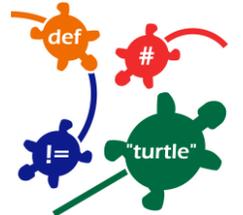


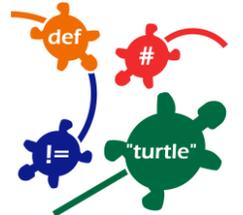
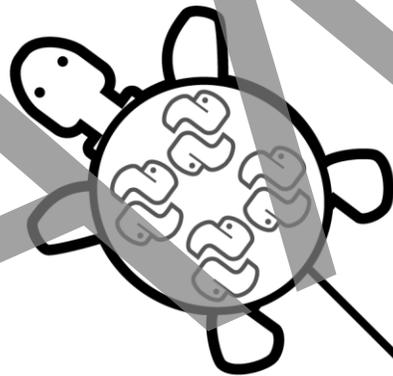
About the Canvas

TechnoTurtle



Get to Know the Canvas

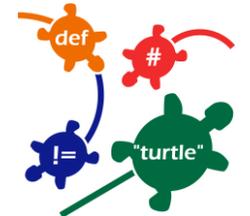
You know how to move the turtle around the canvas. Now you need to know how to get it to go to a specific spot. This is helpful when you are creating artwork or making a game.



About Pixels

You cannot see it, but the canvas is a grid. It is made up of squares. These are called pixels. When the turtle moves forward a step, it is moving one pixel. Since the pixels are very tiny the turtle must move many steps to see it on the canvas.

```
forward(5)
```



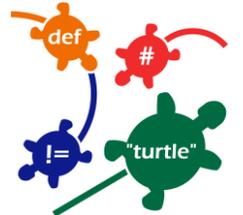
About the Canvas

Each pixel has two numbers that let the computer know where it is on the canvas - the x and y values. These can be used to tell the turtle to go to a specific spot.

```
goto (100, 100)
```

x value

y value



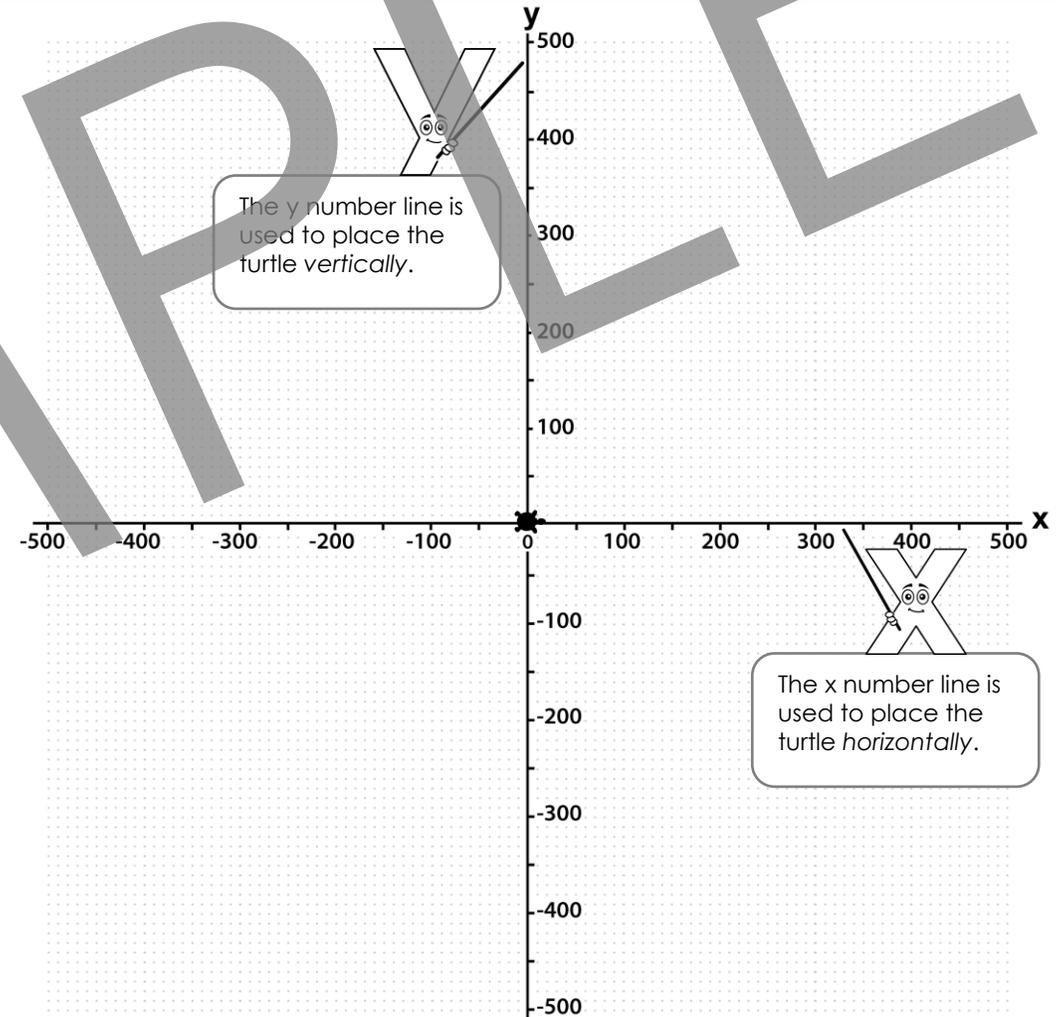
About the Canvas

How do you know the x and y value of a pixel?

