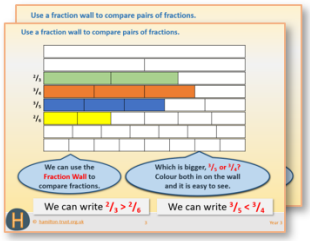
Week 9, Day 3

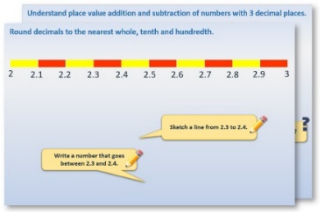
Plot co-ordinates and draw polygons in two quadrants

Each day covers one maths topic. It should take you about 1 hour or just a little more.

1. If possible, watch the **PowerPoint presentation** with a teacher or another grown-up.



OR start by carefully reading through the **Learning Reminders**.



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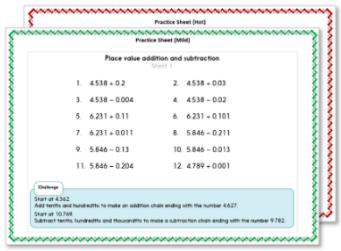
2. Tackle the questions on the **Practice Sheet**.
There might be a choice of either Mild (easier) or Hot (harder)!
Check the answers.



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3. Finding it tricky? That's OK… have a go with a grown-up at **A Bit Stuck?**

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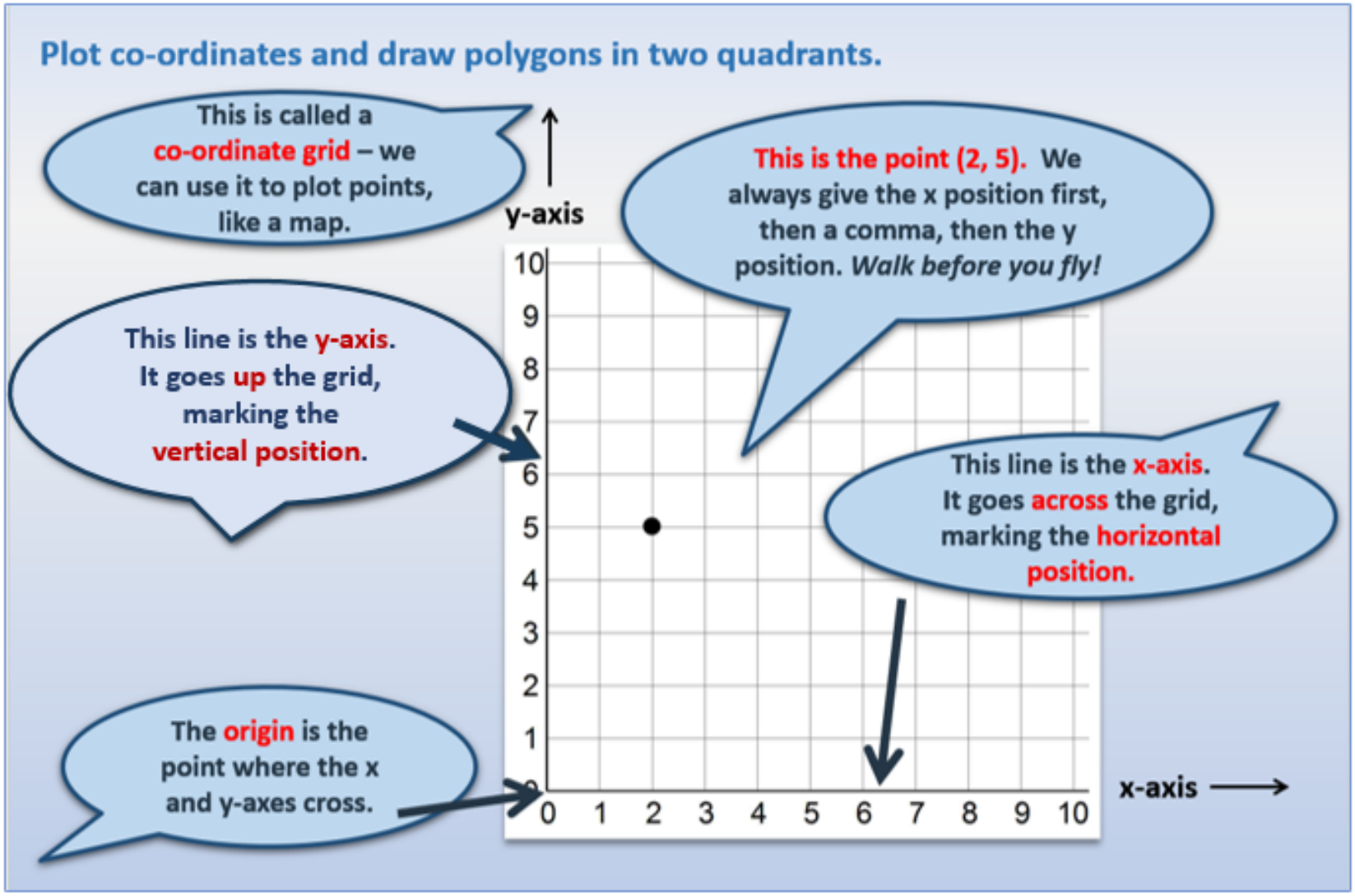
4. Think you've cracked it? Whizzed through the Practice Sheets? Have a go at the **Investigation**…

