

Lesson 95: More nonlinear systems

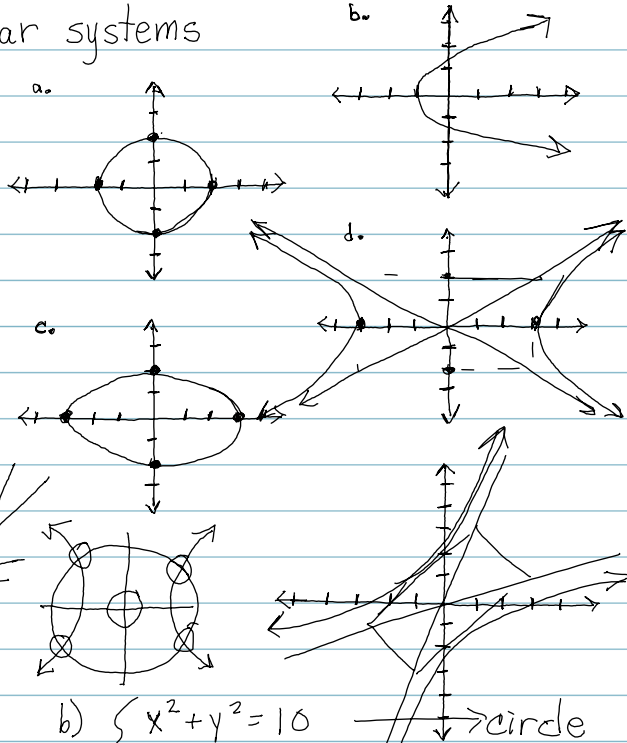
Line: $y = mx + b$

a. Circle: $x^2 + y^2 = r^2$

b. Parabola: $y = ax^2 + bx + c$

c. Ellipse: $ax^2 + by^2 = c$
oval

d. Hyperbola: $ax^2 - by^2 = c$
 or $xy = c$



p. 336 Diagrams

Practice Problems:

a) $\begin{cases} 3x - y = 4 & \text{(line)} \\ xy = 7 & \text{(hyperbola)} \end{cases}$
 $y = \frac{7}{x}$

b) $\begin{cases} x^2 + y^2 = 10 & \text{circle} \\ 3x^2 - y^2 = -2 & \text{hyperbola} \end{cases}$
 $\frac{4x^2}{4x^2} = \frac{8}{4x^2}$
 $\sqrt{x^2} = \pm\sqrt{2}$
 $x = \pm\sqrt{2}$

$(3x - \frac{7}{x} = 4) \cdot x$
 $3x^2 - 7 = 4x$

$3x^2 - 4x - 7 = 0$

$(3x - 7)(x + 1) = 0$

$\swarrow 3x^2 + 3x - 7x - 7 = 0$

$3x - 7 = 0$

$x + 1 = 0$

$3x = 7$

$x = -1$

$x = \frac{7}{3}$

$3x - y = 4$ $3(-1) - y = 4$

$3(\frac{7}{3}) - y = 4$ $-3 - y = 4$

$7 - y = 4$ $-y = -7$

$(\frac{7}{3}, 3)$ $(-1, 7)$

$x^2 + y^2 = 10$

$(-\sqrt{2})^2 + y^2 = 10$

$2 + y^2 = 10$

$y^2 = 8$

$y = \pm\sqrt{8}$

$y = \pm 2\sqrt{2}$

$(\sqrt{2}, 2\sqrt{2})$ $(-\sqrt{2}, 2\sqrt{2})$
 $(\sqrt{2}, -2\sqrt{2})$ $(-\sqrt{2}, -2\sqrt{2})$