Measles
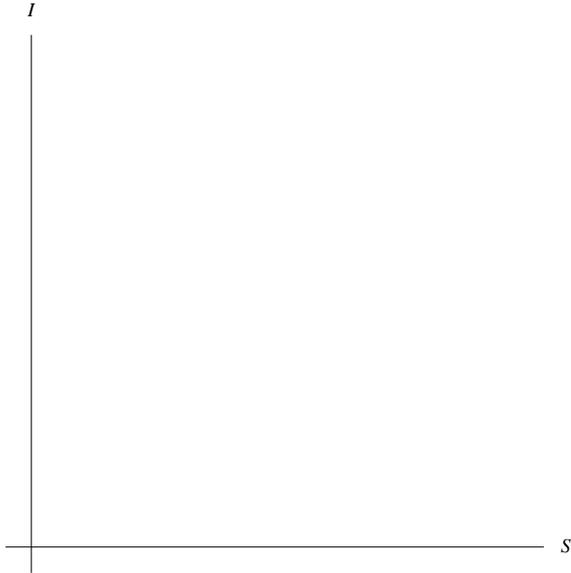
We'll look at the system

$$\frac{dS}{dt} = -IS + 50$$

$$\frac{dI}{dt} = IS - 10I$$

1. Do a qualitative phase plane analysis of this system. (You should draw equilibrium points, nullclines, and the direction of the trajectories in each region.)

I

S

2. Based on your phase plane analysis, what do you think the trajectories look like? Sketch a possible trajectory on your diagram if $S(0) = 5$ and $I(0) = 20$.

3. Using your trajectory, sketch a possible graph of $I(t)$ if $S(0) = 5$ and $I(0) = 20$.

4. This graph shows the number of cases of measles in 2 week periods in London from 1944 to 1966. Does our system give the same qualitative behavior?