To find out you need to plot it on the canvas.

The canvas is divided into four parts. This is done using two number lines:

- The x number line goes from **left to right**. It tells where the turtle is horizontally on the canvas.
- The y number line goes from **top to bottom**. It tells where the turtle is vertically on the canvas.
- The center of the canvas is where the two number lines meet. It is 0, 0.



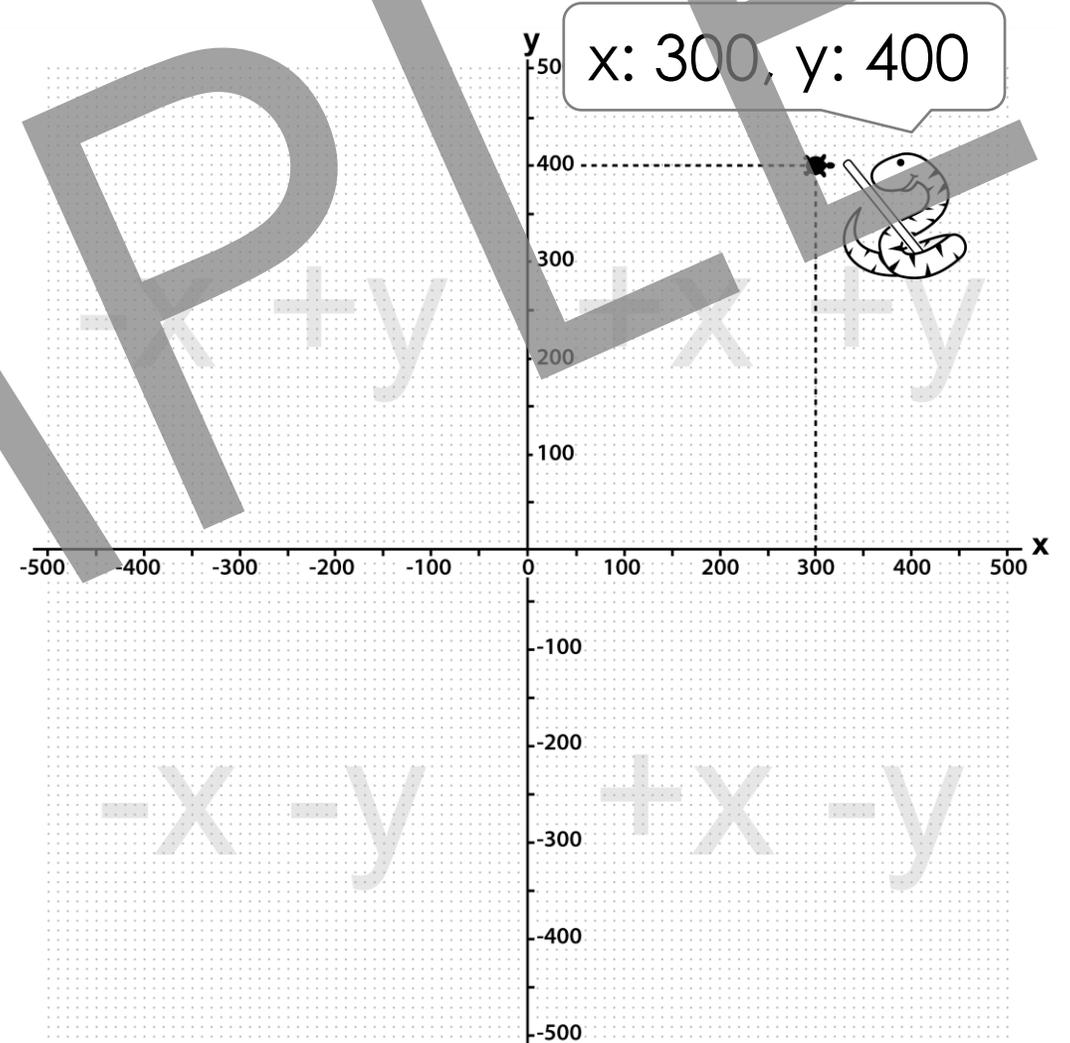
About X and Y Values

The x value tells the turtle how many steps to move right or left from the center point:

