Homework 4 - Math 142 **Name:** _____

1. Find the following without a calculator/computer:

   (a) $\log_2(12) + \log_2(\frac{2}{3})$

   (b) $\log_5(100) - \log_5(4)$

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2. Solve the following equations for x.

   (a) $\log_{10}(x) + \log_{10}(x) = 8$

   (b) $\log_x(10) = 2$

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3. Find these logarithms without a calculator/computer:

   (a) $\log_2(8\sqrt{8})$

   (b) $\log_{10}\left(\frac{1}{\sqrt{1{,}000{,}000}}\right)$

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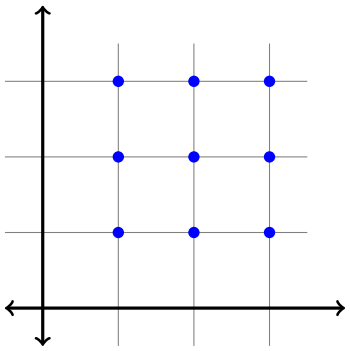
4. Use the axes below to sketch a slope field for the differential equation $\frac{dy}{dx} = \frac{y}{x-2}$. Indicate the slopes at the nine points with whole number (x, y)-coordinates from 1 to 3.



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5. Solve the initial value problem $y' = x^2/y$ with initial condition $y(0) = 3$.

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6. Solve the initial value problem $\dfrac{dy}{dt} = y + 5$ with initial condition $y(0) = 2$.

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7. Solve $x^2 + 6y\dfrac{dy}{dx} = 0$.

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8. Find the solution $P(t)$ of the differential equation

$$\frac{dP}{dt} = P^2 \cos t$$

that satisfies the initial condition $P(0) = \frac{1}{2}$.
