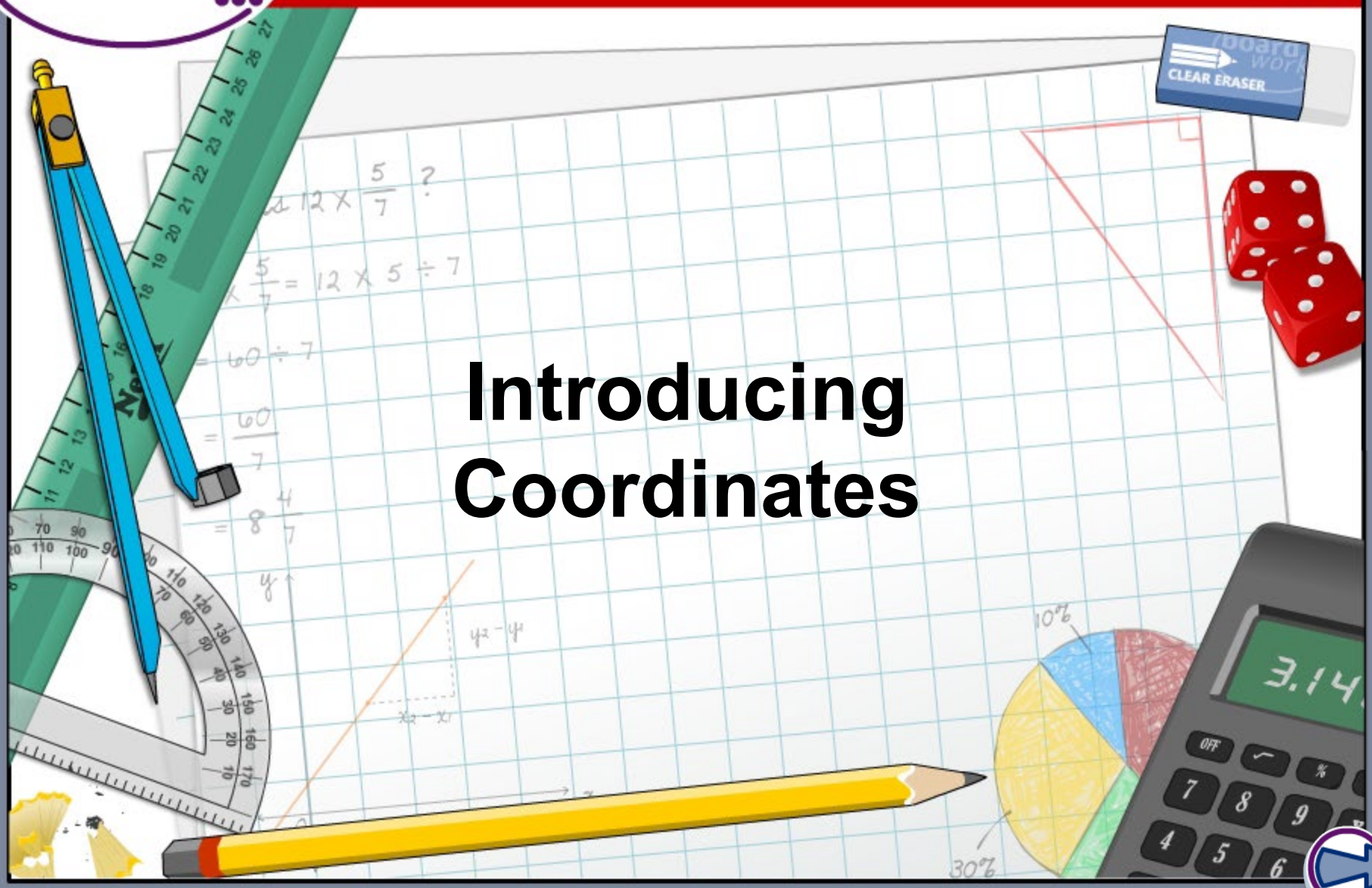


Introducing Coordinates

Information

Common core icons

This icon indicates a slide where the Standards for Mathematical Practice are being developed. Details of these are given in the Notes field.

