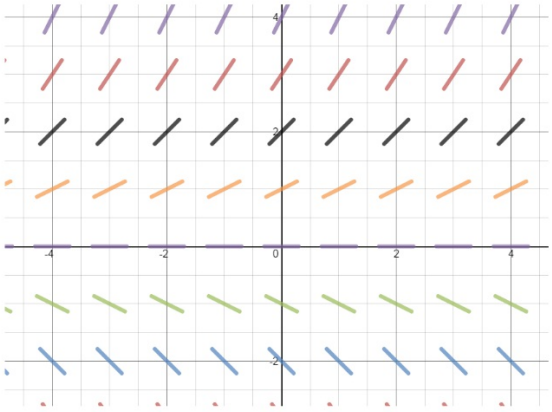
General Solution

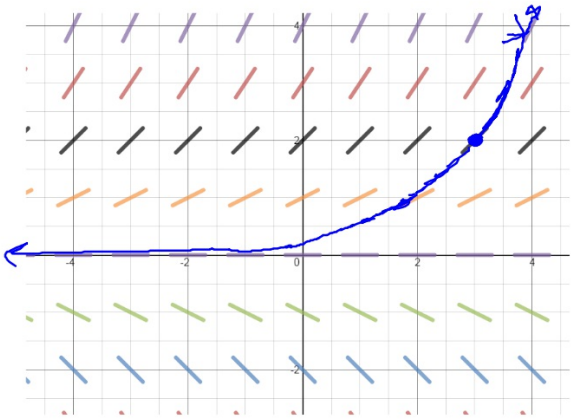
Notes

$\frac{dy}{dx} = 2y \rightarrow y = Ce^{2x}$



Particular Solution

Initial Condition: (3,2)



How to find a particular solution

Separation of variables
Group like terms
Integrate
Simplify...maybe solve for y
Plug initial condition (x,y) point
Solve for C, put it in
Solve for y

Example: Let $dx\left(\frac{dy}{dx}\right) = \left(\frac{-xy^2}{2}\right)dx$ Find y with initial condition y(-1)=2

x y

(-1, 2)

$-2\left(dy = -\frac{1}{2}xy^2\,dx\right)2$

$-2dy = xy^2\,dx$

$\frac{-2dy}{y^2} = \frac{xy^2\,dx}{y^2}$

$\int -2\cdot\frac{1}{y^2}dy = \int x\,dx$

$-2\int \frac{1}{y^2}dy = \frac{1}{2}x^2 + C$

$-2\int y^{-2}dy$

$\int x^n dx = \frac{x^{n+1}}{n+1} + C$

$*2\ \frac{y^{-1}}{-1} + C = \frac{1}{2}x^2 + C$

$2y^{-1} = \frac{1}{2}x^2 + C$

$\frac{2}{y} = \frac{1}{2}x^2 + C$ → use I.C.

$\frac{2}{2} = \frac{1}{2}(-1)^2 + C$

$1 = \frac{1}{2} + C$

$\frac{1}{2} = C$

$\frac{-2}{y} = -\frac{1}{2}x^2 + C$

$\frac{2}{y} = \frac{1}{2}x^2 + \frac{1}{2}$

$\frac{2}{y} \times \frac{x^2+1}{2}$

$y = y(x^2+1)$

$\frac{y}{x^2+1} = y$

Review Stations...will be pushed back to next Friday.
Please note the change on your calendars ("The Final Stretch")

Homework:

- Watch 2 review videos on mcalc.weebly.com
- Work on practice assessment; real assess in DS Weds
- MONDAY: timed 40 min no calculator AP test mult. choice
  OR work on roller coaster project