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## 1 Miscellaneous

## 1.1 Concepts

1. Euler's formula tells us that  $e^{i\theta} = \cos \theta + i \sin \theta$ .

## 1.2 Example

2. Show that  $\sin \theta = \frac{e^{i\theta} - e^{-i\theta}}{2i}$ .

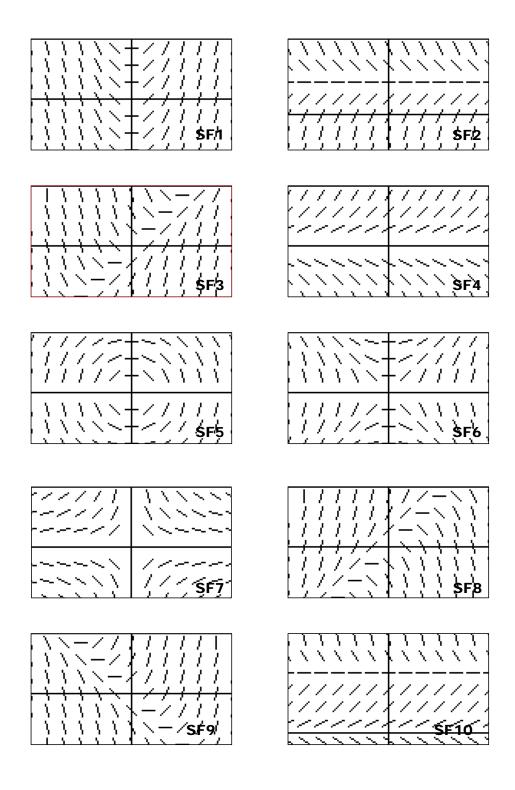
# 2 Slope Fields

## 2.1 Concepts

3. A slope field is a graph where at every point y, t, you draw a line with the slope there, which is given by the function f(y,t).

#### 2.2 Problems

- 4. Match each slope field to the differential equation and sketch some solutions to them.
- 5. For each differential equation, estimate y(2) using the starting point y(1) = 1 and step size of  $h = \frac{1}{2}$ .



$$\frac{dy}{dx} = x - y$$

DE1

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

DE2

$$\frac{dy}{dx} = y - x$$

DE3

$$\frac{dy}{dx} = -\frac{x}{y}$$

DE4

$$\frac{dy}{dx} = x$$

DE5

$$\frac{dy}{dx} = -\frac{y}{x}$$

DE6

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

DE7

$$\frac{dy}{dx} = 0.25y(4-y)$$

DE8

$$\frac{dy}{dx} = 2 - y$$

DE9

$$\frac{dy}{dx} = x + y$$

**DE10**