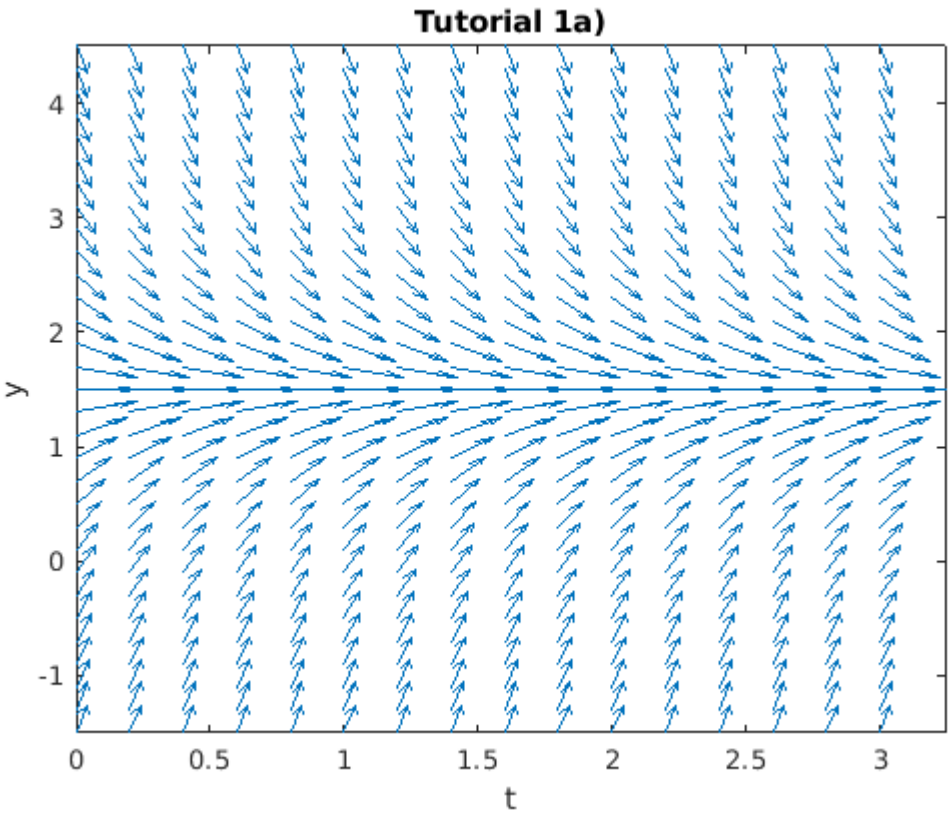
MA431 - Tutorial 1

Problem 1

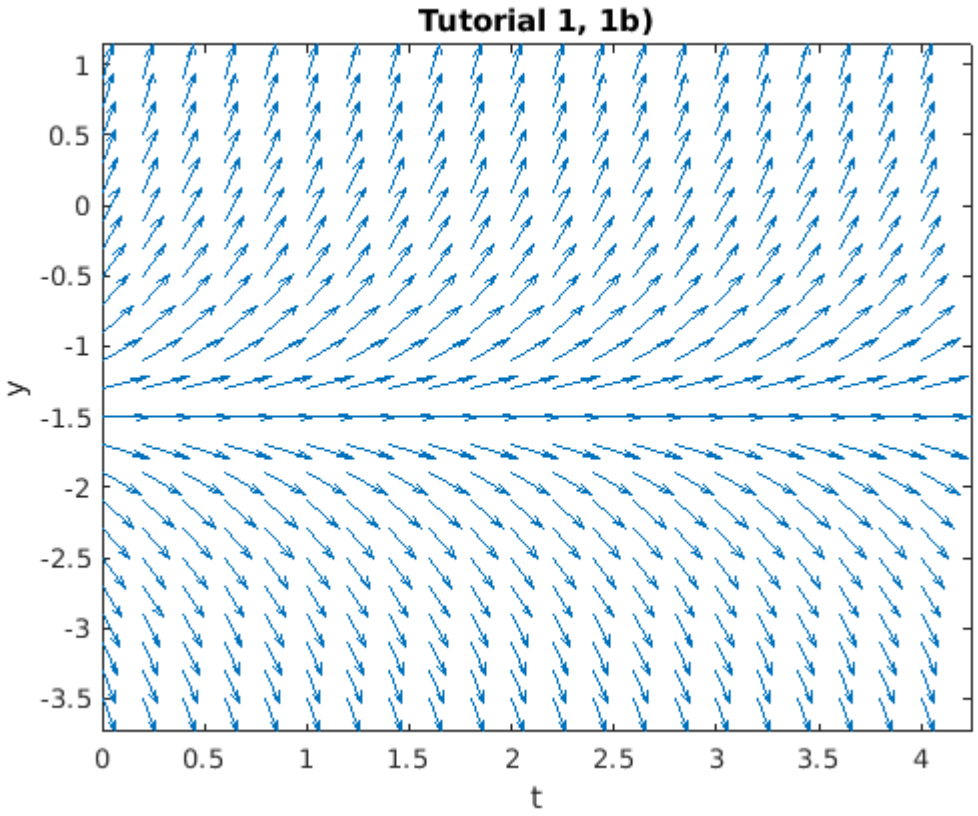
```
clc; clear all; close all;

% a)
[x,y] = meshgrid(0:0.2:3,-1.5:0.2:4.5);
d = 3-2*y;
L = sqrt(1+d.^2);
quiver(x,y,1./L,d./L)
axis tight
title("Tutorial 1, 1a)")
xlabel("t")
ylabel("y")
```



One can see that the value of y converges towards 1.5 when $t \to \infty$.

```
% b)
clear all;
[x,y] = meshgrid(0:0.2:4,-3.5:0.2:1);
d = 3+2*y;
L = sqrt(1+d.^2);
quiver(x,y,1./L,d./L)
axis tight
title("Tutorial 1, 1b)")
xlabel("t")
```