Slides containing examples of mathematical modeling are marked with this stamp.

This icon indicates an opportunity for discussion or group work.

The **Standards for Mathematical Practice** outlined in the Common Core State Standards for Mathematics describe varieties of expertise that mathematics educators at all levels should seek to develop in their students.

These are:

1) Make sense of problems and persevere in solving them.

2) Reason abstractly and quantitatively.

3) Construct viable arguments and critique the reasoning of others.

4) Model with mathematics.

5) Use appropriate tools strategically.

6) Attend to precision.

7) Look for and make use of structure.

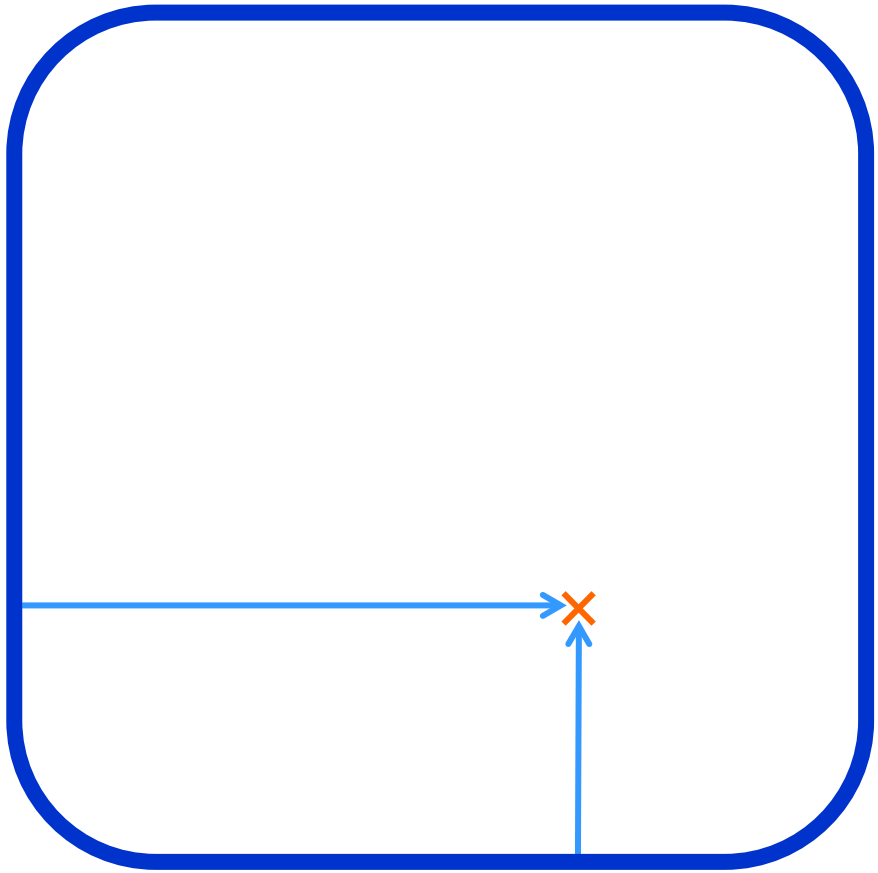
8) Look for and express regularity in repeated reasoning.

This icon indicates that the slide contains activities created in Flash. These activities are not editable.

This icon indicates teacher's notes in the Notes field.

Describing locations

How can we describe the position of this point?



