Math 53: Week 1 Homework

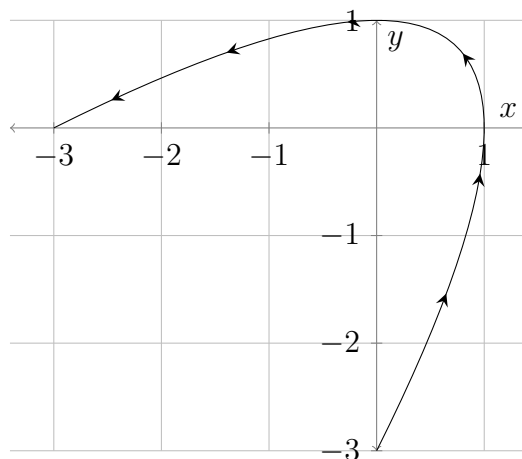Abhijay Bhatnagar

August 27, 2018

Assignment

Section 10.1: 1, 2, 3, 5, 7, 11, 12, 24, 37, 38

Section 10.2: 1, 2, 3, 4, 5, 11, 13, 17, 18, 19, 29, 30, 32, 33, 41, 42, 43, 44, 48, 51, 52, 53, 73, 74

Problem 10.1.1. Graph the parametric equations within the domain.

$$x = 1 - t^2$$
$$y = 2 * t - t^2$$
$$-1 \leqslant t \leqslant 2$$
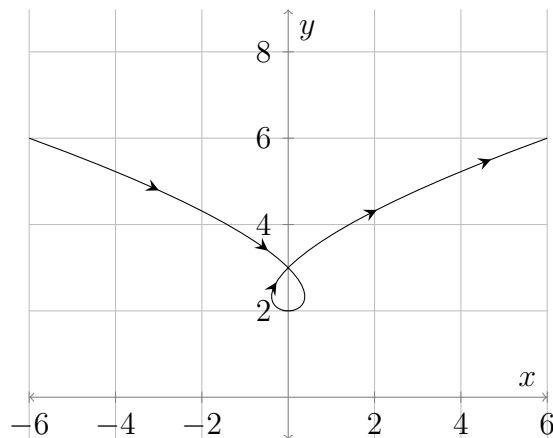
Solution:

Problem 10.1.2. Graph the parametric equations within the domain.

$$x = t^3 - t$$

$$y = t^2 + 2$$

$$-2 \leqslant t \leqslant 2$$
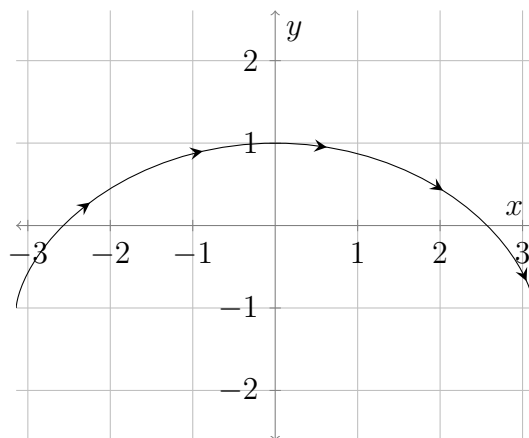
Solution:

Problem 10.1.3. Graph the parametric equations within the domain.

$$x = t + \sin(t)$$

$$y = \cos(t)$$

$$-\pi \leqslant t \leqslant \pi$$

Solution:

Problem 10.1.5.   (a) Sketch the curve by using the parametric equations to plot points. Indicate with an arrow the direction in which the curve is traced as t increases.

(b) Eliminate the parameter to find a Cartesian equation of the curve.

$$x = 2 * t - 1$$
$$y = 1/2 * t + 1$$

Solution:

(a)

(b)

$$x = 2 * t - 1 \tag{1}$$

Solving x for t ...

$$t = \frac{x+1}{2} \tag{2}$$

Inserting (8) into the equation for y ...

$$
\begin{aligned}
y &= \frac{1}{2} * \frac{x+1}{2} + 1 \\
&= \frac{1}{4}x + \frac{5}{4}
\end{aligned}
\tag{3}
$$

Problem 10.1.7.   (a) Sketch the curve by using the parametric equations to plot points. Indicate with an arrow the direction in which the curve is traced as t increases.
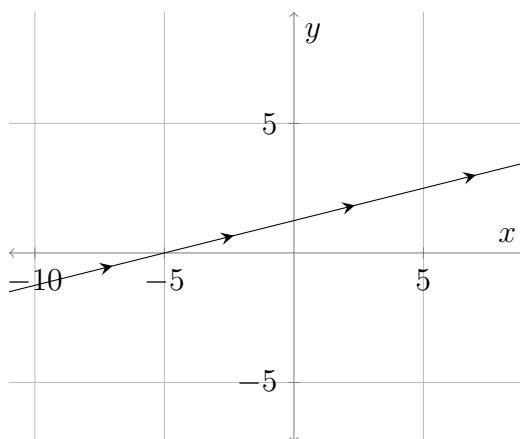
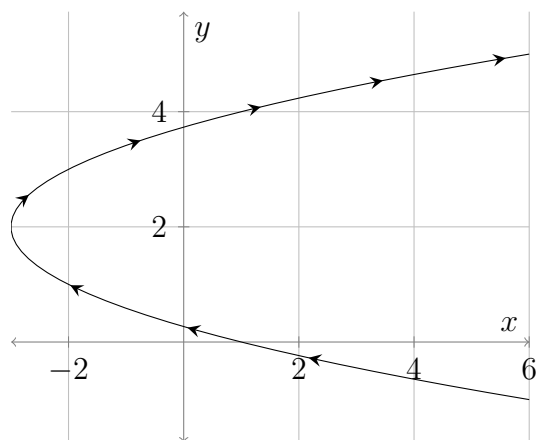(b) Eliminate the parameter to find a Cartesian equation of the curve.

$$x = t^2 - 3$$
$$y = t + 2$$
$$-3 \leqslant t \leqslant 3$$

Solution:

(a)

(b)
$$x = t^2 - 3 \tag{4}$$

Solving x for t ...
$$t = \sqrt{x + 3} \tag{5}$$

Inserting (8) into the equation for y ...
$$y = \sqrt{x + 3} + 2 \tag{6}$$

Problem 10.1.11.   (a) Eliminate the parameter to find a Cartesian equation of the curve.

(b) Sketch the curve by using the parametric equations to plot points. Indicate with an arrow the direction in which the curve is traced as t increases.

$$x = sin(1/2 * t)$$
$$y = cos(1/2 * t)$$
$$-pi \leqslant t \leqslant pi$$

Solution:

(a)
$$x = sin(1/2 * t) \tag{7}$$

Solving x for t ...
$$t = \frac{\arcsin x}{2} \tag{8}$$

Inserting (8) into the equation for y ...
$$y = cos(1/2 * \ddot{)}(9)$$

(b)