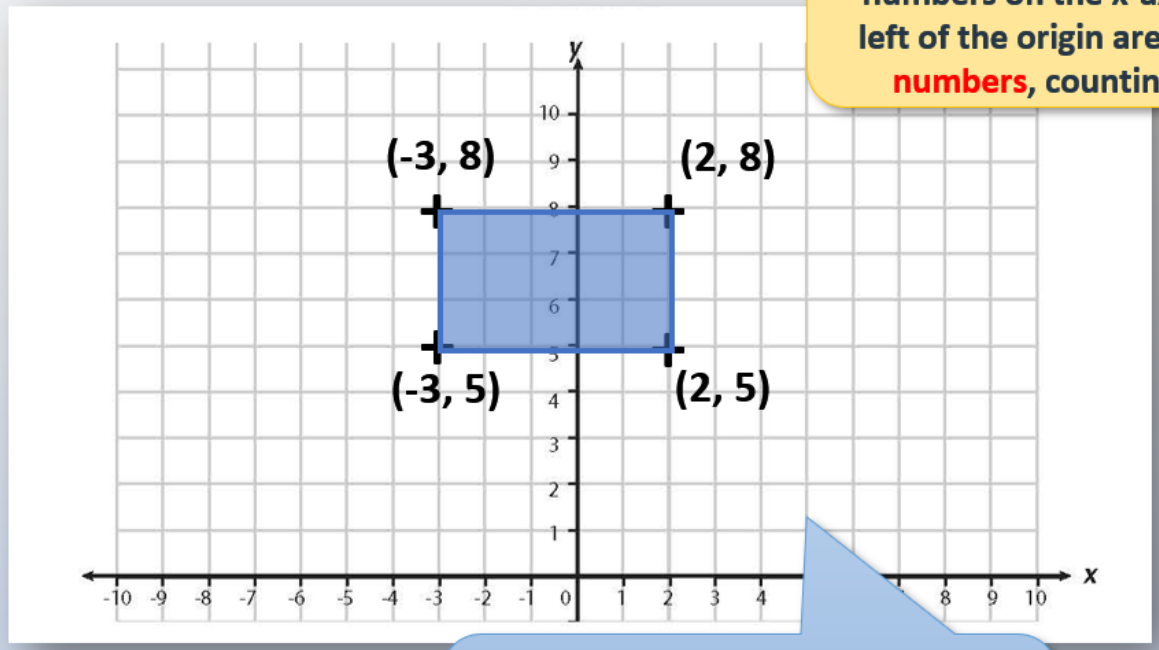
Learning Reminders



Learning Reminders

Plot co-ordinates and draw polygons in two quadrants.

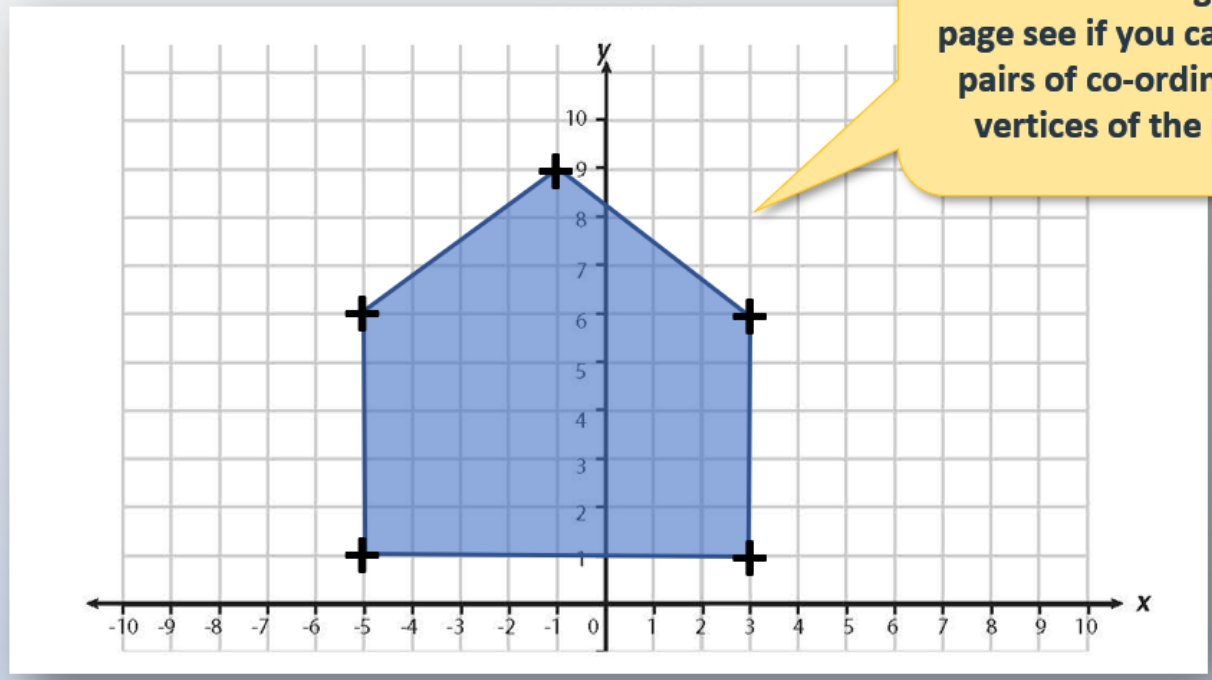
We can extend the grid into a **second quadrant.** Look how the numbers on the x-axis to the left of the origin are **negative numbers**, counting back.



