2) $\begin{cases} y' = x^2 + y \\ y(0) = -2 \end{cases}$; $h = .25$; approx. $y(1.25)$ $\begin{cases} y' = \frac{dy}{dx} = f(x,y) \\ y(x_0) = y_0 \end{cases}$; $y_{n+1} = y_n + h \cdot f(x_n, y_n)$

for $n = 0,1,2,3 \ldots$

n	x_n	y_n
0	0	-2
1	.25	-2.5
2	.5	-3.109375
3	.75	-3.8242..
4	1	-4.6396..
5	1.25	-5.54956..

- $y_{n+1} = y_{0+1} = y_1 = y_0 + (.25) f(x_0, y_0) \leftrightarrow y_1 = -2 + (.25)(-2) = -2.5$
- $y_2 = -2.5 + (.25)(.25^2 + [-2.5]) \approx -3.109375$
- $y_3 = -3.109375 + (.25)(.5^2 + [-3.109375]) \approx -3.82421875$
- $y_4 = -3.824\ldots + (.25)(.75^2 + [-3.824\ldots]) \approx -4.6396484375$
- $y_5 = -4.6396\ldots + (.25)(1^2 + [-4.6396\ldots]) \approx -5.5495605468875$

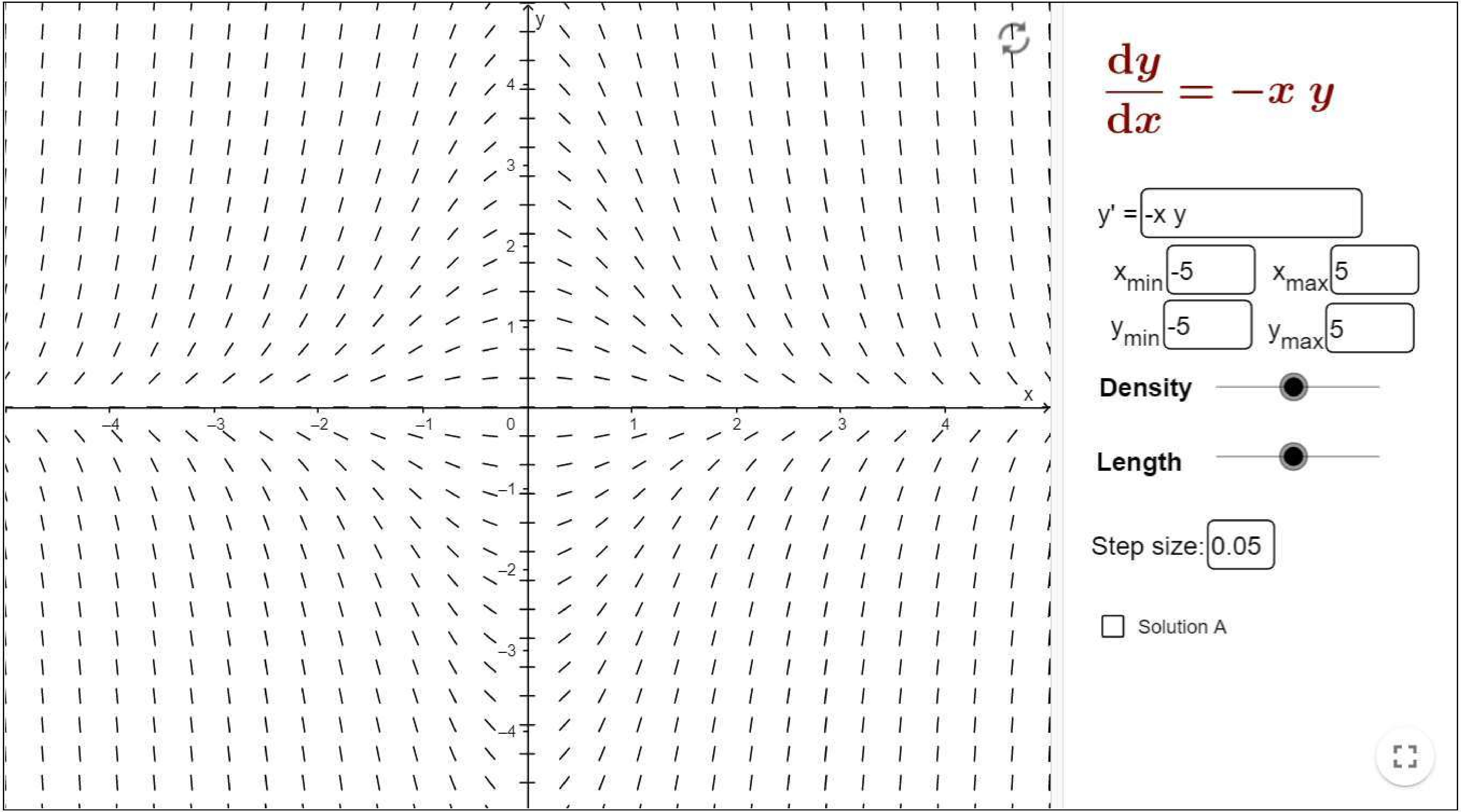
$\boxed{\therefore y(x_5) = y_5 \leftrightarrow y(1.25) \approx -5.54956}$

