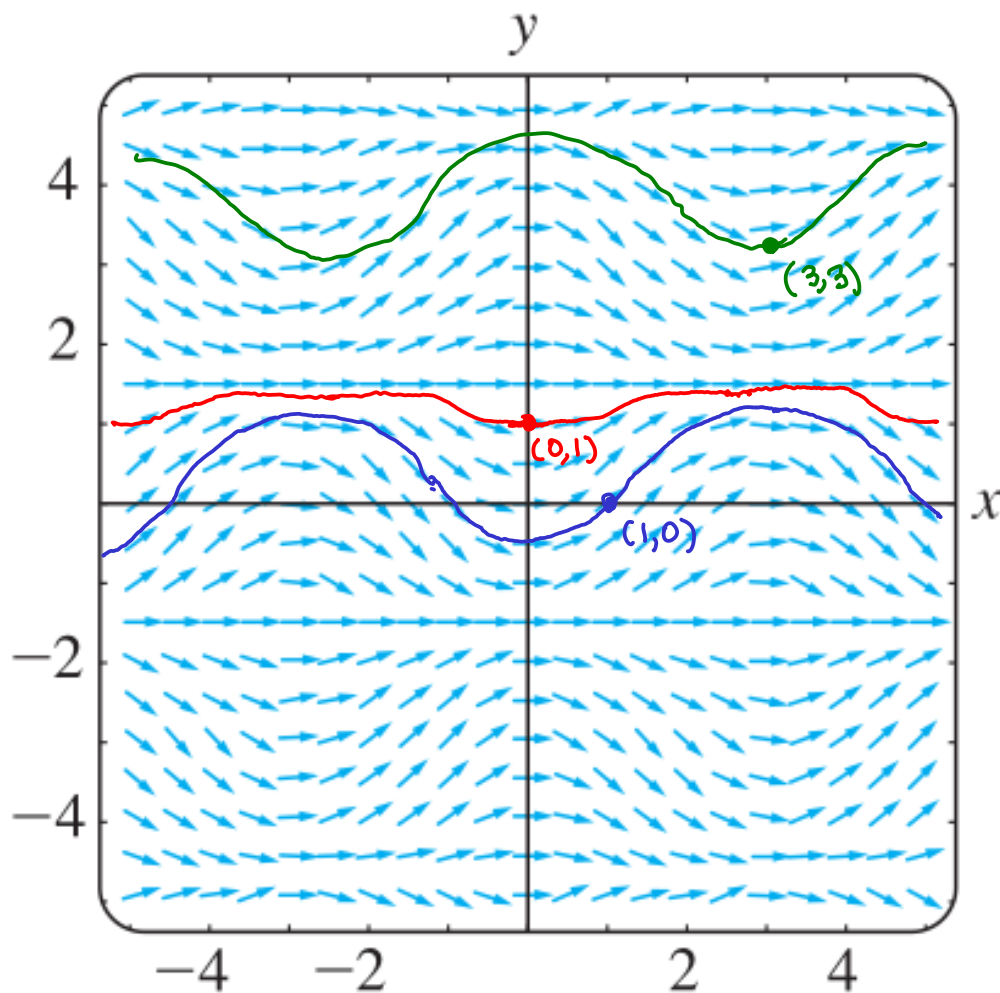




$$f(x, y) = (\sin x)(\cos y)$$

4. $\frac{dy}{dx} = (\sin x) \cos y$

(0, 1)

(a) $y(0) = 1$

(b) $y(1) = 0$

← (1, 0)

(c) $y(3) = 3$

(d) $y(0) = -\frac{5}{2}$

← (0, -5/2)

(3, 3)

