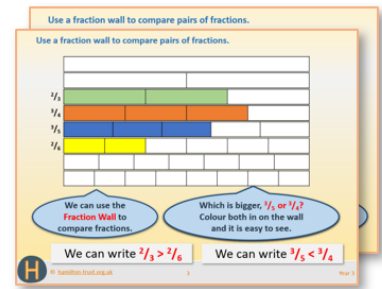


Week 9, Day 5

Reflect a shape and write the new co-ordinates

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

1. Start by reading through the **Learning Reminders**. They come from our *PowerPoint* slides.



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

Practice Sheet (Add)

Practice Sheet (Add)

Place value addition and subtraction

Sheet 1

1. $4.538 + 0.2$	2. $4.538 + 0.03$
3. $4.538 - 0.004$	4. $4.538 - 0.02$
5. $6.231 + 0.11$	6. $6.231 + 0.101$
7. $6.231 + 0.011$	8. $5.846 - 0.211$
9. $5.846 - 0.13$	10. $5.846 - 0.013$
11. $5.846 - 0.204$	12. $4.789 - 0.001$

Challenge

Start at 4.532
Add tenths and hundredths to make an addition chain ending with the number 4.827.
Start at 10.548
Subtract tenths, hundredths and thousandths to make a subtraction chain ending with the number 9.782.

3. Finding it tricky? That's OK... have a go with a grown-up at [A Bit Stuck?](#)

Defining the question

Define the question

What is the question?

What will you need?

- 1. What information do you need?
- 2. What resources do you need?
- 3. What time do you need?

What is the plan?

Remember always your partner will show a number with their destination on the **NUMBER** line.

Remember to be ready to start in 30 seconds on the place value chart when asked to make your number.

How can you answer the question?

Your partner looks at the digit combinations and writes the corresponding number.

How often should you check the number?

How long does it take?

The different activities should be done regularly on the place value grid. Rotation should be done every 10 minutes.

1.

0.001s

Activity 1: Place value grid

Activity 2: Place value grid

Activity 3: Place value grid

Activity 4: Place value grid

Activity 5: Place value grid

Activity 6: Place value grid

Activity 7: Place value grid

Activity 8: Place value grid

Activity 9: Place value grid

Activity 10: Place value grid

Activity 11: Place value grid

Activity 12: Place value grid

Activity 13: Place value grid

Activity 14: Place value grid

Activity 15: Place value grid

Activity 16: Place value grid

Activity 17: Place value grid

Activity 18: Place value grid

Activity 19: Place value grid

Activity 20: Place value grid

Activity 21: Place value grid

Activity 22: Place value grid

Activity 23: Place value grid

Activity 24: Place value grid

Activity 25: Place value grid

Activity 26: Place value grid

Activity 27: Place value grid

Activity 28: Place value grid

Activity 29: Place value grid

Activity 30: Place value grid

Activity 31: Place value grid

Activity 32: Place value grid

Activity 33: Place value grid

Activity 34: Place value grid

Activity 35: Place value grid

Activity 36: Place value grid

Activity 37: Place value grid

Activity 38: Place value grid

Activity 39: Place value grid

Activity 40: Place value grid

Activity 41: Place value grid

Activity 42: Place value grid

Activity 43: Place value grid

Activity 44: Place value grid

Activity 45: Place value grid

Activity 46: Place value grid

Activity 47: Place value grid

Activity 48: Place value grid

Activity 49: Place value grid

Activity 50: Place value grid

Activity 51: Place value grid

Activity 52: Place value grid

Activity 53: Place value grid

Activity 54: Place value grid

Activity 55: Place value grid

Activity 56: Place value grid

Activity 57: Place value grid

Activity 58: Place value grid

Activity 59: Place value grid

Activity 60: Place value grid

Activity 61: Place value grid

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Activity 63: Place value grid