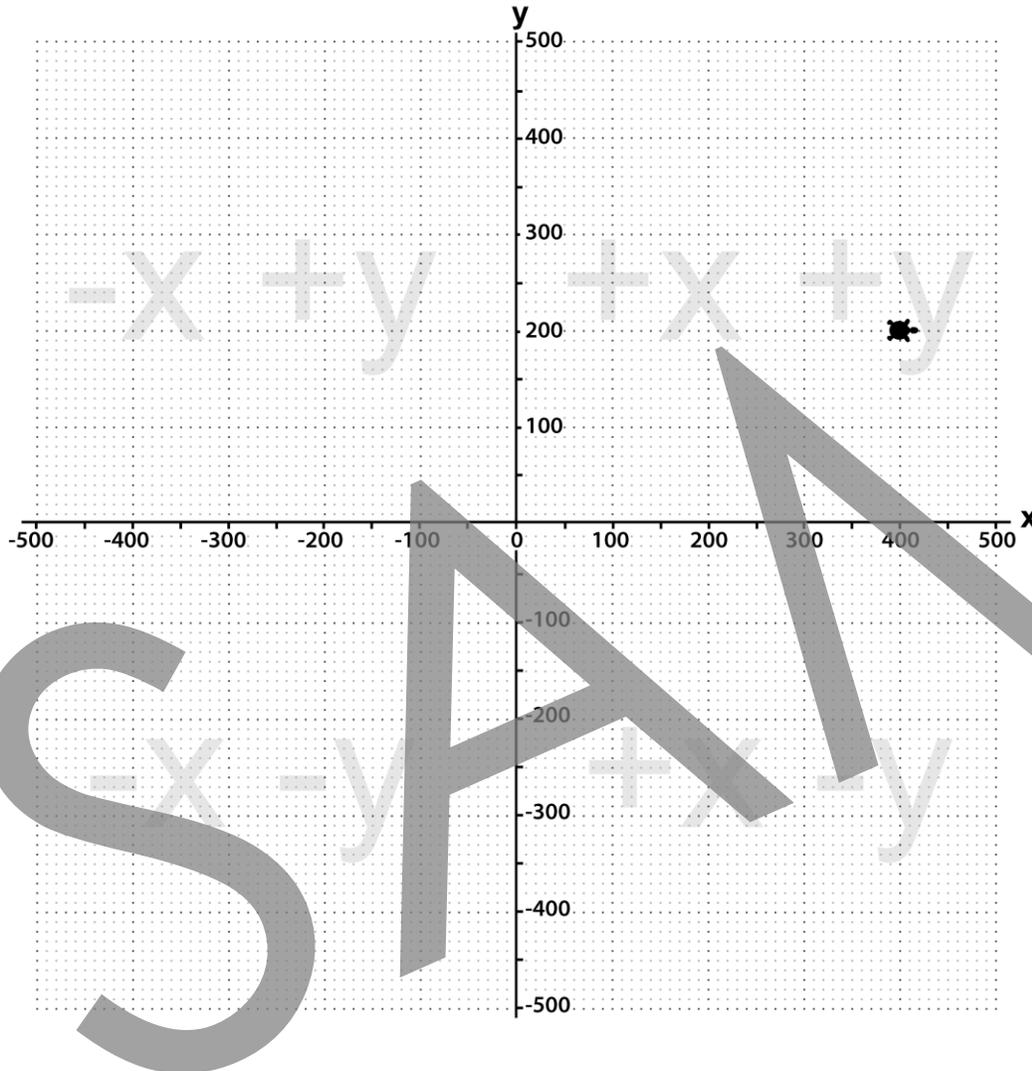
- If the number is **positive**, move right. If it is **negative**, move left.

The y value tells the turtle how many steps to move up or down from the center point:

- If the number is **positive**, move up. If it is **negative**, move down.



Where is the Turtle on the Canvas?

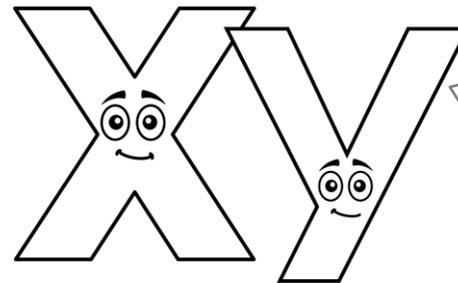


Complete the command:

```
goto (x, y)
```

First, count **across** to get the x value.

Then count **up** or down to get the y value.



Practical Applications of X and Y Coordinates

- A factory owner needs to program a robotic arm to pick up an item and place it in a bin. How does knowing the coordinates of the bin help the programmer?
- A photographer needs to fly a drone over an outdoor event. How would knowing the coordinates of the landing spot help the drone operator?
- Imagine a future that has an automated bus system. How would knowing coordinates help plan the route?
- Pretend you have a robot helper. What task do you do each day that you could program it to do instead? How would knowing coordinates help you write the code?

Programmers write code to move a robot to a specific spot. Why is knowing coordinates important?