General first order ordinary differential equations

$$\frac{dy}{dx} = f(x, y)$$

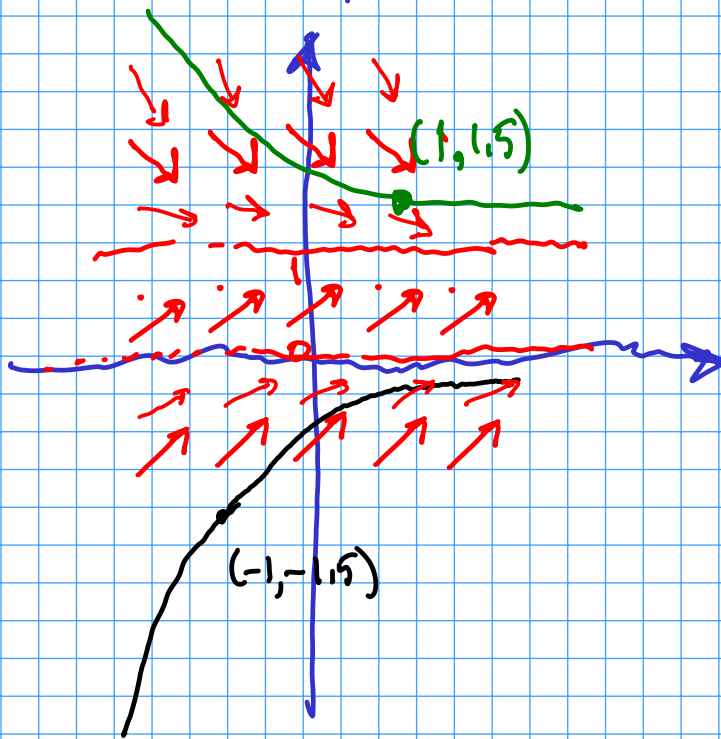
← if x dependency then the direction field depends on x ...

$$22. \frac{dy}{dx} = y^2 - y^3$$

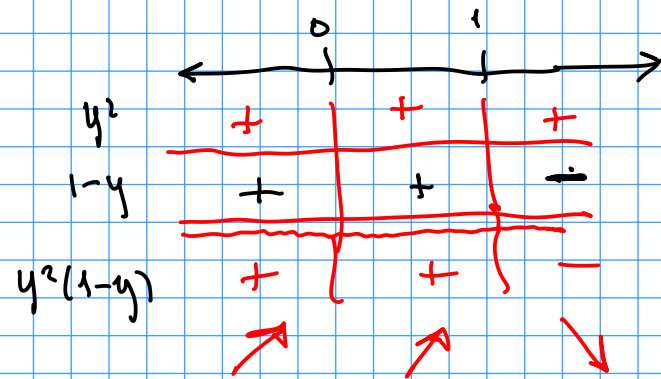
← autonomous means

$$\frac{dy}{dx} = f(y)$$

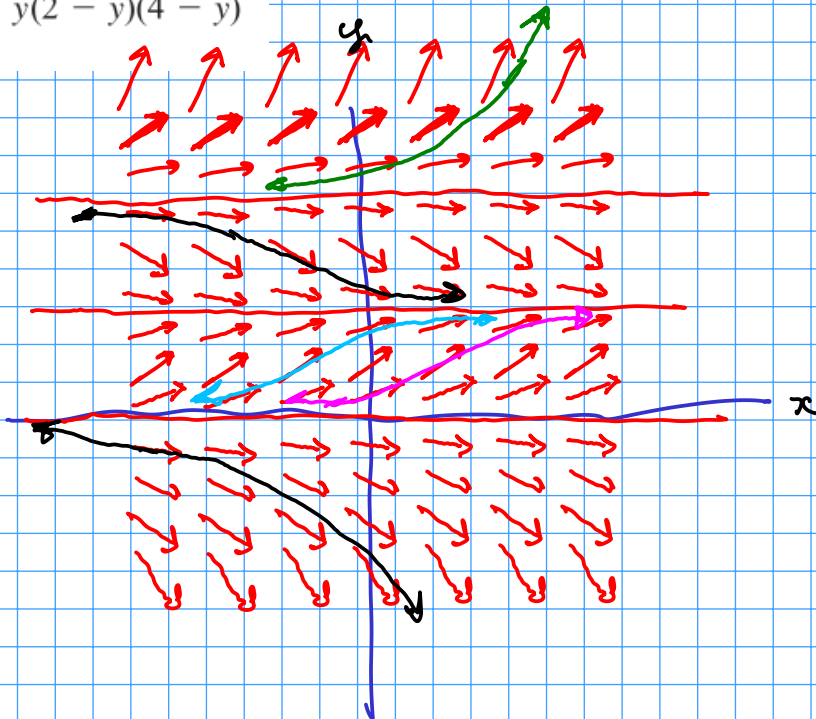
↖ no dependency on x
in the force..



when is $y^2 - y^3$ pos. neg or zero
 $= y^2(1-y)$



$$26. \frac{dy}{dx} = y(2-y)(4-y)$$



2.2 Separable Equations

$$\frac{dy}{dx} = \underbrace{g(x)h(y)}$$

$f(x,y)$ has a special form

$$\textcircled{1} \quad \frac{1}{h(y)} \frac{dy}{dx} = g(x)$$

divide

$$\textcircled{2} \quad \int \frac{1}{h(y)} \frac{dy}{dx} dx = \int g(x) dx$$

integrate both sides $\int \dots dx$

$$\textcircled{3} \quad \int \frac{1}{h(y)} dy = \int g(x) dx$$

use change of variables...