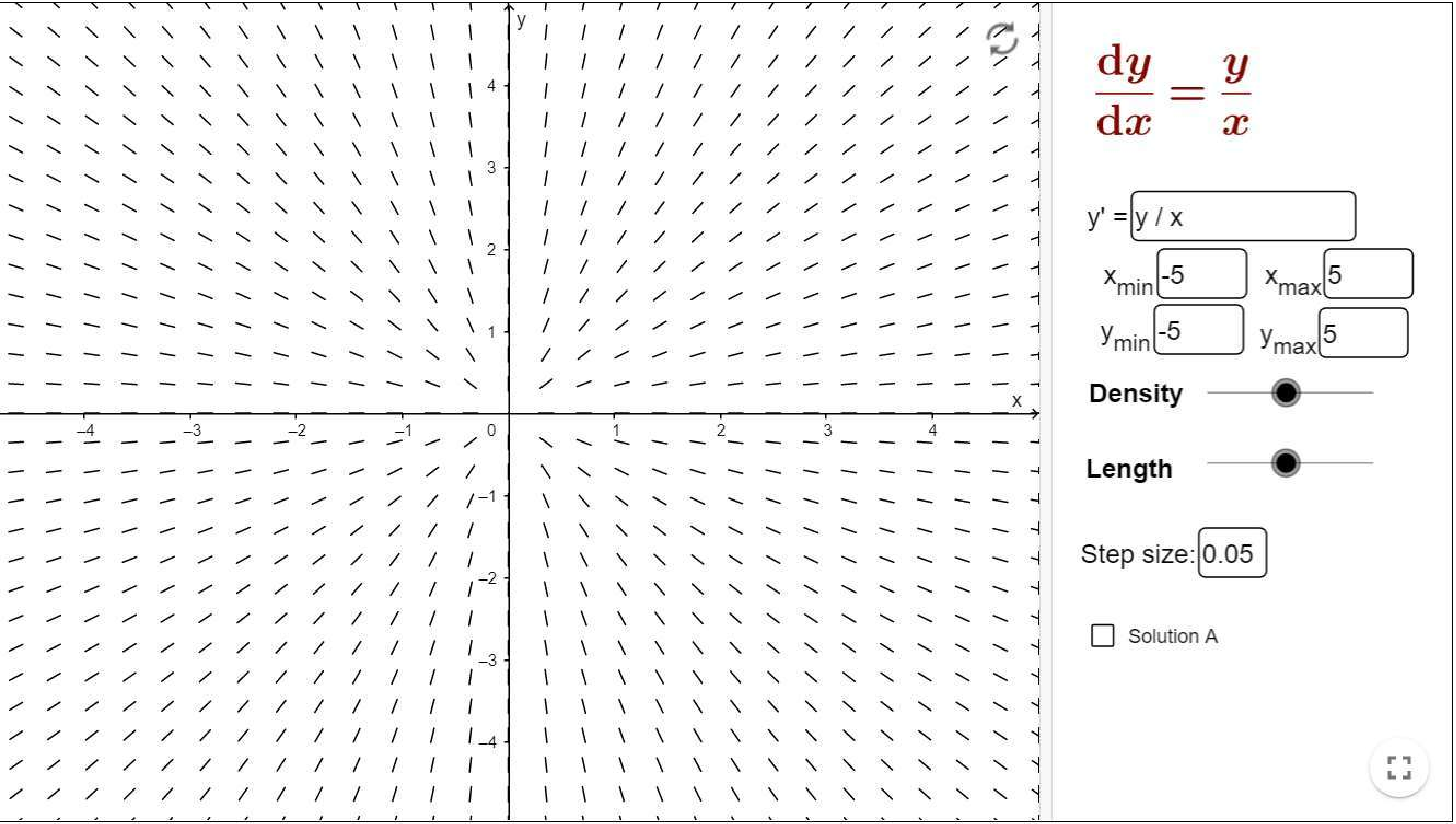
3) $\begin{cases} y' = y - x \\ y(0) = 3 \end{cases}$; $n = 5$; $0 \le x \le 1$ ① find $h \rightarrow h = \frac{1-0}{5} = \frac{1}{5} = .2$

