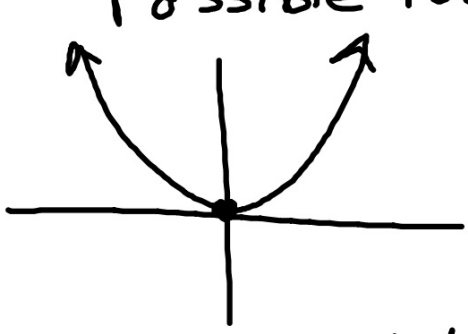
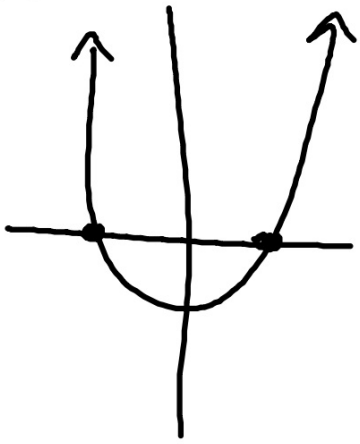
2.3 Roots of Quadratic

- Roots occur at zero
  (y=0 or x-intercepts)

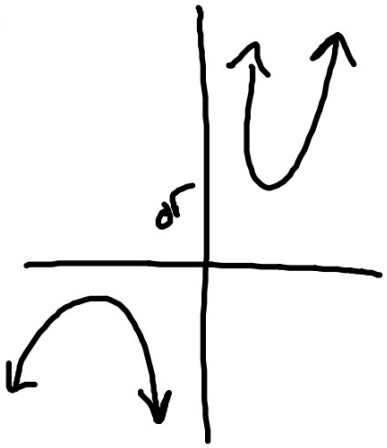
Possible roots:



1 root, repeated twice



2 roots



imaginary numbers under $\sqrt{}$

We can use the discriminant to determine how many real roots there are

the discriminant $x = \frac{-b \pm \sqrt{b^2-4ac}}{2a}$

if $b^2-4ac>0$, there will be two distinct real roots

if $b^2-4ac=0$, then there will be two equal roots

if $b^2-4ac<0$, then there are no real roots

Ex) Determine the number of real roots

a) $9x^2 + 6x + 1 = 0$

$b^2 - 4ac = (6)^2 - 4(9)(1)$

$= 36 - 36 = 0$

Two equal roots (same)

b) $(3x - 5) = \left(\frac{4}{x}\right)x$

$3x^2 - 5x = 4$

$3x^2 - 5x - 4 = 0$

$b^2 - 4ac = (-5)^2 - (4)(3)(-4)$

$= 25 + 48$

(+)

Two distinct real roots

Ex) Find the values of p such that the equation has two different real roots

$$px^2+5x+2=0$$

$a=p$
$b=5$
$c=2$

$$5^2-4p(2)>0$$

$$25-8p>0$$

$$\frac{-8p}{-8}>\frac{-25}{-8}$$

$$p<3.125$$

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