

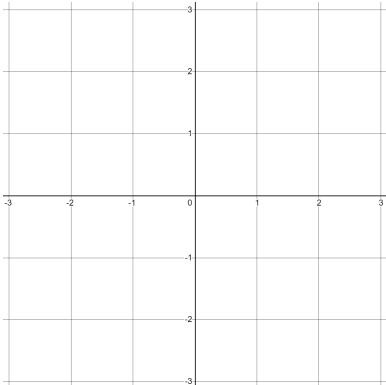
MTH 253

Mini Test 2

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- (10) 1. Without the aid of technology, use the axes below to sketch a direction field for the differential equation $\frac{dy}{dx} = xy + x - y$. Draw a slope at each of the intersections of the grid lines (a total of 49 slopes – we want a rough sketch, not a perfect graph).

Then sketch a solution curve that passes through $(0, 1)$.



- (7) 2. Solve the IVP $\frac{du}{dt} - u + 2tu = 0$, $u(1) = -6$.
- (8) 3. A cake is removed from the oven after baking thoroughly, and the temperature of the cake when it comes out of the oven is 230°C . The temperature of the kitchen is 21°C . After 10 minutes, the temperature of the cake is 165°C .
- Write a differential equation and initial condition to model this situation.
 - Solve the IVP you created in part (a).
 - How long will it take for the cake to reach 25°C .