Exercise 2.2.1

Consider the initial value problem:

\[ \frac{dy}{dx} + y = 0, \quad y(0) = 1, \]

1. Find the general solution of the differential equation.
2. Sketch the graphs of the solutions on the same axes.
3. Describe the behavior of the solutions as \( x \) approaches infinity.

Exercise 2.2.2

Consider the initial value problem:

\[ \frac{dy}{dx} - 2y = 0, \quad y(0) = 2. \]

1. Find the general solution of the differential equation.
2. Sketch the graphs of the solutions on the same axes.
3. Describe the behavior of the solutions as \( x \) approaches infinity.

Exercise 2.2.3

Consider the initial value problem:

\[ \frac{dy}{dx} + 3y = 0, \quad y(0) = 4. \]

1. Find the general solution of the differential equation.
2. Sketch the graphs of the solutions on the same axes.
3. Describe the behavior of the solutions as \( x \) approaches infinity.

Exercise 2.2.4

Consider the initial value problem:

\[ \frac{dy}{dx} - y = 0, \quad y(0) = 5. \]

1. Find the general solution of the differential equation.
2. Sketch the graphs of the solutions on the same axes.
3. Describe the behavior of the solutions as \( x \) approaches infinity.

Exercise 2.2.5

Consider the initial value problem:

\[ \frac{dy}{dx} + 4y = 0, \quad y(0) = 3. \]

1. Find the general solution of the differential equation.
2. Sketch the graphs of the solutions on the same axes.
3. Describe the behavior of the solutions as \( x \) approaches infinity.

Exercise 2.2.6

Consider the initial value problem:

\[ \frac{dy}{dx} - 3y = 0, \quad y(0) = 2. \]

1. Find the general solution of the differential equation.
2. Sketch the graphs of the solutions on the same axes.
3. Describe the behavior of the solutions as \( x \) approaches infinity.

Exercise 2.2.7

Consider the initial value problem:

\[ \frac{dy}{dx} + 2y = 0, \quad y(0) = 1. \]

1. Find the general solution of the differential equation.
2. Sketch the graphs of the solutions on the same axes.
3. Describe the behavior of the solutions as \( x \) approaches infinity.

Exercise 2.2.8

Consider the initial value problem:

\[ \frac{dy}{dx} - y = 0, \quad y(0) = 0. \]

1. Find the general solution of the differential equation.
2. Sketch the graphs of the solutions on the same axes.
3. Describe the behavior of the solutions as \( x \) approaches infinity.
Exercise 2.3.4 (The Algebra of Flow Rates)}

For certain species of organisms, the effective flow rate of an organism of flow rate (N) is given by:

\[ \text{effective flow rate} = \text{flow rate} - \frac{\text{flow rate}}{N} \]

and for certain species of organisms, the effective flow rate of an organism of flow rate (N) is given by:

\[ \text{effective flow rate} = \text{flow rate} - \frac{\text{flow rate}}{N} - \frac{\text{flow rate}}{N^2} \]

Exercise 2.3.3 (The Flow of Organisms)}

The flow of organisms (N) is given by:

\[ \text{flow of organisms} = \frac{\text{flow rate}}{N} \]

Exercise 2.3.2 (The Algebra of Flow Rates)}

For certain species of organisms, the effective flow rate of an organism of flow rate (N) is given by:

\[ \text{effective flow rate} = \text{flow rate} - \frac{\text{flow rate}}{N} \]

Exercise 2.3.1 (The Algebra of Flow Rates)}

For certain species of organisms, the effective flow rate of an organism of flow rate (N) is given by:

\[ \text{effective flow rate} = \text{flow rate} - \frac{\text{flow rate}}{N} \]

Exercise 2.3.0 (The Algebra of Flow Rates)}

For certain species of organisms, the effective flow rate of an organism of flow rate (N) is given by:

\[ \text{effective flow rate} = \text{flow rate} - \frac{\text{flow rate}}{N} \]