Activity 64: Place value grid

Activity 65: Place value grid

Activity 66: Place value grid

Activity 67: Place value grid

Activity 68: Place value grid

Activity 69: Place value grid

Activity 70: Place value grid

Activity 71: Place value grid

Activity 72: Place value grid

Activity 73: Place value grid

Activity 74: Place value grid

Activity 75: Place value grid

Activity 76: Place value grid

Activity 77: Place value grid

Activity 78: Place value grid

Activity 79: Place value grid

Activity 80: Place value grid

Activity 81: Place value grid

Activity 82: Place value grid

Activity 83: Place value grid

Activity 84: Place value grid

Activity 85: Place value grid

Activity 86: Place value grid

Activity 87: Place value grid

Activity 88: Place value grid

Activity 89: Place value grid

Activity 90: Place value grid

Activity 91: Place value grid

Activity 92: Place value grid

Activity 93: Place value grid

Activity 94: Place value grid

Activity 95: Place value grid

Activity 96: Place value grid

Activity 97: Place value grid

Activity 98: Place value grid

Activity 99: Place value grid

Activity 100: Place value grid

4. Have I mastered the topic? A few questions to **Check your understanding**.
Fold the page to hide the answers!

Identify the value of the "4" in the following numbers:

- (a) 3.407
- (b) 4.821
- (c) 0.043
- (d) 5.104
- (e) 48,739

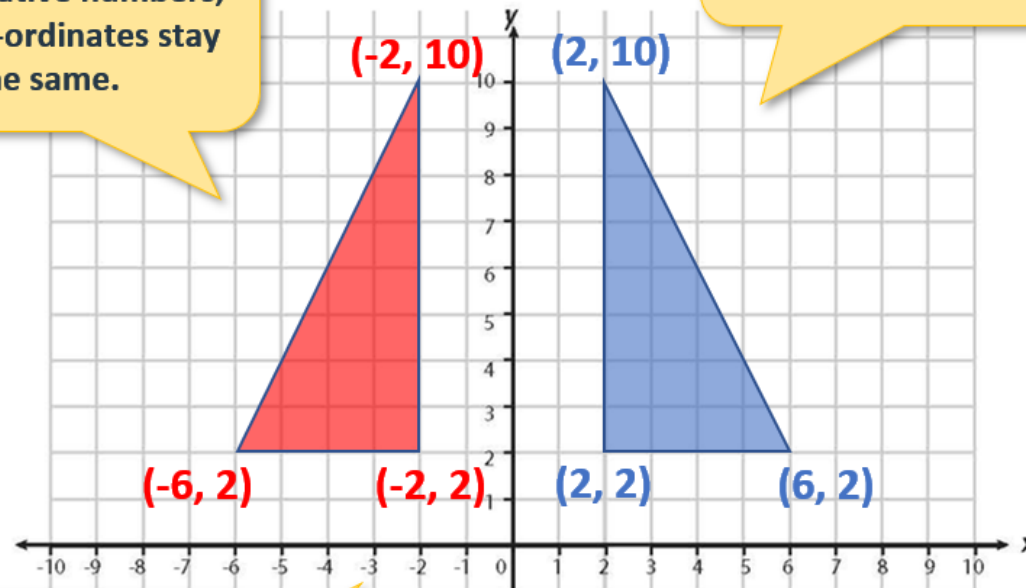
How many times must Dan multiply 0.048 by 10 to get 48,000?

Learning Reminders

Reflect a shape and write the new co-ordinates.

The x-coordinates are now negative numbers, the y-co-ordinates stay the same.