To locate this point we need two pieces of information:

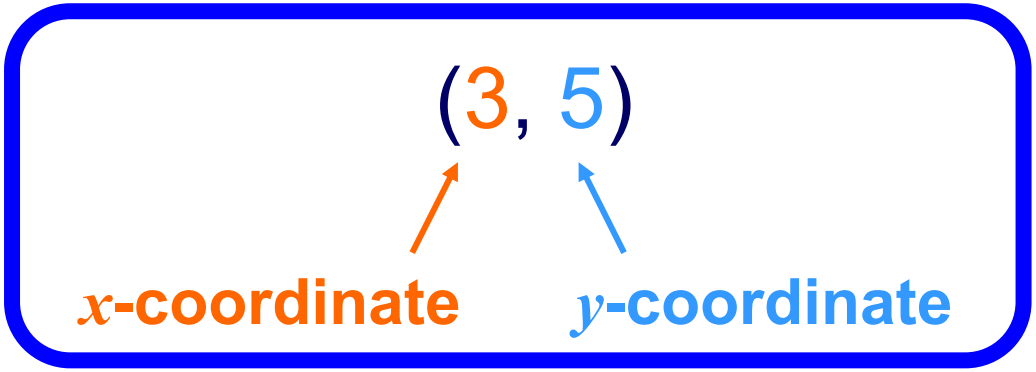
- how far **left or right** it is
- how far **up or down** it is.

We could not draw the point without the box.

The box acts as a **reference**.

Coordinates

We can express these two pieces of information using **coordinates**.



The first number is called the ***x*-coordinate** and tells us how far left or right the point is.

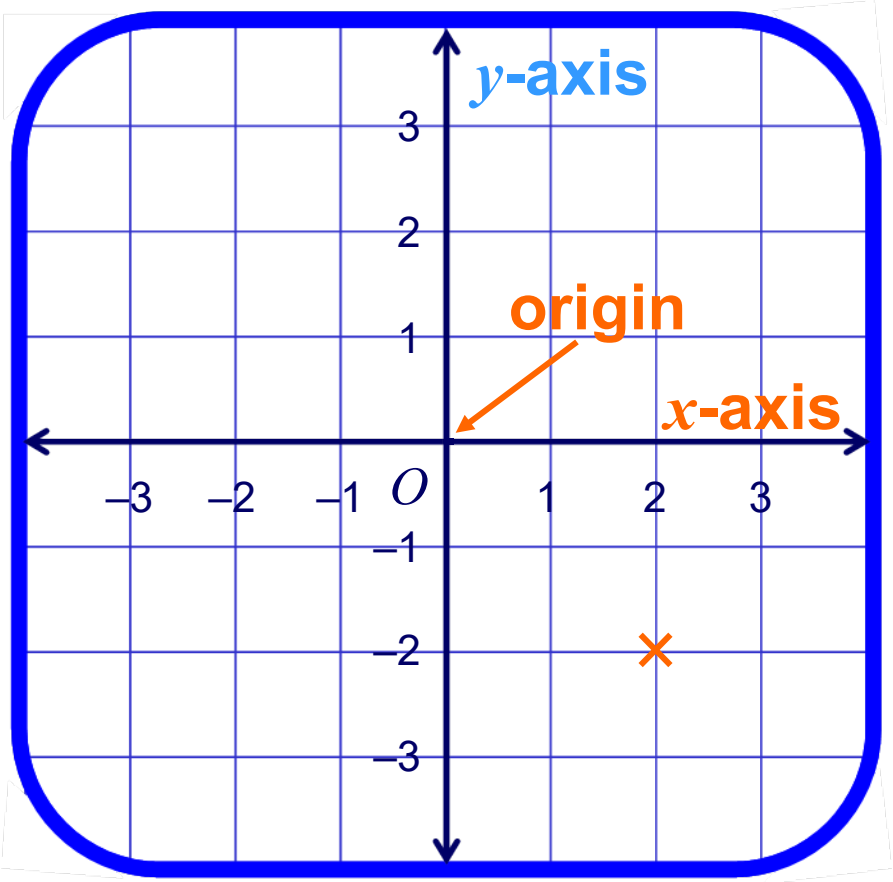
The second number is called the ***y*-coordinate** and tells us how far up or down the point is.

A set of coordinates is also referred to as an **ordered pair**.

Can you think why?

Using a coordinate grid

The coordinate of a point tells us where the point is relative to a starting point, or **origin**. The origin acts as a reference.



The x-axis is **horizontal** and extends in both directions from the origin.