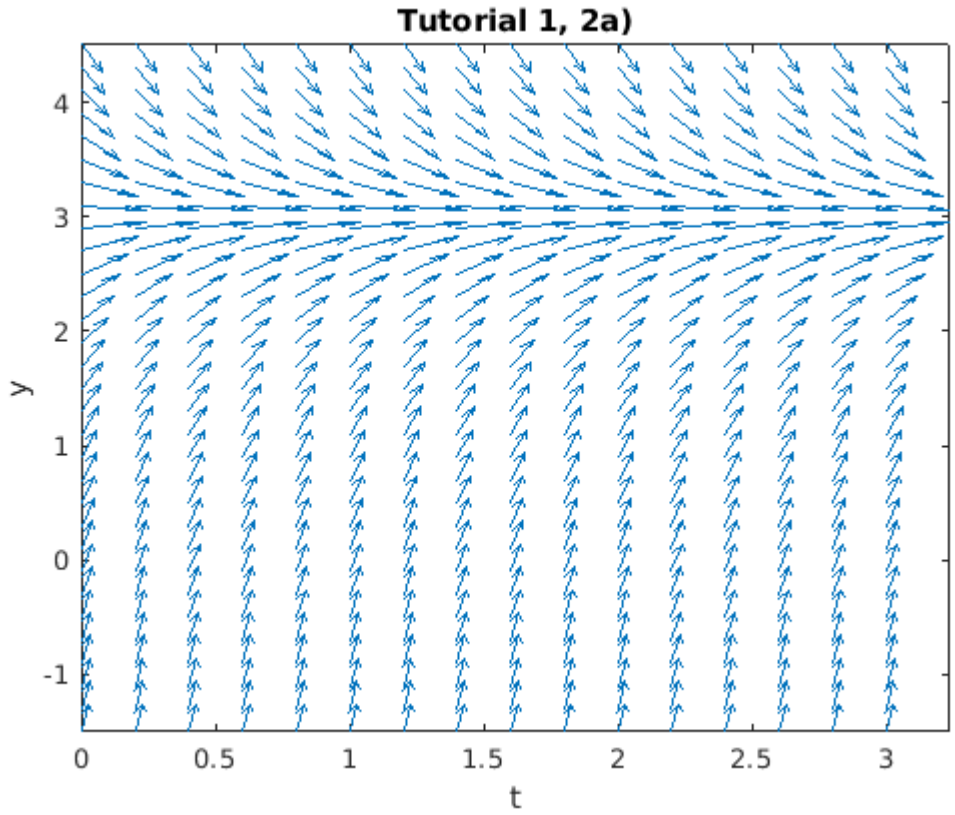
```
ylabel("y")
```



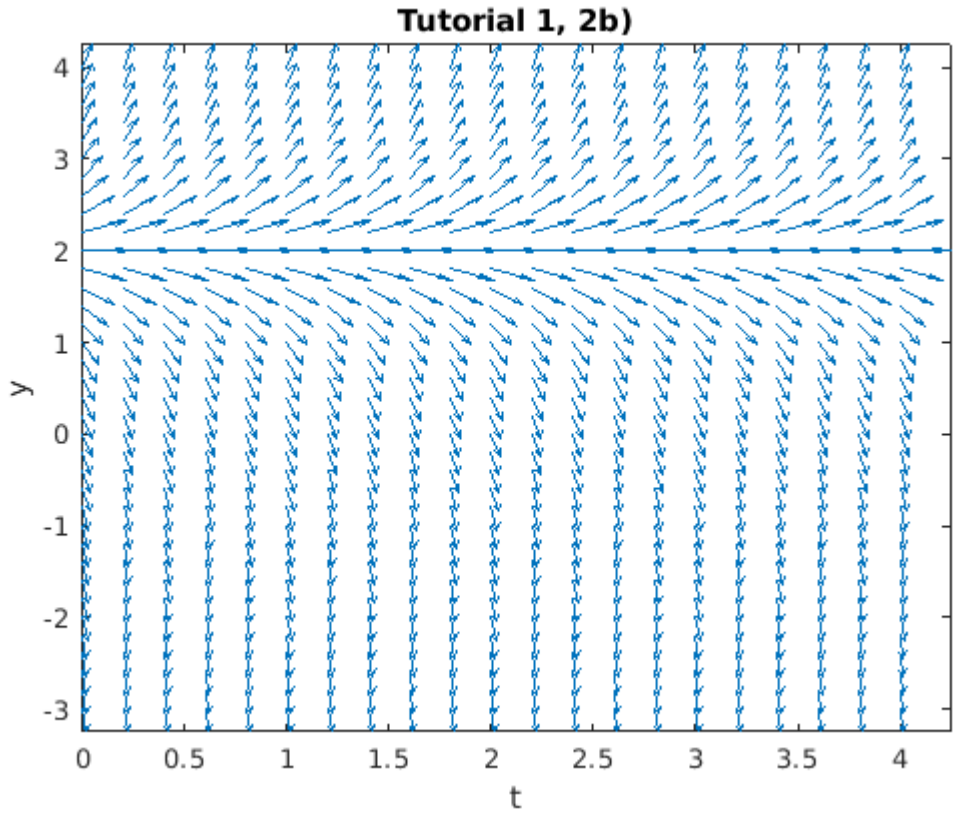
One can see that the value of y diverges from -1.5 when $t \to \infty$. This behavior depends on the initial condition of y.

Problem 2

```
% a)
[x,y] = meshgrid(0:0.2:3,-1.5:0.2:4.5);
d = 6-2*y; % Just found some numbers that makes the arrows diverge from y=2
L = sqrt(1+d.^2);
quiver(x,y,1./L,d./L)
axis tight
title("Tutorial 1, 2a)")
xlabel("t")
ylabel("y")
```




```
% b)
[x,y] = meshgrid(0:0.2:4,-3:0.2:4);
d = 3*y-6; % Just found some numbers that makes the arrows diverge from y=2
L = sqrt(1+d.^2);
quiver(x,y,1./L,d./L)
axis tight
title("Tutorial 1, 2b)")
xlabel("t")
ylabel("y")
```



Problem 3

```
w =  1000000 % gallons
```