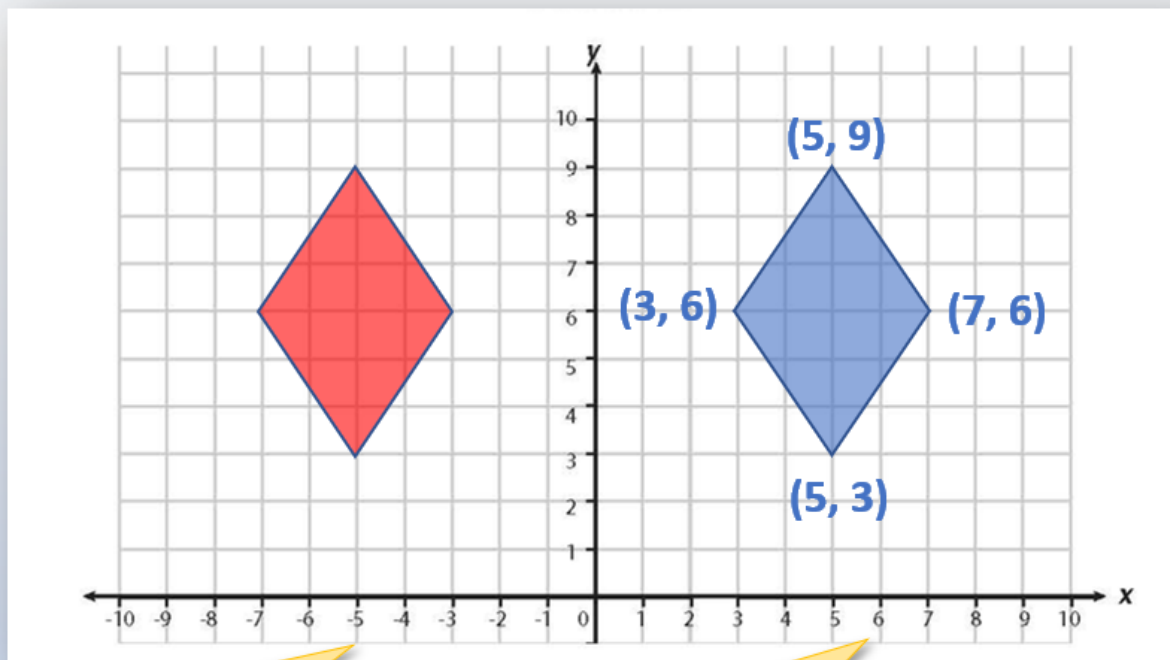
We can pretend that there is a mirror on the y-axis to reflect this triangle.



Checking carefully that each point is the same distance away from the y-axis as it was originally, and that it looks to be the same shape.

Learning Reminders

Reflect a shape and write the new co-ordinates.



You can check with a small mirror on the y axis to check the rhombus is in the right place.

Write down the co-ordinates of the reflected shape.

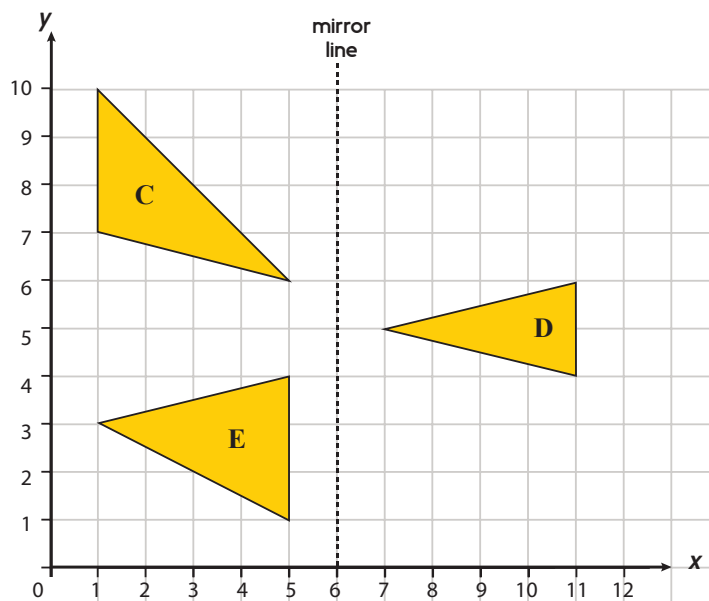
Answers

(6 '5-) (8 '5-)
(9 '7-) (9 '3-)

Practice Sheet Mild

Pattern of reflections

Look at triangles C, D and E.



1. Draw the reflection of each triangle, across the mirror line shown, to give triangles C1, D1 and E1.
2. Mark pairs of vertices (corners) that are reflections of each other. Use crosses, and a different colour for each pair. You should be able to find 9 pairs.
3. In the table, write the co-ordinates of the pairs of vertices you marked.

