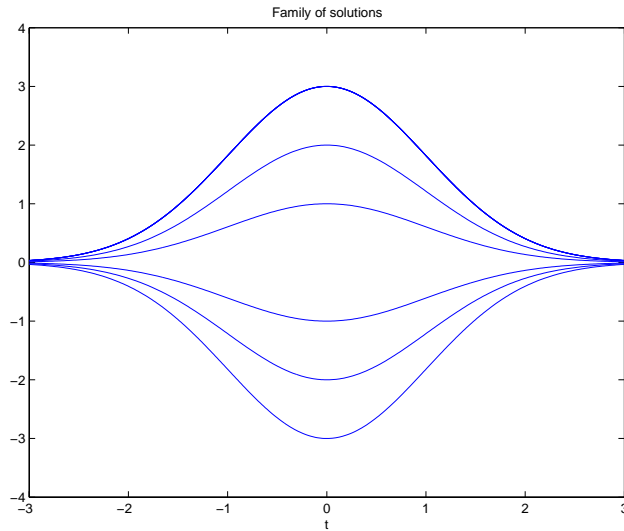


MATH 211 - HW #1 Solutions

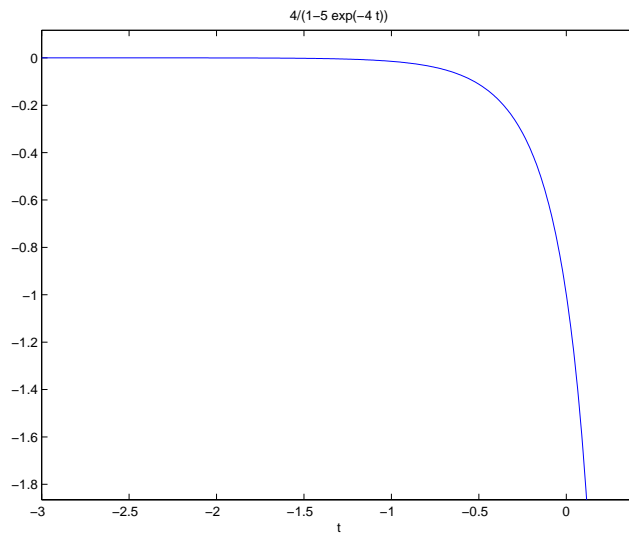
B 3/2.1 By direct computation, one shows that

$$y'(t) = Ce^{-(1/2)t^2} \frac{1}{2}(-2t) = -ty(t).$$

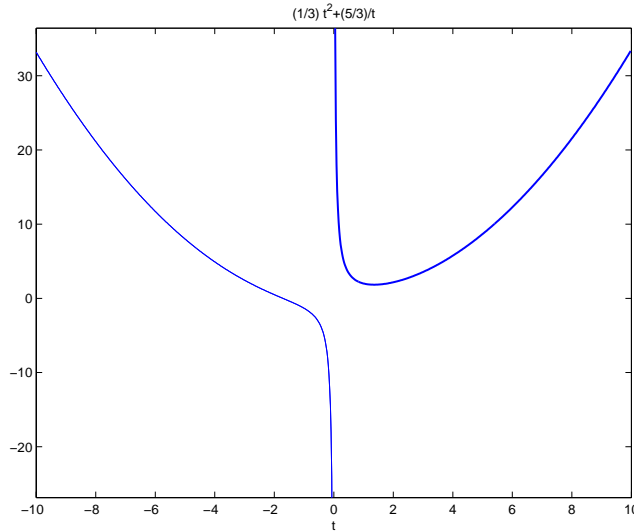
The family of solutions for $C = -3, -2, \dots, 3$ is plotted below.



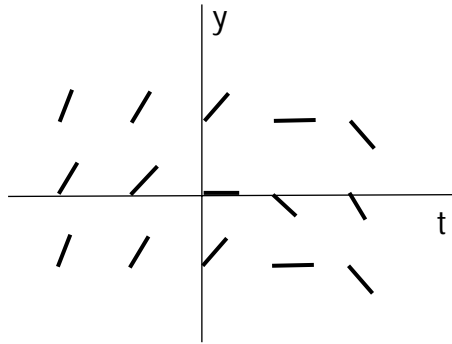
B 11/2.1 By direct computation, one shows that $y(t) = 4/(1 - 5e^{-4t})$ satisfies $y' = y(4 - y)$ and $y(0) = -1$. For the function $y(t)$ to be well defined, $t \neq (\ln 5)/4$. Since the initial condition is $y(0) = 1$, the interval of existence is $(-\infty, (\ln 5)/4)$.