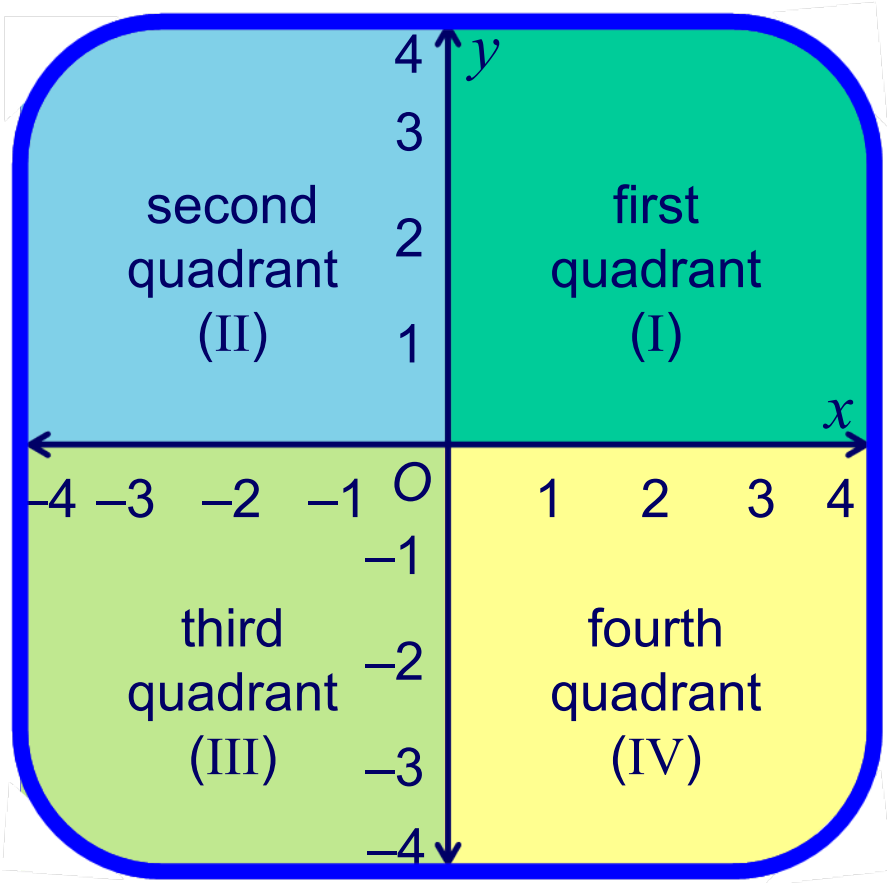
The y-axis is **vertical** and extends in both directions from the origin.

The axes are numbered using positive and negative integers.

The coordinates of the origin, O, are **(0, 0)**.