Notice how the first co-ordinate of the two vertices on the left side of the rectangle are negative numbers.

Learning Reminders

Plot co-ordinates and draw polygons in two quadrants.



Without looking at the next page see if you can match the pairs of co-ordinates to the vertices of the pentagon.

(-1, 9)

(-5, 1)

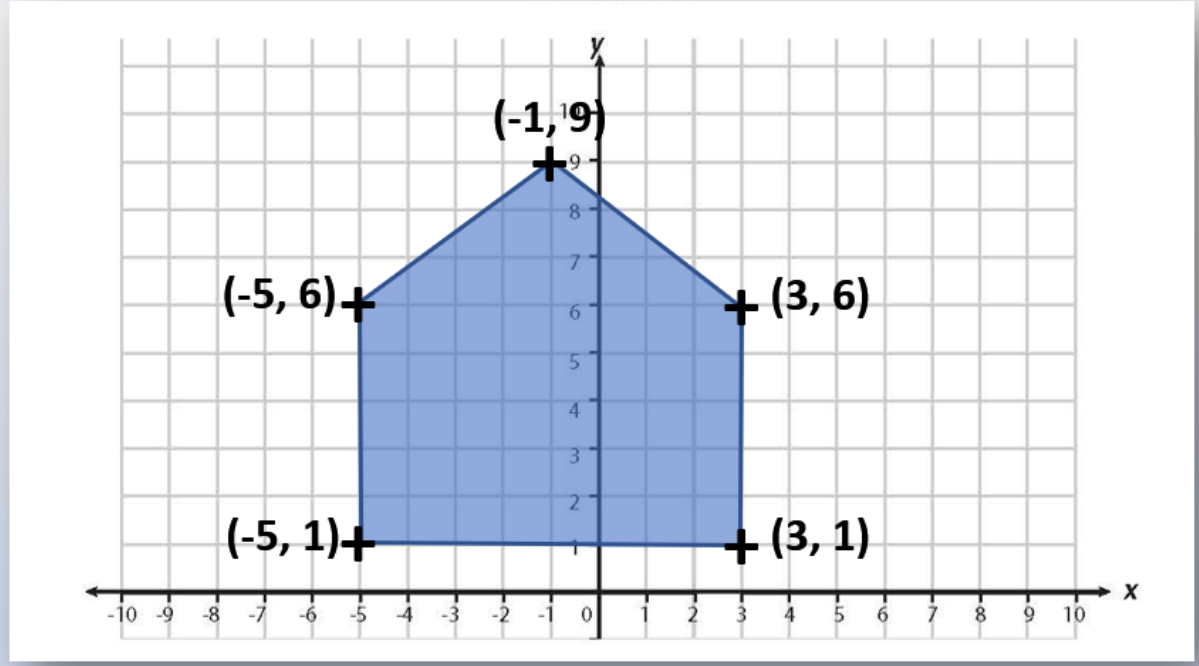
(3, 1)

(3, 6)

(-5, 6)

Learning Reminders

Plot co-ordinates and draw polygons in two quadrants.



Practice Sheet Mild
Plotting co-ordinates

Use a ruler to draw axes for each question, like the ones used earlier in the lesson.

1. Plot these points to make squares. Use a different colour for each.
   a) (1, 2), (1, 7), (6, 2), (6, 7)
   b) (−4, 0), (−4, 4), (0, 0), (0, 4)
   c) (−8, 2), (−2, 2), (−2, 8), (−8, 8)
   d) (−1, 9), (−1, 5), (3, 9), (3, 5)

2. Plot these points to make rectangles. Use a different colour for each.
   a) (0, 7), (9, 3), (9, 7), (0, 3)
   b) (−4, 3), (−4, 0), (0, 3), (0, 0)
   c) (−6, 4), (1, 8), (1, 4), (−6, 8)
   d) (7, 9), (−1, 5), (7, 5), (−1, 9)

3. Plot the three points. Work out the fourth point to make a square. Write down its co-ordinates. Draw the square. Use a different colour for each.
   a) (−1, 2), (1, 2), (1, 0), (,)
   b) (−2, 9), (1, 9), (1, 6), (,)
   c) (−1, 7), (−1, 3), (3, 3), (,)
   d) (−3, 1), (-7, 5), (-3, 5), (,)