n	x_n	y_n
0	0	3
1	.2	3.6
2	.4	4.28
3	.6	5.056
4	.8	5.9472
5	1	6.97664

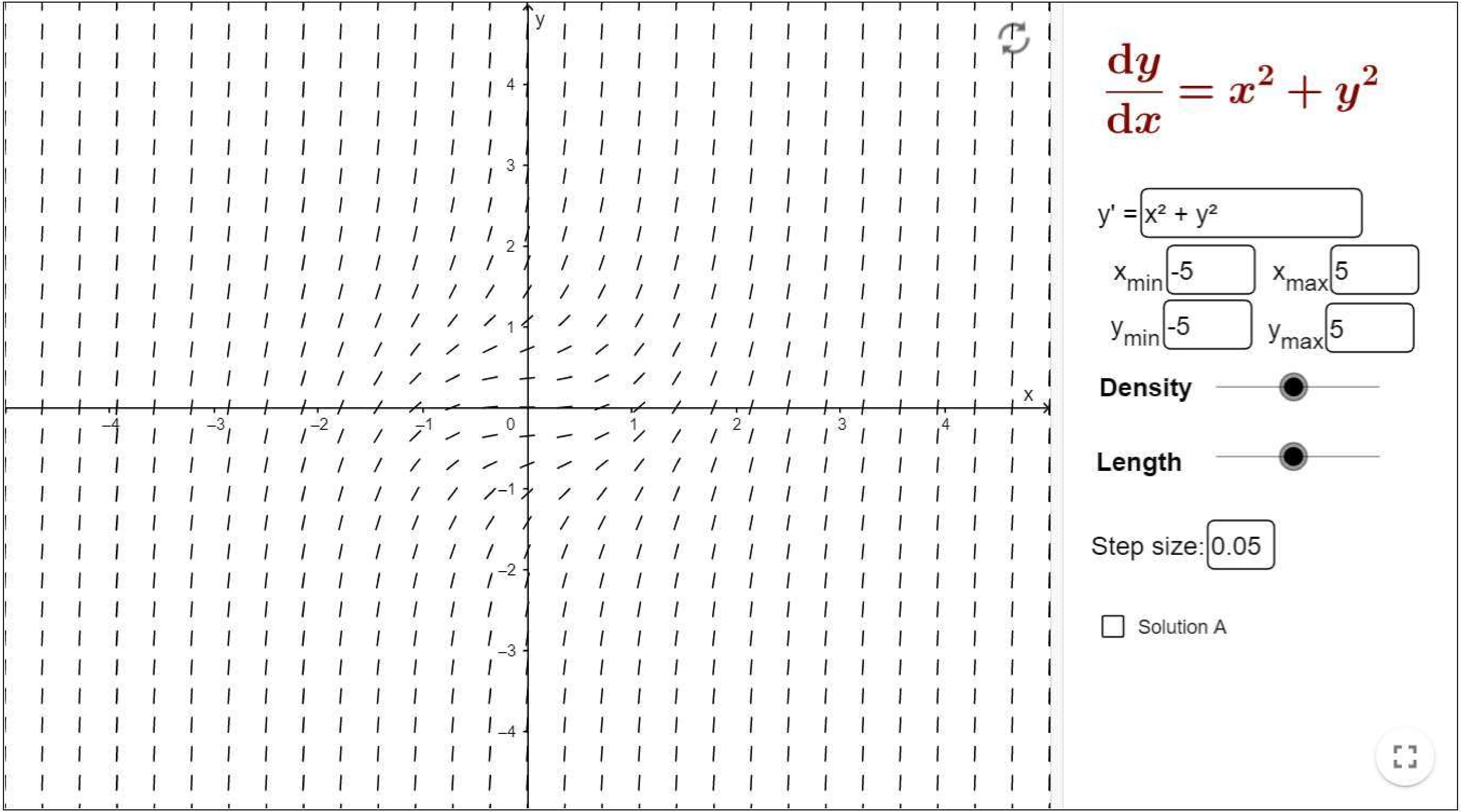
- $y_1 = 3 + (.2)(3 - 0) = 3.6$
- $y_2 = 3.6 + (.2)(3.6 - .2) = 4.28$
- $y_3 = 4.28 + (.2)(4.28 - .4) = 5.056$
- $y_4 = 5.056 + (.2)(5.056 - .6) = 5.9472$
- $y_5 = 5.9472 + (.2)(5.9472 - .8) = 6.97664$

