# Reminder

The first exam, on Chapters 1–4, takes place on February 23 (next Friday).

# New concept: local homeomorphism [Exercise 4.3.9]

The word "local" usually means "in a neighborhood of a point."

$f : X \to Y$ is a homeomorphism if $f$ is a bijection between the *sets* $X$ and $Y$ and additionally $f$ induces a bijection on the *topologies* of $X$ and $Y$.

$f : X \to Y$ is a *local* homeomorphism if every point of $X$ has some open neighborhood that $f$ maps homeomorphically onto an **open** subset of $Y$.

## Example

$f(x) = (\cos x, \sin x)$ maps $\mathbb{R}$ onto the unit circle, a subspace of $\mathbb{R}^2$ often denoted by $S^1$. This mapping is not a homeomorphism (because not injective) but is a local homeomorphism.

# Assignment due next class

- Write a solution to parts (i), (ii), and (iii) of number 17 in Exercises 4.1.
- Read section 4.3 in the textbook.