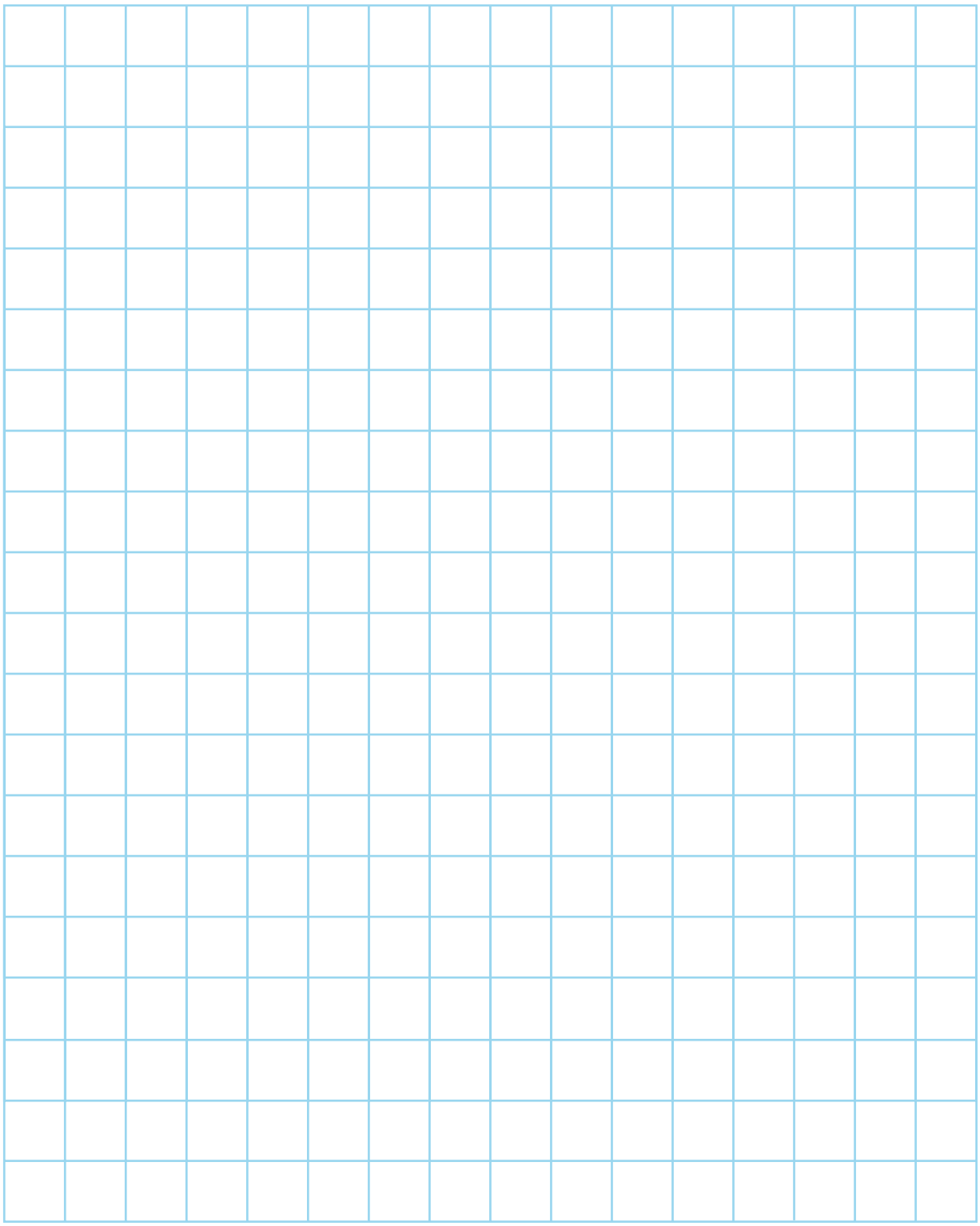
Challenge

Plot the two points. Work out the two other points to make a square. Write down their co-ordinates. Draw the square.
(−2, 1), (4, 1), (,), (,)

Are there any other possibilities?
Plot and draw as many as you can, using a different colour for each.

Practice Sheet Mild

Plotting co-ordinates



Practice Sheet Hot

Polygon co-ordinates

Use a ruler to draw axes for each question, like the ones used earlier in the lesson.

1. Plot the three points. Work out the fourth point to make a square.
   Write down its co-ordinates. Draw the square.
   Use a different colour for each.

   a) (−1, 2), (1, 2), (1, 0), (,)
   b) (−2, 9), (1, 9), (1, 6), (,)
   c) (−1, 7), (−1, 3), (3, 3), (,)
   d) (−3, 5), (−7, 1), (−7, 5), (,)

2. Plot three points and work out the fourth point to make a rectangle.
   Write down its co-ordinates. Draw the rectangle.
   Use a different colour for each.

   a) (−4, 5), (7, 6), (−4, 6), (,)
   b) (4, 2), (−3, 2), (4, 4), (,)
   c) (−6, 6), (1, 6), (1, 10), (,)
   d) (5, 1), (10, 1), (5, 4), (,)