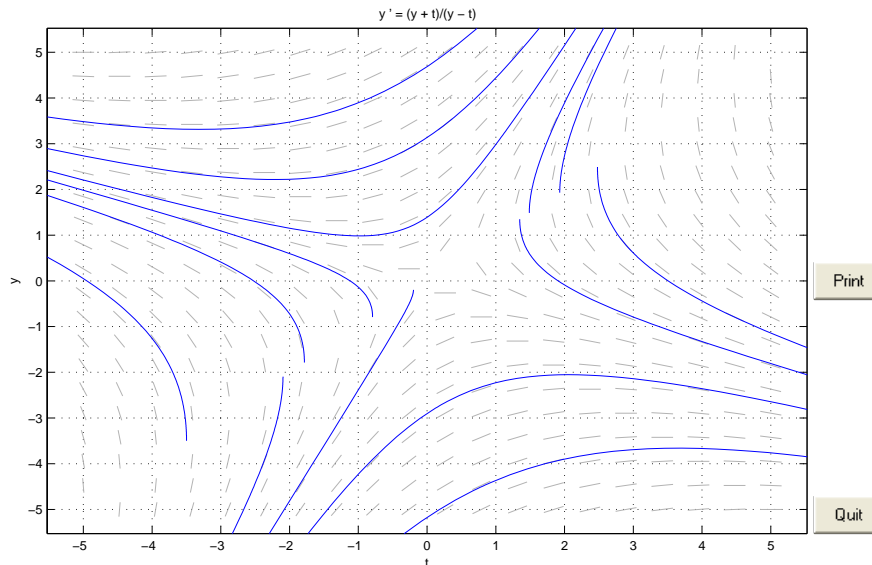
B 13/2.1 Substituting $y(1) = 2$ in the general solution $y(t) = (1/3)t^2 + C/t$, we get $1/3 + C = 2$, hence $C = 5/3$. The interval of existence is $(0, \infty)$.



B 18/2.1 At each integer valued coordinates (t, y) , one needs to draw a short line of slope $f(t, y) = y^2 - t$. For example at $(-2, -1)$ the slope is 5, etc.

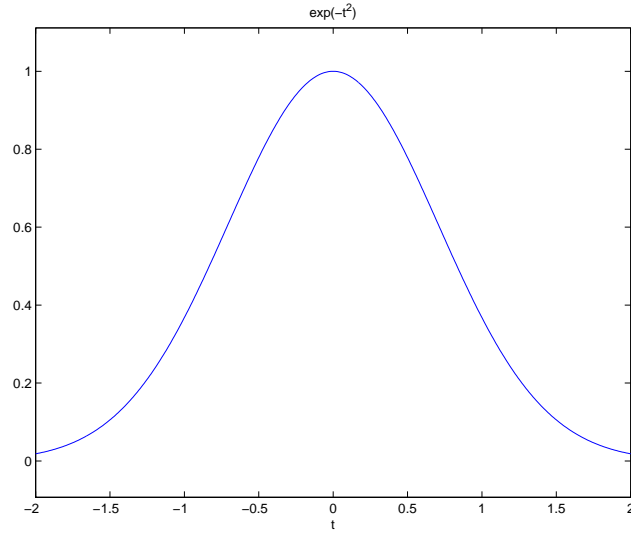


B 24/2.1 Use DFIELD6 to plot the direction field.



The backward orbit from [1.1, 3.2]
Ready.
The forward orbit from [2, 2.4] left the computation window.
The backward orbit from [2, 2.4] was stopped by the user.
Ready.

M 15/Ch.2 The command `dsolve('Dy=-2*t*y', 'y(0)=1')` gives you the solution $\text{ans}=\exp\{-t^2\}$ and its graph can be plotted with the command `ezplot(ans, [-2,2])`.



M 25/Ch.2 Using either `ezplot` (or `plot`) one obtains the following plots of the two curves.

