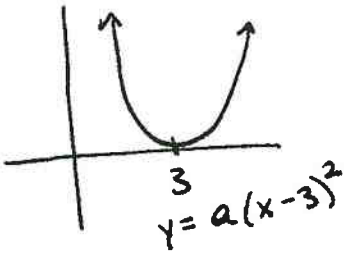
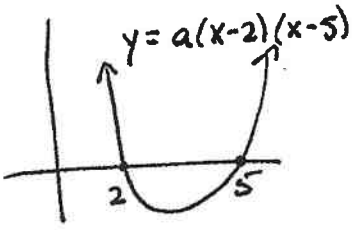
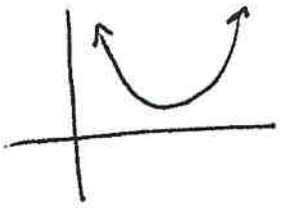
The Discriminant $\Delta = b^2 - 4ac$

$\Delta = 0$	$\Delta > 0$	$\Delta < 0$
one solution	two solutions	no solutions
one pt. on x-axis	two pts. on x-axis	no pts. on x-axis
		
one repeated solution	two distinct real solutions	no <u>real</u> solutions

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

$\Delta = (-4)^2 - 4(3)(-2)$

$\Delta = 16 + 24$

$\Delta = 40$

two distinct real irrational solutions

Ex $x^2 - 2x + m = 0$

Find m if

a. repeated root

$\Delta = (-2)^2 - 4(1)(m)$

$0 = 4 - 4m$

$\underline{1 = m}$

b. no real roots

$\Delta = 4 - 4m$

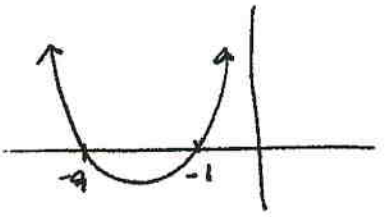
$4 - 4m < 0$

$-4m < -4$

$\underline{m > 1}$

Ex $kx^2 + (k+3)x = 1 \rightarrow kx^2 + (k+3)x - 1 = 0$

For what value(s) of k are there two real distinct solutions?



$\Delta = (k+3)^2 - 4(k)(-1)$

$\Delta = k^2 + 6k + 9 + 4k$

$\Delta = k^2 + 10k + 9$

$0 < (k+9)(k+1)$

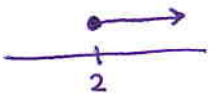
sign diagram

$k < -9$ or $k > -1$

$\boxed{(-\infty, -9) \cup (-1, \infty)}$

HW 1B

Interval Notation

inequality	$a \geq 2$	$-1 < a \leq 4$
number line		
American interval notation	$[2, \infty)$	$(-1, 4]$
Our book's interval notation	$[2, \infty[$	$]-1, 4]$