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B. 8 critical points, 3 stable.

C. 8 critical points, 4 stable.

D. 9 critical points, 4 stable.

E. 9 critical points, 5 stable.

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How would you classify the equilibrium solution of the equation $y' = (1 - y)^2$?

Solving a first-order ODE

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B. is autonomous.

C. is separable.

D. does not have a unique solution for a given initial condition.

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Find the general solution of this equation.

Chemical reactions

A second order chemical reaction involves the interaction (collision) of one molecule of a substance P with one molecule of a substance Q to produce one molecule of a new substance X. Let p and q denote the initial concentrations of P and Q respectively, and let $x(t)$ denote the concentration of X at time t. The rate at which X is produced is proportional to the product of amount of P and Q remaining in the system. Write down the differential equation governing the system.

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(a) p

(b) q

(c) $\max(p, q)$

(d) $\min(p, q)$

(e) $(p + q)/2$