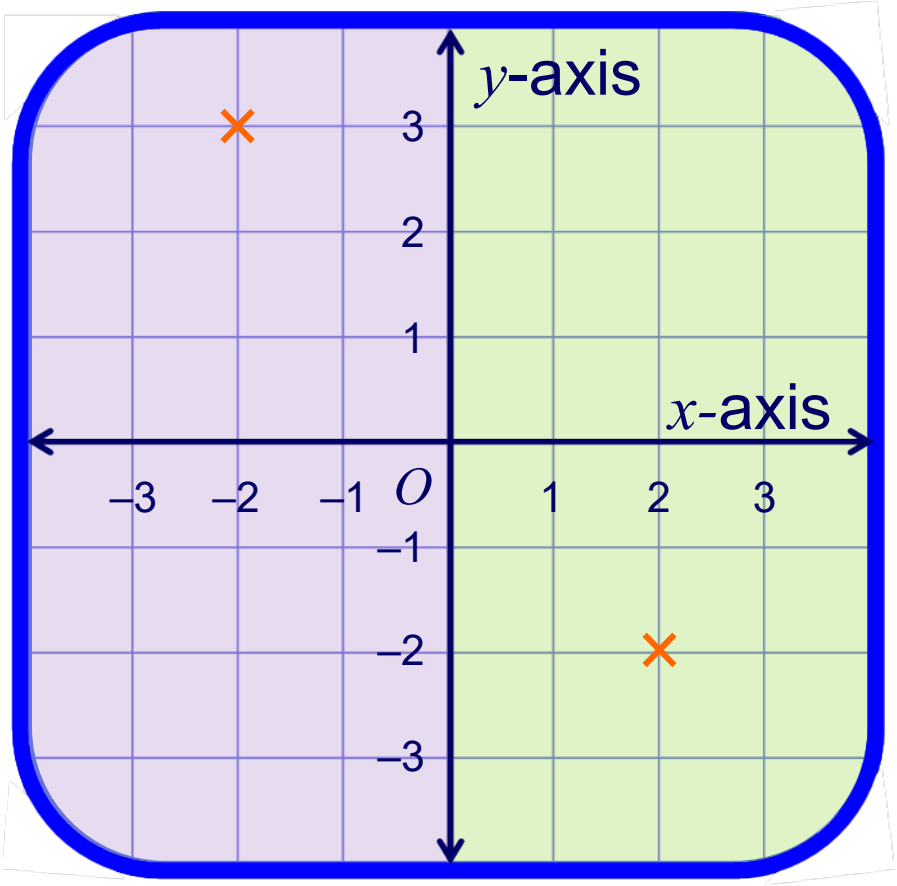
Quadrants

The coordinate **axes** divide the grid into four **quadrants**.
The quadrants are numbered counterclockwise.



The x direction

The first number in an ordered pair (the x-coordinate) tells us **how many units** from the origin the point is in the x-direction.

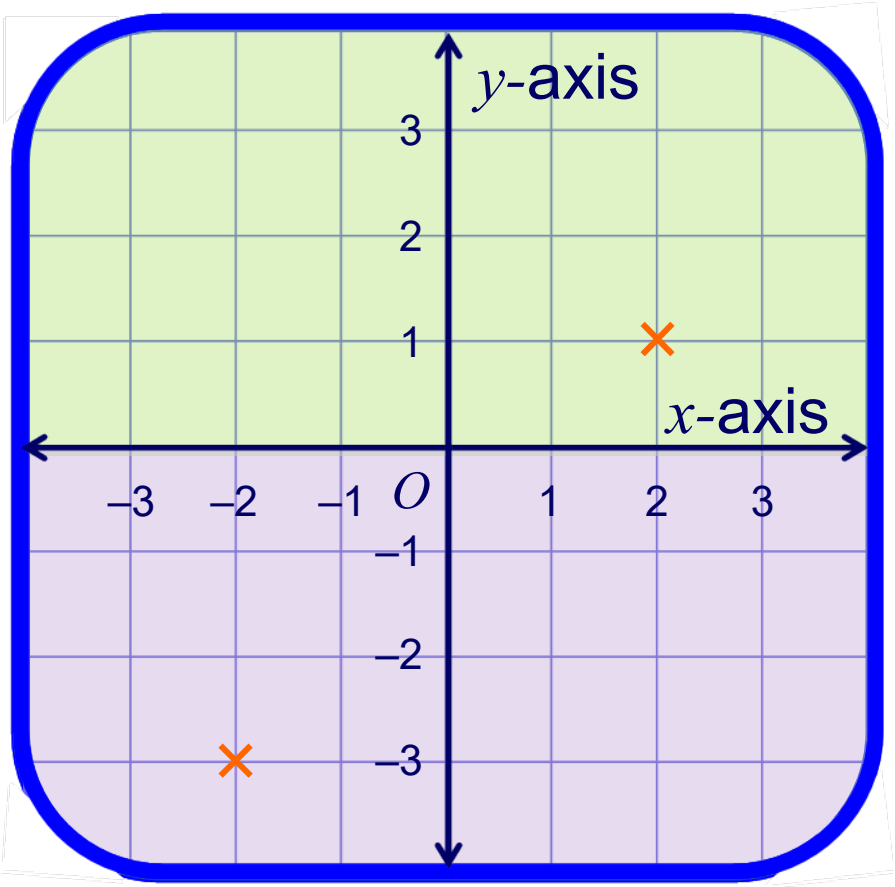


A **positive** number means the point is to the **right** of the origin.