$\boxed{\therefore y(x_5) = y_5 \leftrightarrow y(1) = 6.97664}$

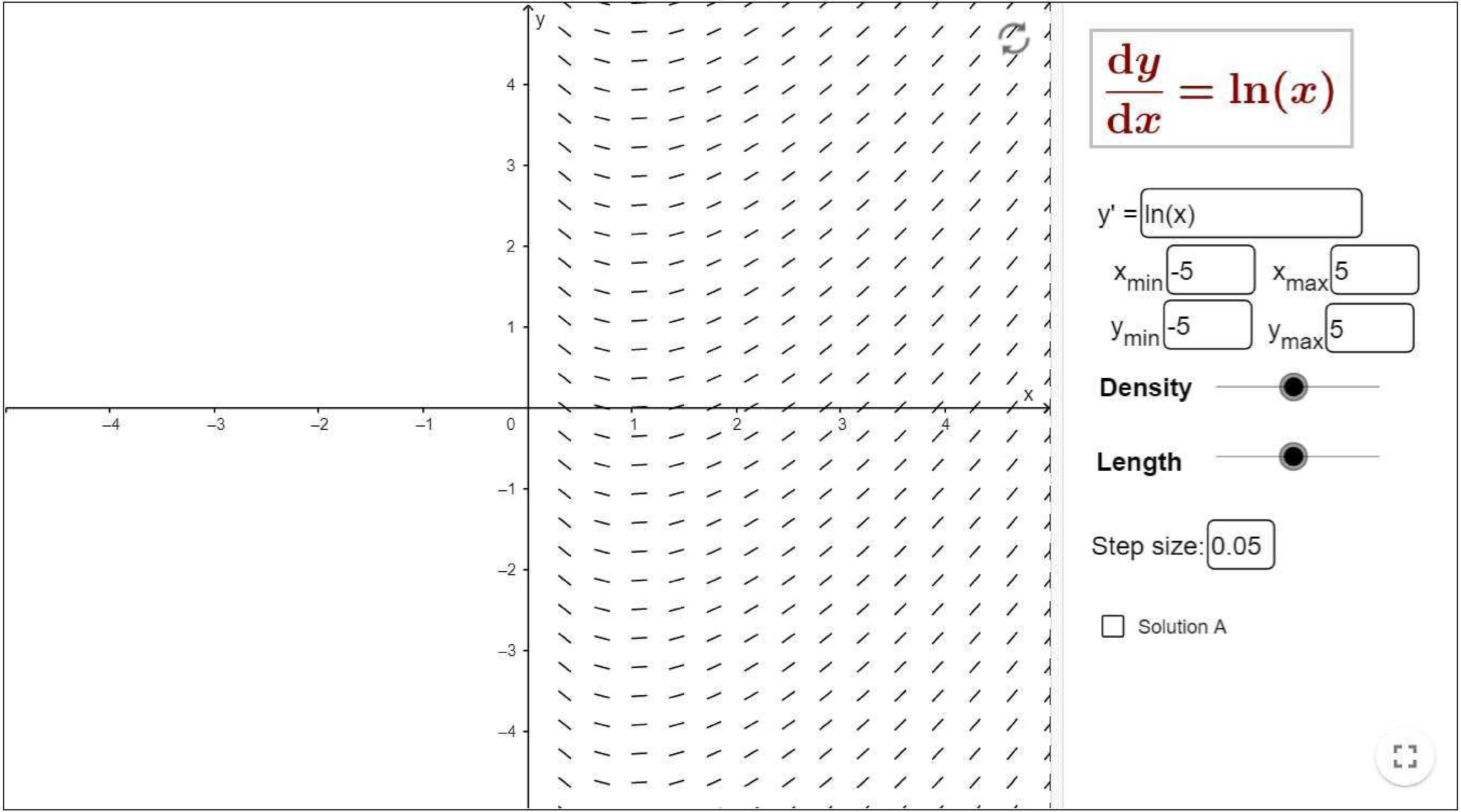

y
x
-4
-3
-2
-1
0
1
2
3
4
$\frac{dy}{dx} = -x\,y$
y' = -x y
x_{min} -5
x_{max} 5
y_{min} -5
y_{max} 5
Density
Length
Step size: 0.05
Solution A