3. Plot and join these points. Use a different colour for each.
   Write what each polygon is.

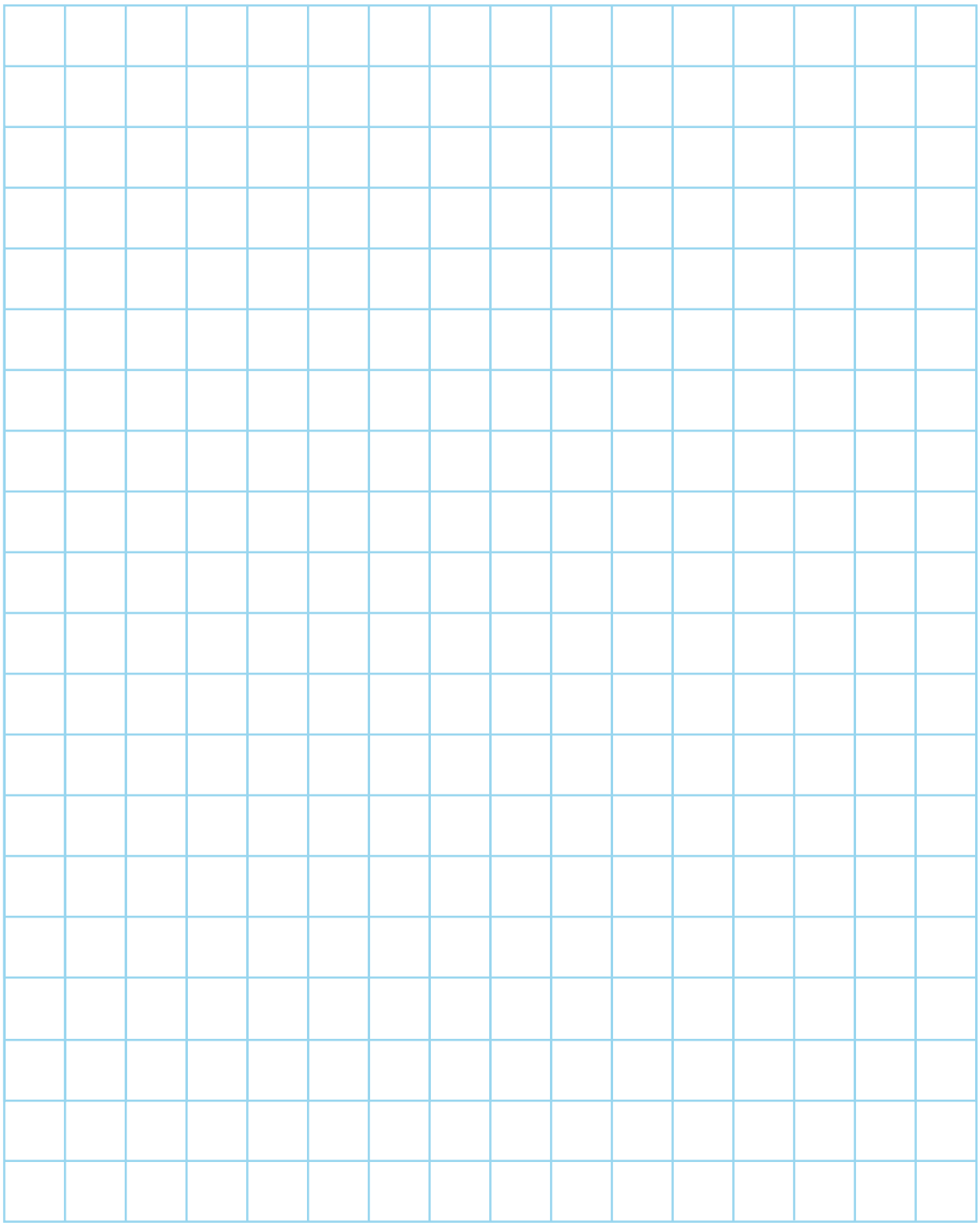
   a) (−2, 5), (1, 4), (1, 6), (4, 5)
   b) (7, 2), (8, 3), (−2, 3), (−1, 4)
   c) (−6, 6), (−6, 8), (1, 7), (2, 8), (1, 9),
   d) (−1, 9), (2, 9), (3, 1), (2, 0), (−1, 0), (−2, 1)

Challenge

Plot a trapezium and write down all its co-ordinates.
Now try this again. This time you are not allowed to use the same *y* value twice.
If you managed this with the first one, draw a trapezium that does not use the same *x* or *y* value twice...

