Two warm up exercises done before we went through 6.2 exercises from the text.

NOTES 12/6/11 CALCULUS

A Differential Equation is:

D.E.

an equation that has a derivative in it.

A Second Order Differential Equation is:

an equation with a second derivative in it.

$f''(x)$ $D_x^2 y$ d^2y/dx^2

Solve $\frac{dy}{dx} = 2^x + x^2$ } $y = \frac{2^x}{\ln 2} + \frac{1}{3}x^3 + C$

What does it mean to Solve a D.E.?

Find the function which satisfies the D.E. + any other conditions given.

Now solve it with an initial condition (or boundary condition) of (1,3). ~ helps solve for C.

$$3 = \frac{2^1}{\ln 2} + \frac{1}{3} \cdot 1^3 + C$$

$$C = \frac{8}{3} - \frac{2}{\ln 2}$$

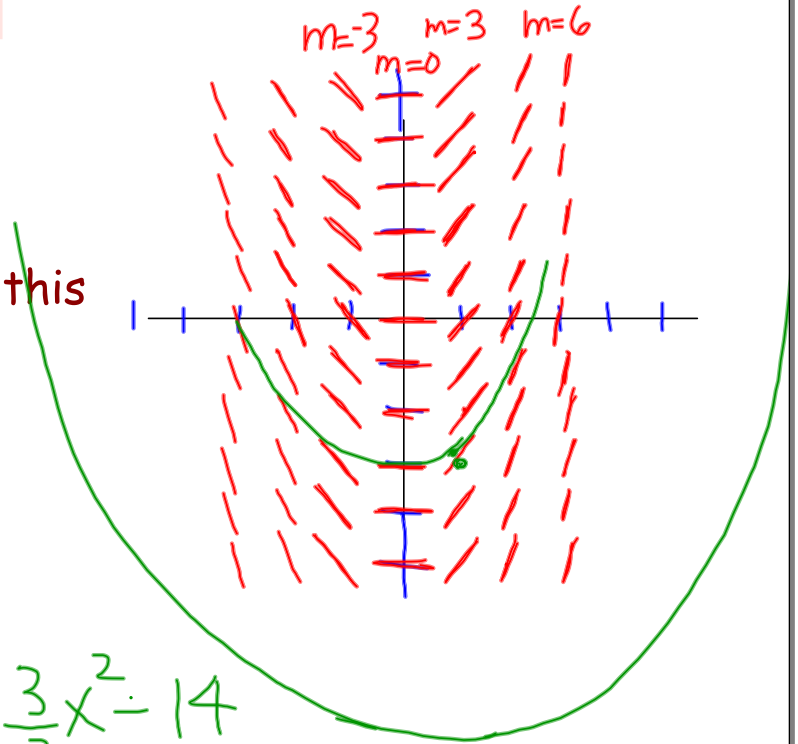
$$y(x) = \frac{2^x}{\ln 2} + \frac{x^3}{3} + \frac{8}{3} - \frac{2}{\ln 2}$$

Solve $\frac{dy}{dx}=3x$

$y=\frac{3}{2}x^2+C$

Create a slope field for this differential equation.

generated by a diff. eq + it gives us a peek at the solution's graph



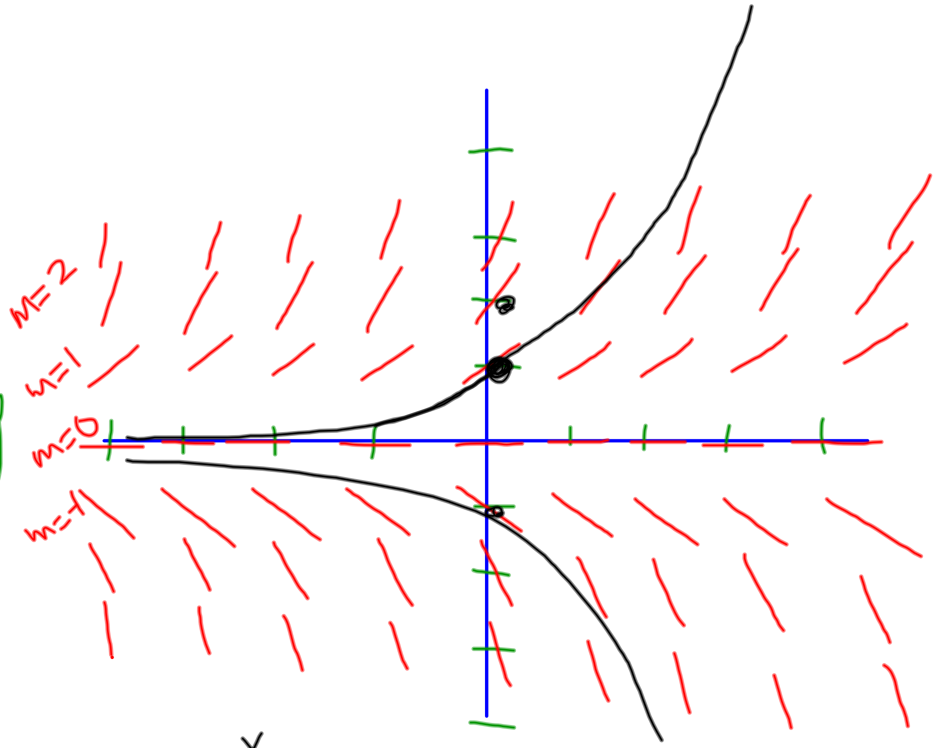
Solve $\frac{dy}{dx}=3x$ if $y(4)=10$

$10=\frac{3}{2}(4^2)+C$

$-14=C$

$y=\frac{3}{2}x^2-14$

Draw a slope field for $\frac{dy}{dx} = y$



exponential function!

e^x
$-e^x$
$2e^x$

$y = Ke^x$

$\frac{dy}{dx} = Ke^x$