A **negative** number means the point is to the **left**.

The y direction

The second number in an ordered pair (the y-coordinate) tells us how many units from the origin the point is in the y-direction.



A **positive** number means the point is **above** the origin.

A **negative** number means the point is **below** the origin.

We can remember the order of the coordinates by the phrase:

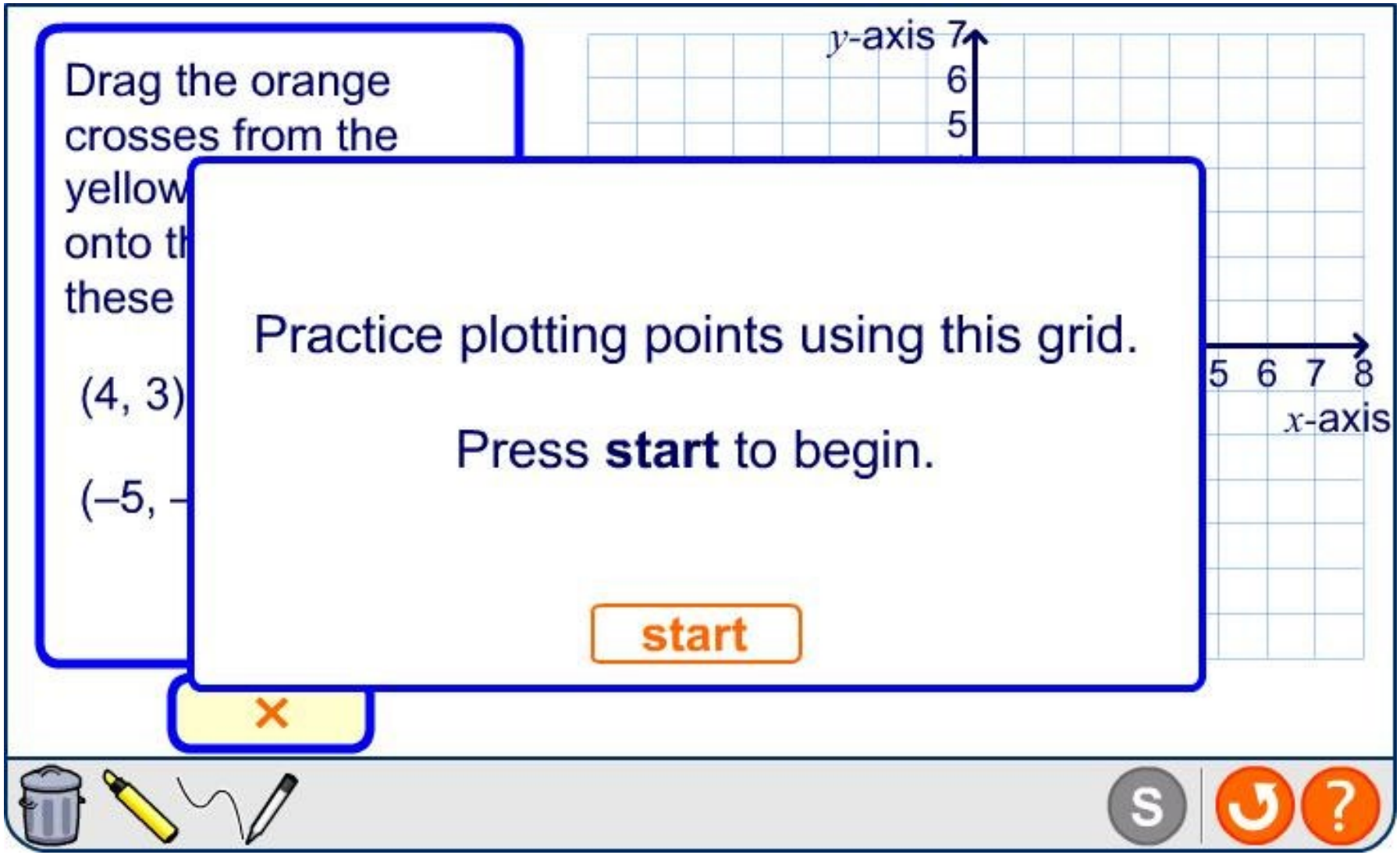
Along the hall and up (or down) the stairs.