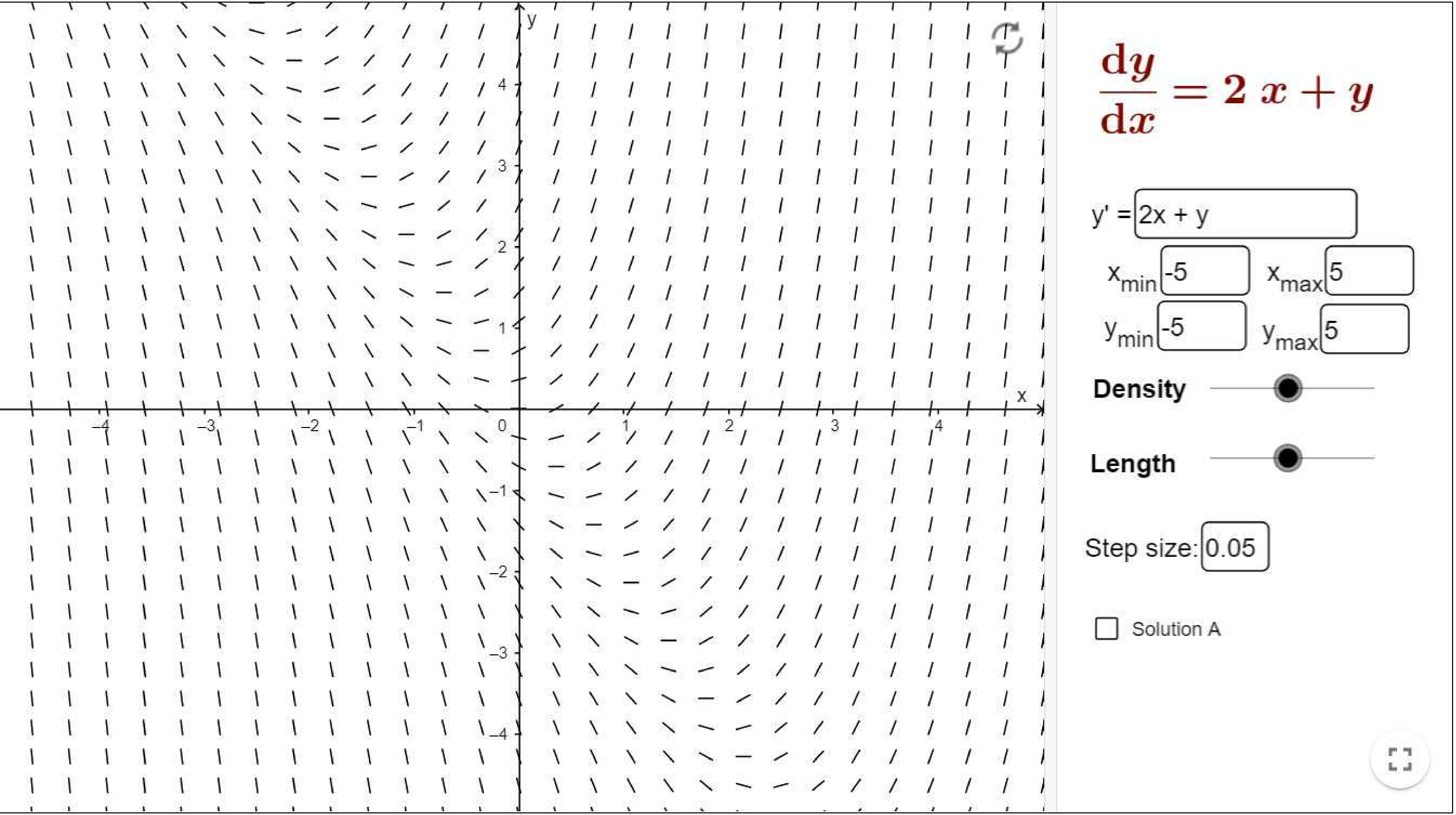
y
x
4
3
2
1
0
−1
−2
−3
−4
dy/dx = y/x
y' = y / x
xmin -5
xmax 5
ymin -5
ymax 5
Density
Length
Step size: 0.05
Solution A



