12	Sec 4.4, 4.5 Test 4 Covers Chapters 1 - 4, Due Sunday, 4/16	11/6
13	Secs 6.6, 6.7	11/13
14	Secs 6.8, 6.9	11/20
15	Sec 6.9 Final Test Part 1, Covers Chapter 6, Due Sunday, 12/3	11/27
	Final Test Part II, Comprehensive Chapters 1 - 4	

Do Section 4.4	Mon, Nov 13, 2023, 10:59 PM PST
Practice Test 4	Mon, Nov 13, 2023, 10:59 PM PST
Test 4	Tue, Nov 14, 2023, 10:59 PM PST

Section 6.6 - Parametric Equations

Definition of Plane Curve

If f and g are continuous functions of t on an interval I, then the set of ordered pairs $(f(t), g(t))$ is a **plane curve** C. The equations

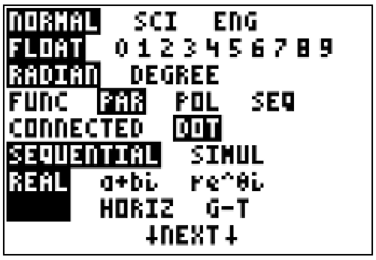
$$x = f(t) \quad \text{and} \quad y = g(t)$$

are **parametric equations** for C, and t is the **parameter.**

Example 1

Sketch and describe the orientation of the curve given by the parametric equations

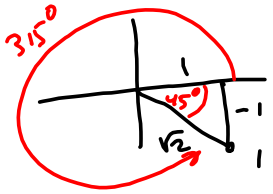
$$x = t^2 - 4 \quad \text{and} \quad y = \frac{t}{2}, \quad -2 \le t \le 3.$$



Solve $x^5 - (1-i) = 0$

$x^5 = 1-i$

We want the 5^{th} roots of $1-i$.



$1-i = (1,-1)$

$315° = \frac{7\pi}{4}$ $n=5$

$\sqrt[5]{1-i} =$

$1-i = \sqrt{2}\left(\cos\left(\frac{7\pi}{4}\right) + i\sin\left(\frac{7\pi}{4}\right)\right)$

$k=0$ $\sqrt[5]{1-i} = \left(\sqrt{2}\right)^{\frac{1}{5}}\left(\cos\left(\frac{7\pi}{20}\right) + i\sin\left(\frac{7\pi}{20}\right)\right)$ $k=0$

increment: $\frac{2\pi}{5}$

$k=1$ $\frac{7\pi}{20} + \frac{2\pi}{5}\cdot\frac{4}{4} = \frac{7\pi}{20} + \frac{8\pi}{20} = \frac{15\pi}{20} = \frac{3\pi}{4}$ $\sqrt[10]{2}\left(\cos\left(\frac{3\pi}{4}\right) + i\sin\left(\frac{3\pi}{4}\right)\right)$

$k=2$ $\frac{15\pi}{20} + \frac{8\pi}{20} = \frac{23\pi}{20}$ $\sqrt[10]{2}\left(\cos\left(\frac{23\pi}{20}\right) + i\sin\left(\frac{23\pi}{20}\right)\right)$

$k=3$ $\frac{31\pi}{20}$ $\sqrt[10]{2}\left(\cos\left(\frac{31\pi}{20}\right) + i\sin\left(\frac{31\pi}{20}\right)\right)$

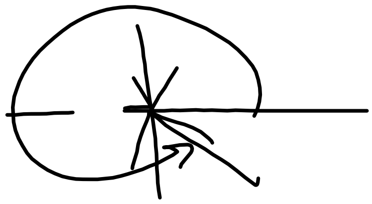
$k=4$ $\frac{39\pi}{20}$ Done $\sqrt[10]{2}\left(\cos\left(\frac{39\pi}{20}\right) + i\sin\left(\frac{39\pi}{20}\right)\right)$

$k=5$ $\frac{47\pi}{20} = \frac{40\pi}{20} + \frac{7\pi}{20} \longleftrightarrow \frac{7\pi}{20}$ (co-terminal)

$z^{\frac{1}{n}} = r^{\frac{1}{n}}\left(\cos\left(\frac{\theta}{n} + \frac{2k\pi}{n}\right) + i\sin\left(\frac{\theta}{n} + \frac{2k\pi}{n}\right)\right)$, $k = 0, 1, \dots, n-1$

$\sqrt[5]{\sqrt{2}} = \left(2^{\frac{1}{2}}\right)^{\frac{1}{5}} = 2^{\frac{1}{10}} = \sqrt[10]{2}$

$\left(\frac{7\pi}{20}\right)\left(\frac{180}{\pi}\right) = 9(7) = 63°$



$\left(\frac{2\pi}{5}\right)\left(\frac{180}{\pi}\right) = (36)(2) = 72°$

0 $\sqrt[10]{2}\left(\cos\left(\frac{7\pi}{20}\right)+i\sin\left(\frac{7\pi}{20}\right)\right)$

1 $\sqrt[10]{2}\left(\cos\left(\frac{15\pi}{20}\right)+i\sin\left(\frac{15\pi}{20}\right)\right)=\sqrt[10]{2}\left(\cos\left(\frac{3\pi}{4}\right)+i\sin\left(\frac{3\pi}{4}\right)\right)$

2 $\sqrt[10]{2}\left(\cos\left(\frac{23\pi}{20}\right)+i\sin\left(\frac{23\pi}{20}\right)\right)$

3 $\sqrt[10]{2}\left(\cos\left(\frac{31\pi}{20}\right)+i\sin\left(\frac{31\pi}{20}\right)\right)$ $\frac{2\pi}{5}\cdot\frac{4}{4}=\frac{8\pi}{20}$

4 $\sqrt[10]{2}\left(\cos\left(\frac{39\pi}{20}\right)+i\sin\left(\frac{39\pi}{20}\right)\right)$

SAME AS 1st one (k=0 ↔ k=5) 5 $\sqrt[10]{2}\left(\cos\left(\frac{47\pi}{20}\right)+i\sin\left(\frac{47\pi}{20}\right)\right) \longleftrightarrow \sqrt[10]{2}\left(\cos\left(\frac{7\pi}{20}\right)+i\sin\left(\frac{7\pi}{20}\right)\right)$