WeBWorK assignment number Exercises_5

This is an exercise assignment, treated differently from ordinary WeBWork assignments. The WeBWork due date is the same as the opening date, so that answers are available to students immediately. Students are to print the assignment and work the problems on paper. That work will be collected periodically and graded for effort. Exercises are worth 20 points (4% of the overall grade).

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1. **(1 pt) Library/maCalcDB/setIntegrals21Length/ur_in_21_1.pg**

To find the length of the curve defined by

$$y = 4x^4 + 6x$$

from the point (-1,-2) to the point (3,342), you'd have to compute

$$\int_a^b f(x)dx$$

where a=_____,
b=_____,
and f(x) = ____________________

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2. **(1 pt) Library/maCalcDB/setIntegrals21Length/ur_in_21_3.pg**

Find the length of the curve defined by

$$y = 2\ln\left(\left(\frac{x}{2}\right)^2 - 1\right)$$

from $x = 4$ to $x = 7$.

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3. **(1 pt) Library/Rochester/setIntegrals21Length/ns6_3_18.pg**

If $f(\theta)$ is given by: $f(\theta) = 2\cos^3\theta$ and $g(\theta)$ is given by: $g(\theta) = 2\sin^3\theta$

Find the total length of the astroid described by $f(\theta)$ and $g(\theta)$. (The astroid is the curve swept out by $(f(\theta), g(\theta))$ as θ ranges from 0 to 2π.)

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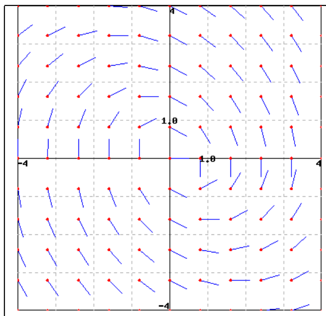
4. **(1 pt) Library/maCalcDB/setDiffEQ2DirectionFields/ur_de_2_3.pg**

Match the following equations with their direction field. Clicking on each picture will give you an enlarged view. While you can probably solve this problem by guessing, it is useful to try to predict characteristics of the direction field and then match them to the picture.

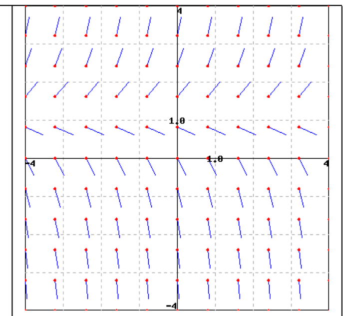
Here are some handy characteristics to start with – you will develop more as you practice.

A. Set y equal to zero and look at how the derivative behaves along the x-axis.
B. Do the same for the y-axis by setting x equal to 0
C. Consider the curve in the plane defined by setting $y' = 0$ – this should correspond to the points in the picture where the slope is zero.
D. Setting y' equal to a constant other than zero gives the curve of points where the slope is that constant. These are called isoclines, and can be used to construct the direction field picture by hand.

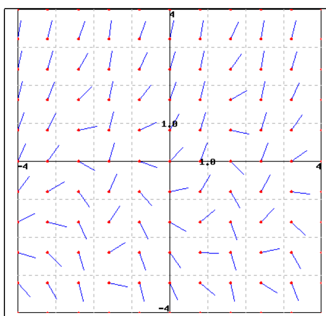
___1. $y' = 2\sin(3x) + 1 + y$
___2. $y' = \dfrac{y}{x} + 3\cos(2x)$
___3. $y' = 2y - 2$
___4. $y' = -\dfrac{(2x+y)}{(2y)}$



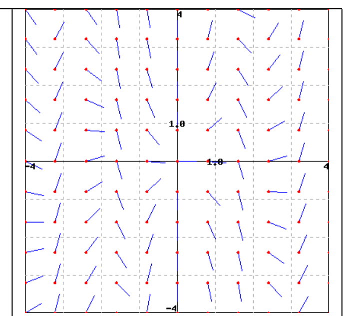
A



B



C



D

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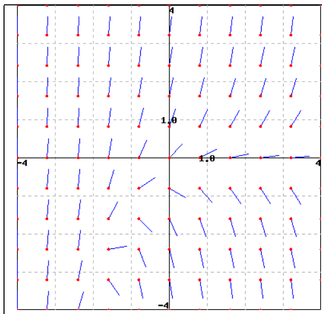
5. **(1 pt) Library/maCalcDB/setDiffEQ2DirectionFields/ur_de_2_4.pg**

Match the following equations with their direction field. Clicking on each picture will give you an enlarged view. While you can probably solve this problem by guessing, it is useful to try to predict characteristics of the direction field and then match them to the picture. Here are some handy characteristics to start with – you will develop more as you practice.

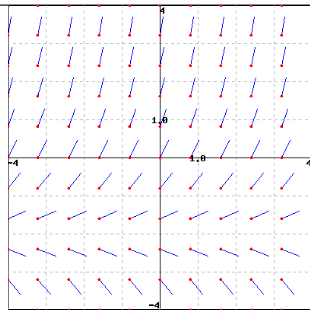
A. Set y equal to zero and look at how the derivative behaves along the x-axis.
B. Do the same for the y-axis by setting x equal to 0
C. Consider the curve in the plane defined by setting $y' = 0$ – this should correspond to the points in the picture where the slope is zero.
D. Setting y' equal to a constant other than zero gives the curve of points where the slope is that constant. These

are called isoclines, and can be used to construct the direction field picture by hand.

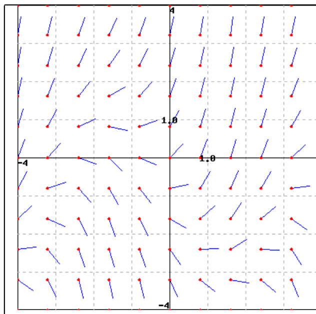
___1. $y' = e^{-x} + 2y$
___2. $y' = y + 2$
___3. $y' = 2\sin(x) + 1 + y$
___4. $y' = 2y + x^2 e^{2x}$



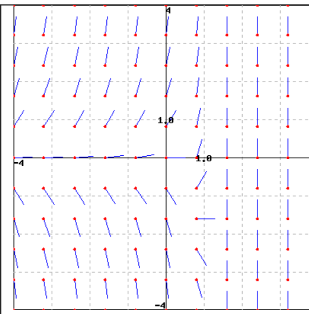
A



B



C



D