$$x' = ax + 2xy$$
$$y' = 3y - y^2 + bxy$$

where a and b are constants. The direction field and phase portrait for the system are shown in the figure to the right. (Dots indicate initial conditions for the trajectories shown.)

a. [6 points] What are a and b? Be sure to explain your answer.



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b. [6 points] Suppose that x and y are populations of interacting species. What type of interaction is being modeled here? Explain what the phase portrait shown tells you about the behavior and expected long-term values of the populations and sketch a representative solution (x and y) against t.