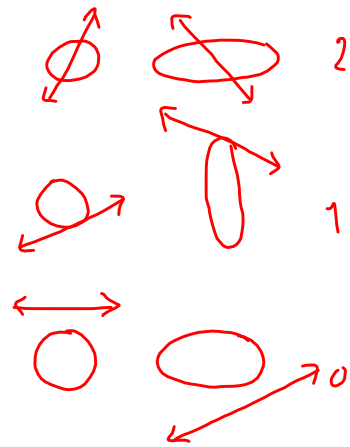
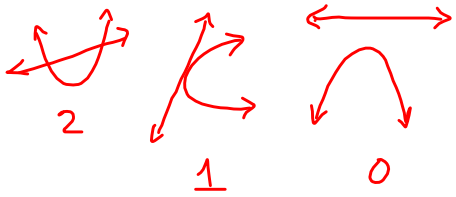
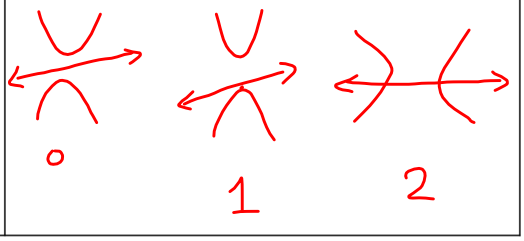
LINEAR & QUADRATIC SYSTEMS

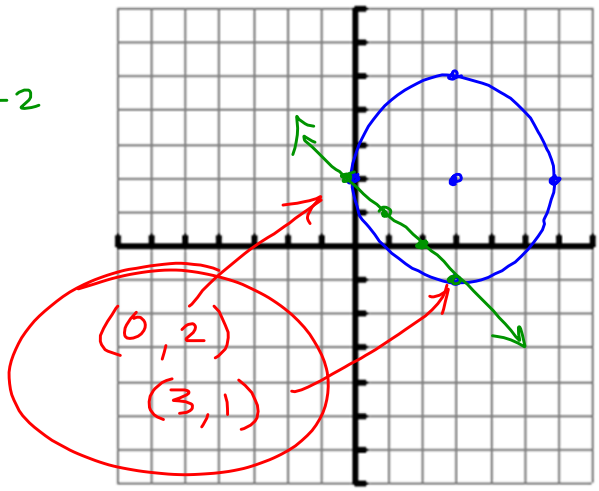
In how many ways can a quadratic & a line intersect?

a line and a circle or a line and an ellipse ...	a line and a parabola ...
	
	a line and a hyperbola ... 

SOLVE BY GRAPHING:

$$\begin{cases} (x-3)^2+(y-2)^2=9 \\ x+y=2 \end{cases}$$

$y = -x+2$



SOLVE ALGEBRAICALLY:

$$\begin{cases} x^2 + y^2 + 4x = 0 \\ y - x = 4 \end{cases} \longrightarrow y = x + 4$$

$x^2 + (x+4)^2 + 4x = 0$

$x^2 + x^2 + 8x + 16 + 4x = 0$

$2x^2 + 12x + 16 = 0$

$x^2 + 6x + 8 = 0$

$(x+4)(x+2) = 0$

$x = -4$	$x = -2$
$y = -4 + 4$	$y = -2 + 4$
$y = 0$	$y = 2$

$(-4, 0)$ $(-2, 2)$

SOLVE ALGEBRAICALLY:

$$\begin{cases} 3x + y^2 + 2 = 0 \\ 3x = y - 2 \end{cases} \longrightarrow y = 3x + 2$$

$3x + (3x+2) + 2 = 0$

$3x + 9x^2 + 12x + 4 + 2 = 0$

$9x^2 + 15x + 6 = 0$

$3x^2 + 5x + 2 = 0$

$(3x + 2)(x + 1) = 0$

$x = -\frac{2}{3}$	$x = -1$
$y = 3\left(-\frac{2}{3}\right) + 2$	$y = 3(-1) + 2$
$y = 0$	$y = -1$

$\left(-\frac{2}{3}, 0\right)$ $(-1, -1)$