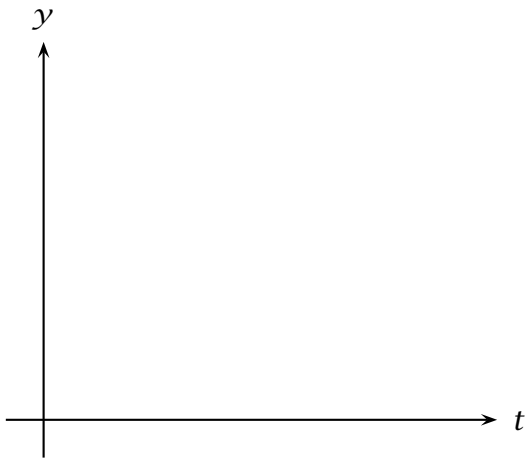
| MA 238-01<br>§1.1–1.3 | **Quiz #1** | *score* | **Name:** _____<br>**11 June 2000** |
|---|---|---|---|

1. Suppose the differential equation

$$y' = 22y - y^2 - 40$$

represents the rate of change of a population $y$ at time $t \geq 0$. Determine all equilibrium solutions. Sketch those solutions on the axes to the right, then sketch solution curves for a few other initial populations: say, $y(0) = 1, 3, 9, 15, 22$? Explain. *(10 points)*

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2. Use the method of integrating factors to find the general solution to the given differential equation. Explain what happens to the solutions as $t$ gets large. Then find the particular solution with the property $y(0) = 1$. *(10 points)*

$$\frac{dy}{dt} = -2ty - 4t$$