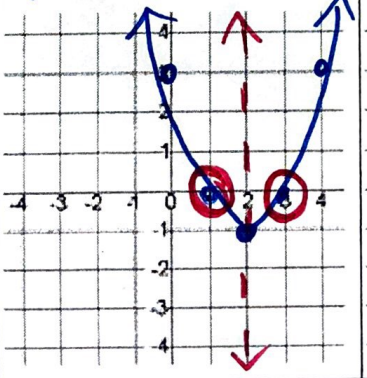
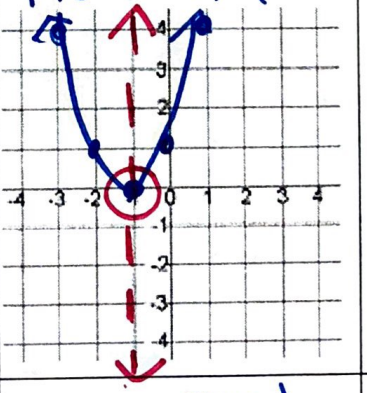
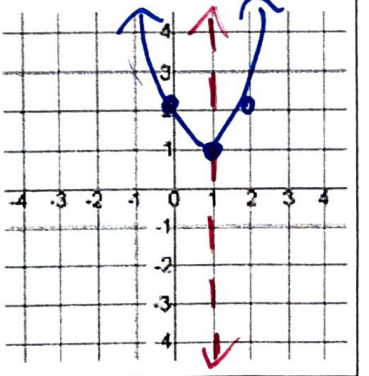
10-6 The Discriminant

$b^2 - 4ac$ $\qquad x = \dfrac{-b \pm \sqrt{b^2-4ac}}{2a}$

*You can determine the number of solutions of a quadratic equation by evaluating its discriminant.

Equation	$x^2 - 4x + 3 = 0$	$x^2 + 2x + 1 = 0$	$x^2 - 2x + 2 = 0$
Discriminant	$a=1\ b=-4\ c=3$ b^2-4ac $(-4)^2-4(1)(3)$ $16-12$ $\boxed{4}$ the discriminant is **POSITIVE**	$a=1\ b=2\ c=1$ b^2-4ac $(2)^2-4(1)(1)$ $4-4$ $\boxed{0}$ The discriminant is **ZERO**	$a=1\ b=-2\ c=2$ b^2-4ac $(-2)^2-4(1)(2)$ $4-8$ $\boxed{-4}$ the discriminant is **NEGATIVE**
Graph of Related Function	$x=\frac{-b}{2a}=\frac{4}{2}=2$ $4-8+3=-1\ (2,-1)$ $(0,3)$ $1-4+3=0\ (1,0)$ 	$x=\frac{-b}{2a}=\frac{-2}{2}=-1$ $1-2+1=0\ (-1,0)$ $(0,1)$ $1+2+1=4\ (1,4)$ 	$x=\frac{-b}{2a}=\frac{2}{2}=1$ $1-2+2=1\ (1,1)$ $(0,2)$ 
Number of Solutions	two real solutions	one real solution	no real solutions