1. Consider the differential equation

\[ y' = y^3 - 3y^2 \]

The graph of the phase curve \( g(y) = y^3 - 3y^2 \) is below; use this to help you sketch, on a separate set of axes, the constant solutions to the equation, as well as curves corresponding to the below initial conditions. Take care to show proper concavity behavior.

- \( y(1) = -1 \)
- \( y(1) = 2.9 \)
- \( y(1) = 4 \)

2. A wealthy grandfather opens a trust fund for his granddaughter. At the moment she begins to draw from the trust fund, its balance, in $US is \( K \), and it earns an annual return of 5.0%. She begins to make regular withdrawals to supplement her income amounting to $25,000 per year.

- Assuming the earnings and withdrawals are each enacted continuously, derive an initial value problem which models the balance of the account, \( t \) years after she begins drawing from it. (You do not have to solve the equation.)

- What is the equilibrium solution to this equation? Explain the significance of that number to the financial situation described in the problem. [Hint: compare solutions which take initial values above and below the equilibrium.]