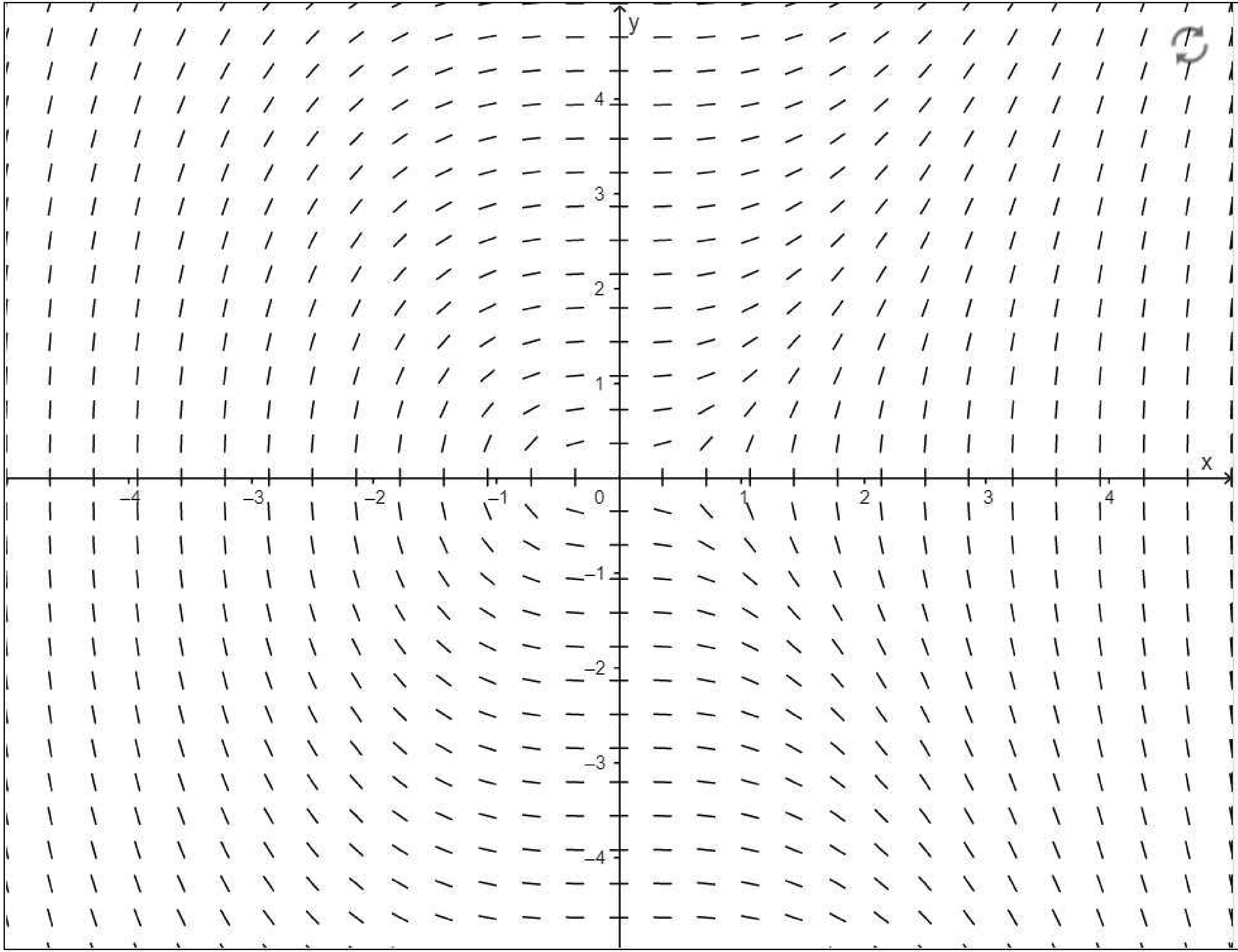
y
x
4
3
2
1
0
−1
−2
−3
−4
$$\frac{dy}{dx} = x^2 + y^2$$
$y' = x^2 + y^2$
x_{min} -5
x_{max} 5
y_{min} -5
y_{max} 5
Density
Length
Step size: 0.05
Solution A



y
x
4
3
2
1
0
−1
−2
−3
−4
$\frac{dy}{dx} = \ln(x)$
y' = ln(x)
x_{min} -5
x_{max} 5
y_{min} -5
y_{max} 5
Density
Length
Step size: 0.05
Solution A



y
x
4
3
2
1
0
-1
-2
-3
-4
$\frac{dy}{dx} = 2x + y$
y' = 2x + y
x_{min} -5
x_{max} 5
y_{min} -5
y_{max} 5
Density
Length
Step size: 0.05
Solution A



$$\frac{dy}{dx} = \frac{x^2}{y}$$

$y' =$ x² / y

x_{min} -5 x_{max} 5

y_{min} -5 y_{max} 5

Density

Length

Step size: 0.05

☐ Solution A