Practice Sheet Hot

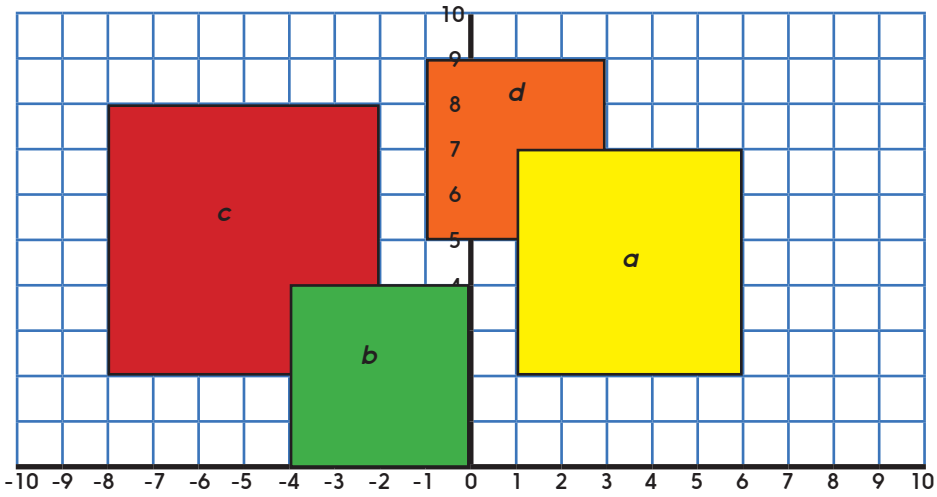
Polygon co-ordinates



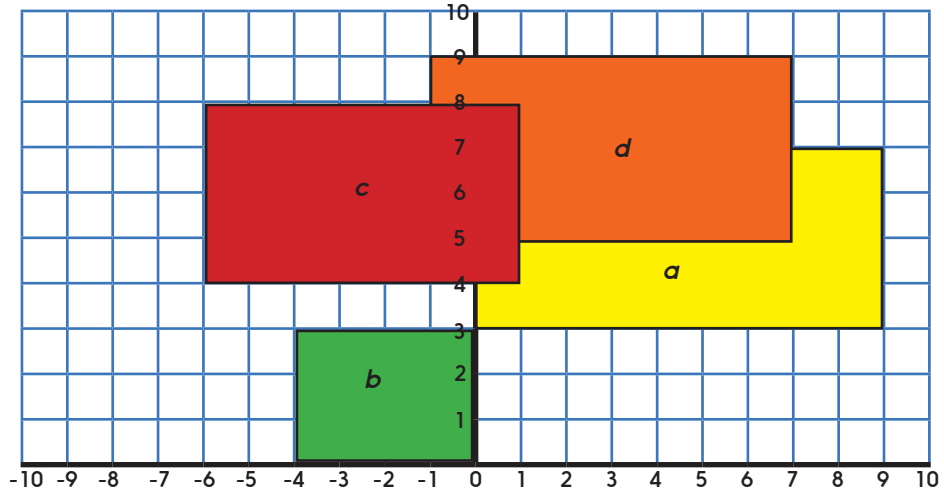
Practice Sheets Answers

Plotting co-ordinates (mild)

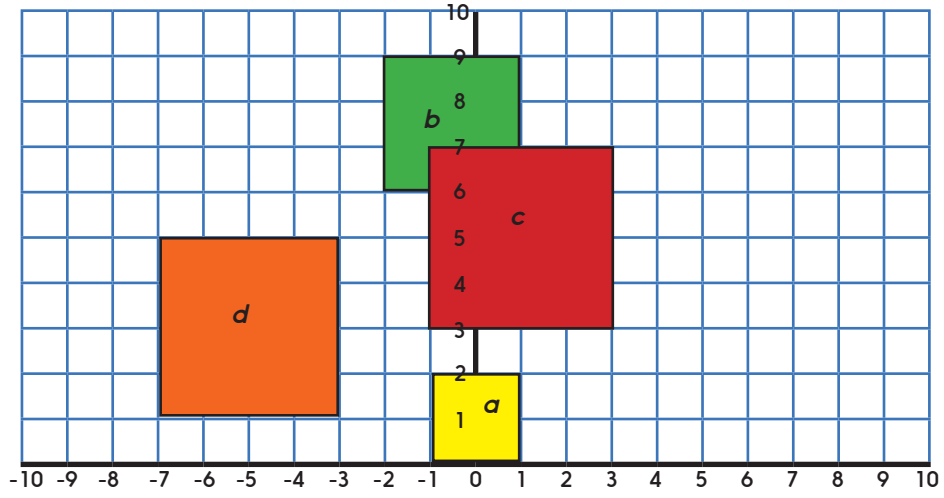
1.



2.



3.



The missing co-ordinates are:
a) (-1, 0)
b) (-2, 6)
c) (3, 7)
d) (-7, 1)

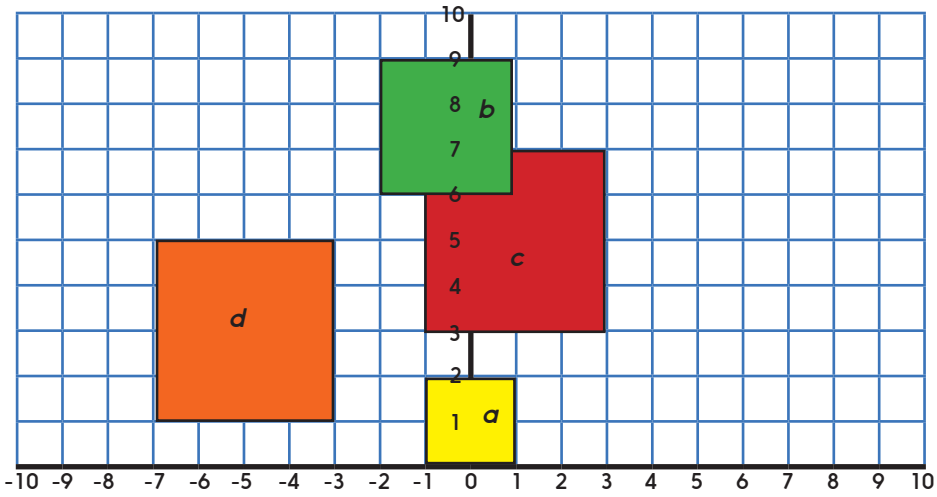
Challenge

The other two points to make the square are (-2, 7) and (4, 7). Children should draw the square. There aren't any other possibilities unless you use four quadrants, in which case, their co-ordinates are (-2, -5) and (4, -5) or (1, 4) and (1, -2).

Practice Sheets Answers (continued)

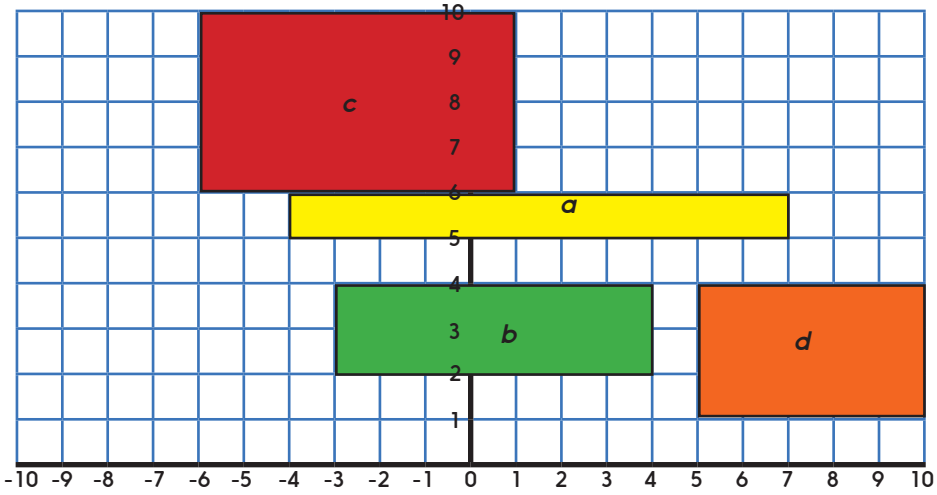
Polygon co-ordinates (hot)

1.