Which quadrant?

In which quadrant is the point (–30, –61)?

- First quadrant
- Second quadrant
- Third quadrant
- Fourth quadrant

Plotting points

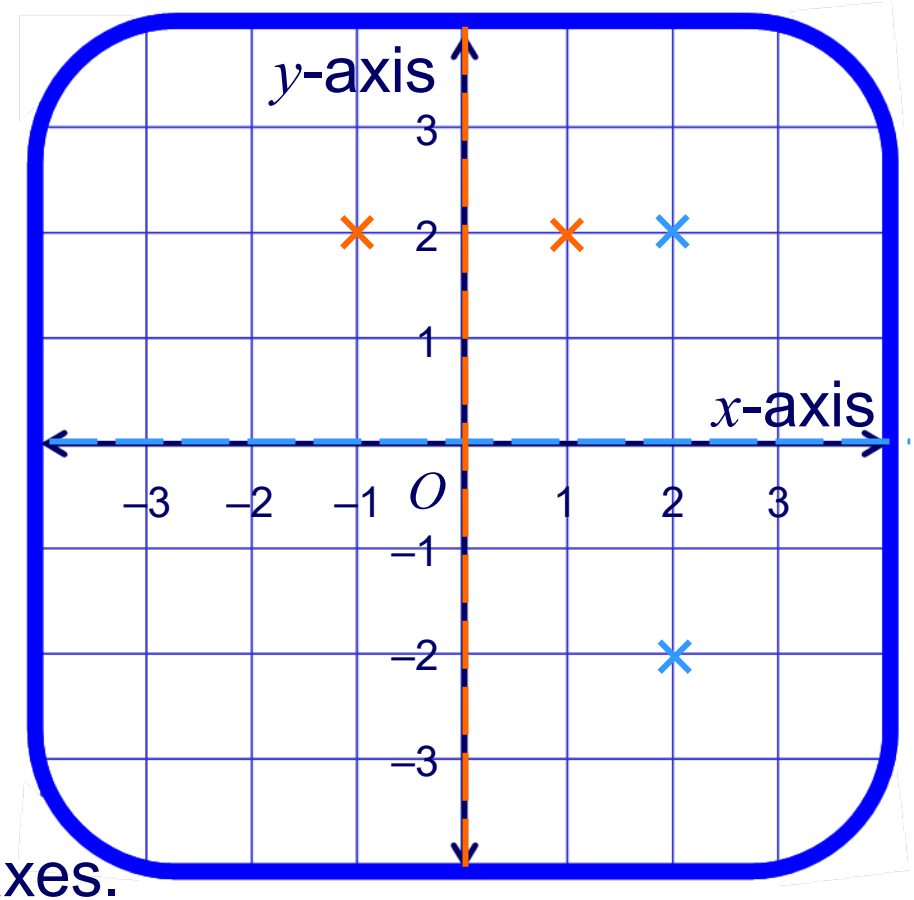


Pairs of coordinate sets

What can you tell about each of these two sets of coordinates?

(1, 2) and (–1, 2)

(2, 2) and (2, –2)



Let's plot them to see if you are right:

These points have been **reflected** across the x- and y-axes.

Reflecting coordinates

(1, 2) and (–1, 2)

***x*-coordinates are opposites** ***y*-coordinates are the same**

These points are **reflected** across the y-axis.

(2, 2) and (2, –2)

***x*-coordinates are the same** ***y*-coordinates are opposites**

These points are **reflected** across the x-axis.

What about (3, 5) and (–3, –5)?

Practice game