Given the ______________________________

$$\frac{dy}{dt} = -y^4 - 8y^3 - 21y^2 + 22y - 8 = -(y-1)^2(y-2)(y-4)$$

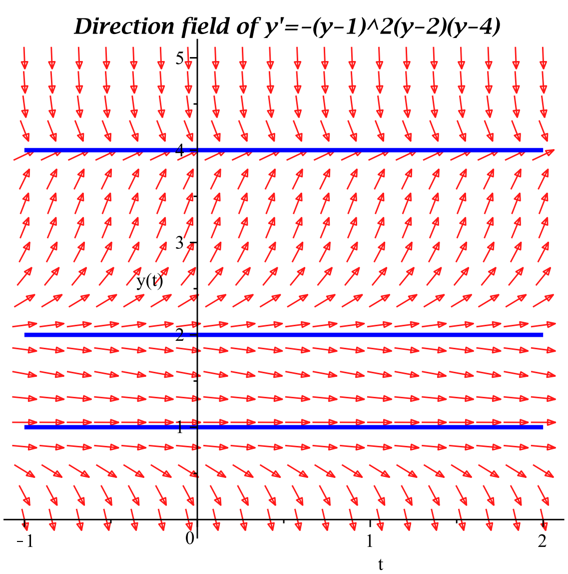
(a). Find all equilibrium solutions. i.e.

(b). Use the direction field below to determine the behavior of solutions as $t \to \infty$. ______________________________

<u>Ex</u>: If $y(0) = 3$, predict the asymptotic behavior (as $t \to \infty$).

Now use the direction field to do this generally for all possible initial conditions.

Since the ODE is autonomous, the slopes do not depend on t ie. Only need the value of y to give the slope



Classification and Stability of Equilibrium Points

If a solution is perturbed (ie. moves slightly) from the equilibrium point

1. ______________________ if all perturbed solutions return to approach it.

2. ______________________ if all perturbed solutions move away from it.

3. ______________________ if some perturbed solutions move away and some return to approach it.

Easier way (ie. w/o using the direction field) to sketch the phase line:

[More examples on the board.]

Homework: Section 2.5, p. 67: #[1, 2, 4, 6, 9 Do not sketch solutions in ty-plane], 16(a), 19, 20, [21(a) Then answer: For any initial condition $y(0) = y_0$, what will the proportion of the population infected with the disease approach as $t \to \infty$?]