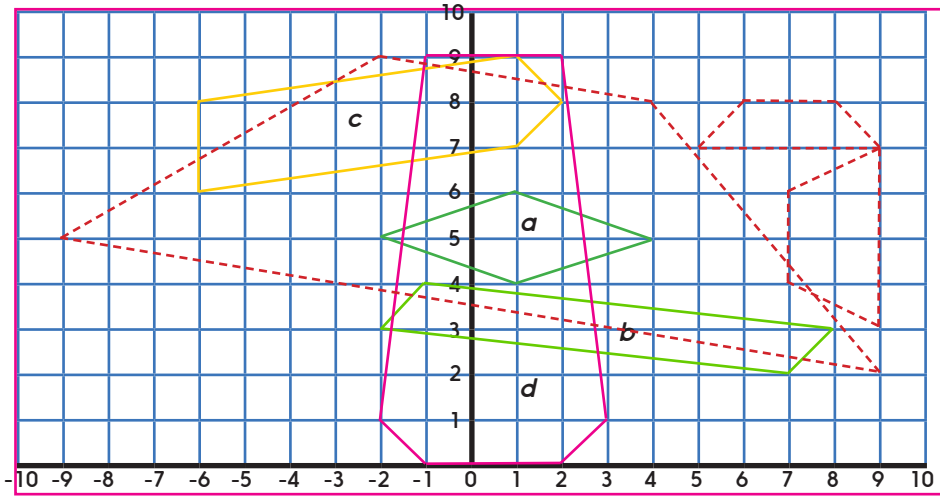
The missing co-ordinates are:
a) (-1, 0)
b) (-2, 6)
c) (3, 7)
d) (-3, 1)

2.



The missing co-ordinates are:
a) (7, 5)
b) (-3, 4)
c) (-6, 10)
d) (10, 4)

3.



a) rhombus
b) parallelogram
c) pentagon
d) hexagon

Challenge

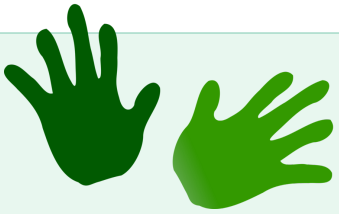
Possible answers for the challenge questions are indicated above with red dotted lines.

A Bit Stuck?
Walk then fly!

Work in pairs

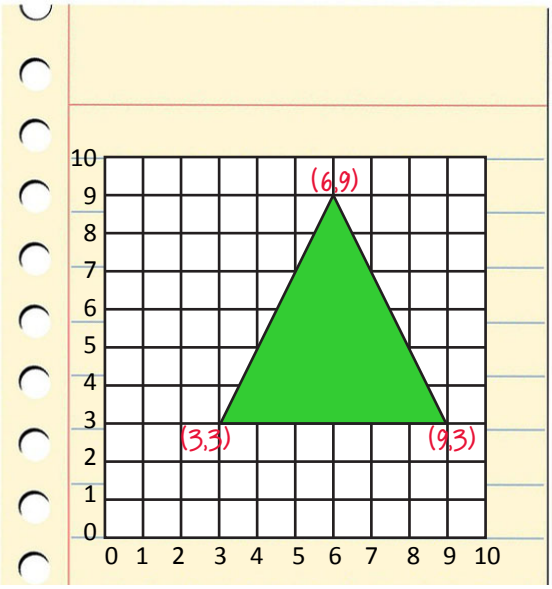
Things you will need:

- A grid
- Coloured pencils



What to do:

- Sit back to back.
- Choose a coloured pencil.
  Use it to draw a triangle on your grid.
- Tell your partner the colour pencil you chose.
  Call out the co-ordinates of the points of your triangle to your partner.
  They draw the points, then join them to make a triangle using the same coloured pencil.
- Now compare your triangles.
  Are they the same?
  If so, you both score 3 points.
  If not, you score 1 point for each matching point.
- Swap roles and repeat using a different coloured pencil.



