* call your absent friends! *

~ QUIZ TODAY ~

- Quiz pdf on Canvas
- Submit quiz via Gradescope

TODAY:

2:40 - 2:50 comments on HW1
2:50 - 3:17 concept review with practice problems
3:20 - 3:30 Quiz
3:30 - 3:40 Q&A

Is $y' = x+3$ linear

homogeneous: $y' = x$

Comments on HW1

$u = u'' + u'' + au$

0. Checking whether a diffEq is linear (notion of homogeneity)

y_1, y_2 solution $\Rightarrow \alpha y_1 + \beta y_2$ solution

H(y) ← find y(x)

$y' = y + 3$ homogeneous

$H(y) = y' - x$

1. Constant solution

assume $y \neq 0$

$y' = xy$

$\frac{1}{y} y' = x$

say $y = 0$ ✓

$y(0) = 1$

$y' = y$

$y \neq 0$

2. Finding minimum of a function

3. on writing Math

$\because a = 1, b = 2$

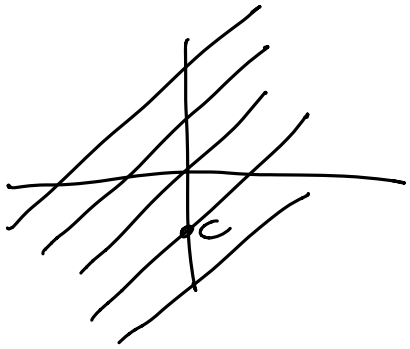
$\therefore a + b = 3$

BAD! more English please

Concept Review

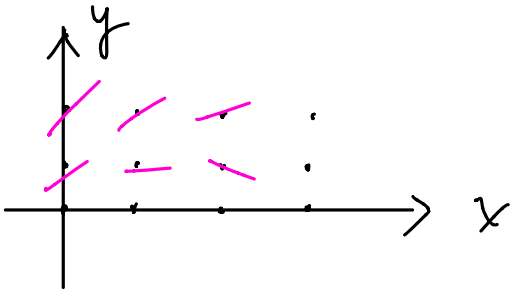
0. General solution VS particular solution

$$y = x + C$$



1. Direction field

What does it mean?



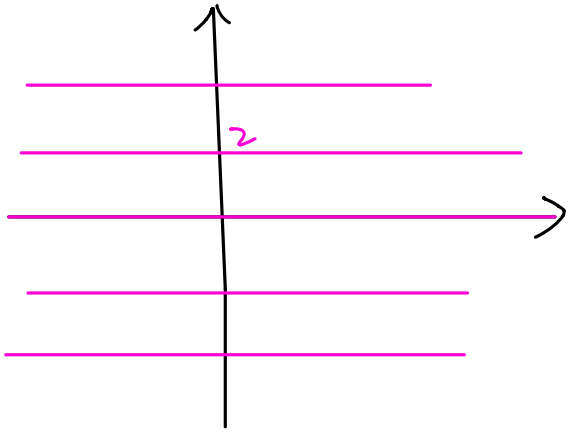
think of Eddy!

describe the slope of the solution at different pts

2. What is an isocline?

a curve where the slope in the direction field is the same

Example: dy/dx = y/2



$$\frac{dy}{dx} = 0$$

$$\frac{y}{2} = 0 \Rightarrow y = 0$$

$$\frac{dy}{dx} = C$$

$$\frac{y}{2} = C \Rightarrow y = 2C$$

3. What are three steps in building a mathematical model?

① Science
assumptions & hypotheses

② Notation
recognize relevant quantities & give them notation

③ Math
write a math equation using the assumption from ① & the notation from ②

4. What assumptions lead to Newton's Law of Cooling?

science

Rate of change in the temperature is proportional to difference of temperatures b/w the 2 objects

Notation is T_0 : obj temp T_s : surrounding temperature t : time k : proportionality constant

Differential equation is

math

$$\frac{dT_0}{dt} = k(T_s - T_0)$$

How does this correspond to the steps in building a mathematical model?