Exercise 2.2.9 (The Algebra of Flow Rates)}

For certain species of organisms, the effective flow rate of an organism of flow rate (N) is given by:

\[ \text{effective flow rate} = \text{flow rate} - \frac{\text{flow rate}}{N} \]

Exercise 2.2.8 (The Algebra of Flow Rates)}

For certain species of organisms, the effective flow rate of an organism of flow rate (N) is given by:

\[ \text{effective flow rate} = \text{flow rate} - \frac{\text{flow rate}}{N} \]

Exercise 2.2.7 (The Algebra of Flow Rates)}

For certain species of organisms, the effective flow rate of an organism of flow rate (N) is given by:

\[ \text{effective flow rate} = \text{flow rate} - \frac{\text{flow rate}}{N} \]

Exercise 2.2.6 (The Algebra of Flow Rates)}

For certain species of organisms, the effective flow rate of an organism of flow rate (N) is given by:

\[ \text{effective flow rate} = \text{flow rate} - \frac{\text{flow rate}}{N} \]

Exercise 2.2.5 (The Algebra of Flow Rates)}

For certain species of organisms, the effective flow rate of an organism of flow rate (N) is given by:

\[ \text{effective flow rate} = \text{flow rate} - \frac{\text{flow rate}}{N} \]

Exercise 2.2.4 (The Algebra of Flow Rates)}

For certain species of organisms, the effective flow rate of an organism of flow rate (N) is given by:

\[ \text{effective flow rate} = \text{flow rate} - \frac{\text{flow rate}}{N} \]

Exercise 2.2.3 (The Algebra of Flow Rates)}

For certain species of organisms, the effective flow rate of an organism of flow rate (N) is given by:

\[ \text{effective flow rate} = \text{flow rate} - \frac{\text{flow rate}}{N} \]

Exercise 2.2.2 (The Algebra of Flow Rates)}

For certain species of organisms, the effective flow rate of an organism of flow rate (N) is given by:

\[ \text{effective flow rate} = \text{flow rate} - \frac{\text{flow rate}}{N} \]

Exercise 2.2.1 (The Algebra of Flow Rates)}

For certain species of organisms, the effective flow rate of an organism of flow rate (N) is given by:

\[ \text{effective flow rate} = \text{flow rate} - \frac{\text{flow rate}}{N} \]

Exercise 2.2.0 (The Algebra of Flow Rates)}

For certain species of organisms, the effective flow rate of an organism of flow rate (N) is given by:

\[ \text{effective flow rate} = \text{flow rate} - \frac{\text{flow rate}}{N} \]
2.6 Implications of Ocellations

unique in both directions: there is no solution if \( a = 0 \) (or \( b = 0 \)) and the solution is \( x = y \) if \( b = 0 \) and \( a \neq 0 \).

2.6.2 Converse of Ocellations

\( a \neq 0 \) (or \( b \neq 0 \)) and the solution is \( x = y \) if \( b = 0 \) and \( a \neq 0 \).

2.6.3 Converse of Ocellations

\( a \neq 0 \) (or \( b \neq 0 \)) and the solution is \( x = y \) if \( b = 0 \) and \( a \neq 0 \).

2.6.4 Converse of Ocellations

\( a \neq 0 \) (or \( b \neq 0 \)) and the solution is \( x = y \) if \( b = 0 \) and \( a \neq 0 \).

2.6.5 Converse of Ocellations

\( a \neq 0 \) (or \( b \neq 0 \)) and the solution is \( x = y \) if \( b = 0 \) and \( a \neq 0 \).

2.6.6 Converse of Ocellations

\( a \neq 0 \) (or \( b \neq 0 \)) and the solution is \( x = y \) if \( b = 0 \) and \( a \neq 0 \).
2.8.18 Solve Equations on the Computer

2.8.22 The slope is constant along horizontal lines in Figure 2.8.5.