

Ch 3: Three Simple Curves

Goal: Circles, horiz. lines and vertical lines

Terminology and Conditions

1) Horizontal Lines

Draw the collection of all points (x, y) such that $y = 3$ and x can be any number.

Chapter 3 Key Facts

- Horizontal Line: $y = k$
- Vertical Line: $x = h$
- Circle: $(x - h)^2 + (y - k)^2 = r^2$
 - where (h, k) = center, r = radius

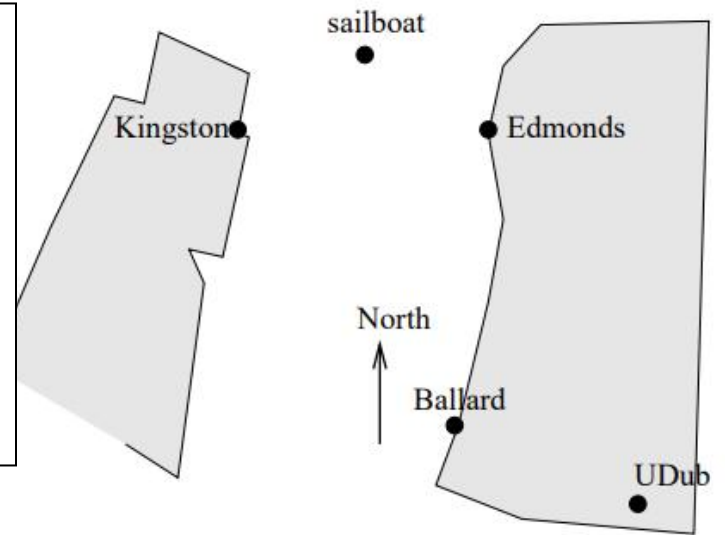
2) Vertical Lines

Draw the collection of all points (x, y) such that $x = -2$ and y can be any number.

Example: (Ch 3 Q5a)

In the picture,
Edmonds is 8 miles north and 1 mile east of Ballard.
Kingston is 6 miles west of Edmonds.
A ferry leaves Kingston heading toward Edmonds at 12 mph.
After 20 minutes, the ferry turns heading south.

- (a) Impose a coordinate system with Ballard as the origin.
- (b) Give the horiz. and vertical lines of the ferry's path.



3) Circles

Example:

Give me a center point $(h, k) = (\quad , \quad)$

Give me a radius =

Now write down the equation that says...

“the dist. from (x, y) to (h, k) equal r ”

Follow-up questions:

- How could we give a condition for the points on the “interior” of the circle?

Some mechanical questions

Example:

Give the equation of the circle centered at $(2, -5)$ with a diameter of 6.

- Is the point $(1,1)$ on this circle?

Example:

Give an example of a circle that has radius 2 and goes passes through the point $(4,5)$.

Some related algebra (Completing the Square)

Example:

Find the center and radius of the circle...

$$x^2 + 2x + y^2 + 6y + 6 = 0$$

Example:

Find the center and radius of the circle...

$$x^2 + \frac{1}{3}x + y^2 - \frac{10}{3}y = \frac{191}{18}$$

Example: (Ch 3 Q4)

A ferris wheel has a radius of 50 ft. The center of the wheel is mounted on a tower 52 ft above the ground. Your friend is standing on a platform that is 60 feet above the ground and 100 feet along the ground from the center of ferris wheel.

At what location(s) will a rider on the ferris wheel be in line with the top of the platform?

Building Your Own Problem-Solving Routine

You should be starting to make a note sheet with your “problem-solving” routine. Here are two models I made up, but you should be building your own!

“Given-and-Want” Problem Solving

1. Identify what we **want**
2. Identify what we are **given**
3. **Fact finding**: Label Unknowns; Write related formulas
4. **Solve**

“V.E.T.S.” Problem Solving

1. **Visualize**: Draw axes, label unknowns.
2. **Equations**: Equations for curves.
3. **Translate**: Convert words to math.
4. **Solve**: Find intersections, distances, anything you can.

Other notes:

- Check units at the start.
- Reread at the end, answer reasonable?
- We now can give equations for circles as well as horizontal and vertical lines.