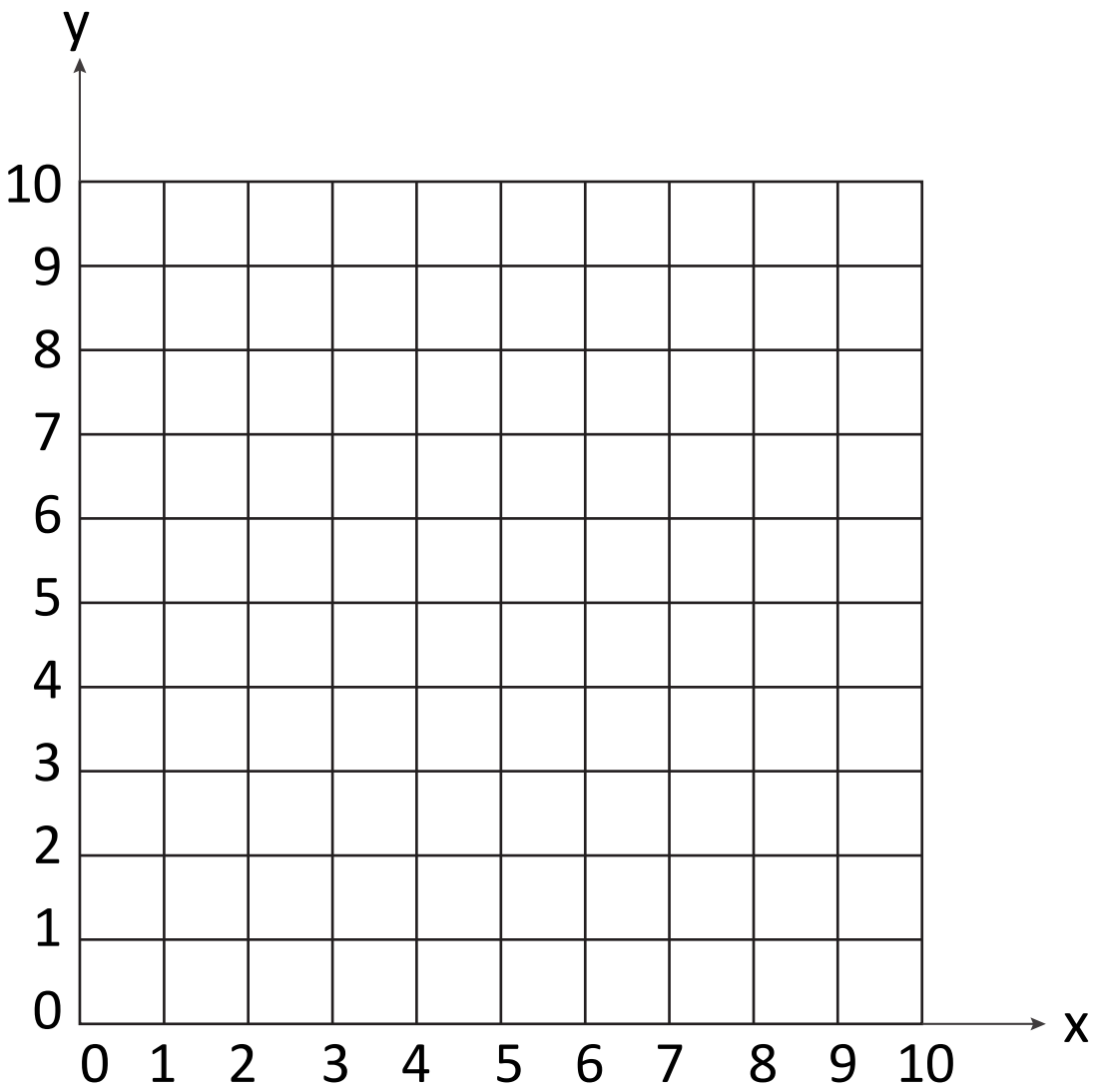
S-t-r-e-t-c-h:

Move one of your triangles up by two squares. Record the new co-ordinates.

Learning outcomes:

- I can use co-ordinates in the first quadrant.
- I am beginning to work out new co-ordinates after a translation.

A Bit Stuck?
Walk then fly!

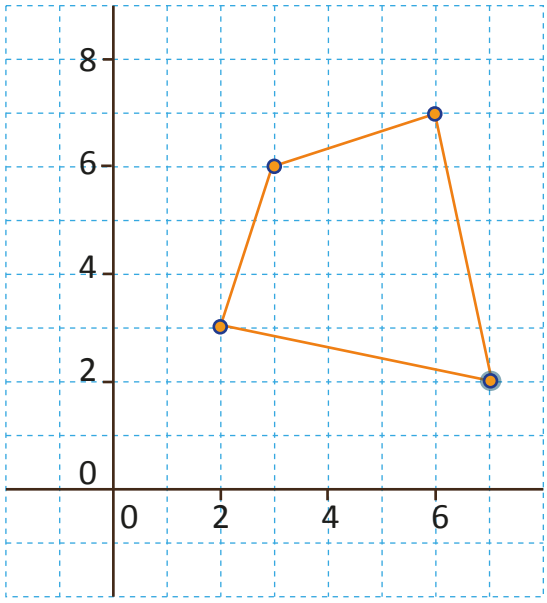


Investigation
Cycling co-ordinates

1. Write down four single-digit numbers, for example 2, 3, 6, 7.

2. Use these to produce four pairs of co-ordinates. Take the first two numbers to produce the first pair (2, 3), the second and third number to give the second pair of co-ordinates (3, 6), the third and fourth number to give the third pair of co-ordinates (6, 7) and then cycle round using the last and first numbers to give the last pair of co-ordinates (7, 2).

3. Plot the four points, then join them together. What shape have you drawn?



4. Now try 2, 6, 5, 1. What shape do they form this time?

5. Now try groups of your own four numbers. See what different types of quadrilateral you can produce?

   Can you write a rule for producing kites? Can you write a rule for producing squares?

Challenge

Do your rules work in all four quadrants?

Investigation

Cycling co-ordinates