Colour of the two crosses	Vertex in shape on left	Vertex in shape on right
	(,)	(,)
	(,)	(,)
	(,)	(,)
	(,)	(,)
	(,)	(,)
	(,)	(,)
	(,)	(,)
	(,)	(,)
	(,)	(,)

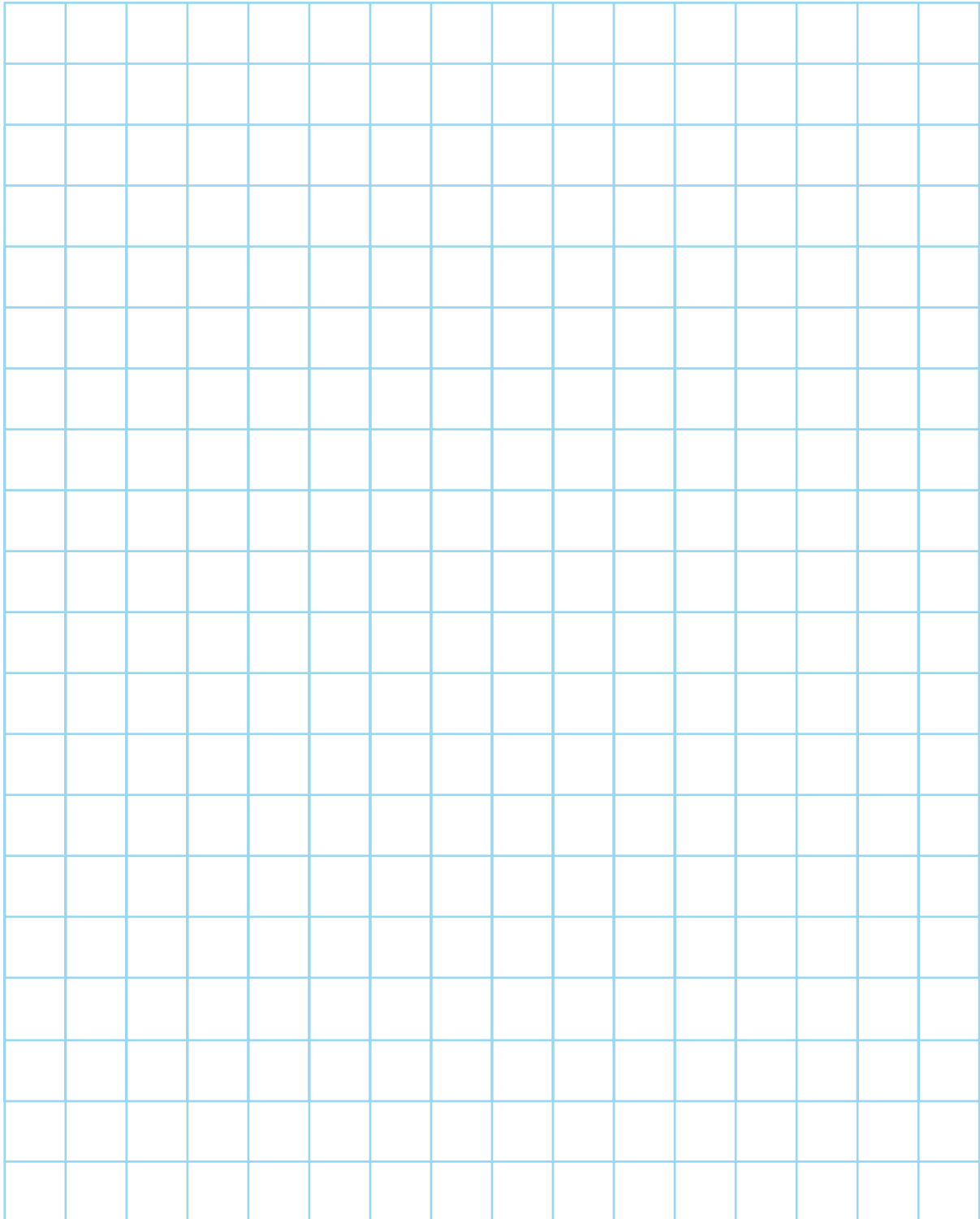
Did you notice anything interesting about each pair of co-ordinates?
Explain any ideas carefully...

Challenge

Triangle F has vertices at (8, 0), (6, 3) and (9, 4).
Can you predict where its reflection, F1 will be? Draw it to check.

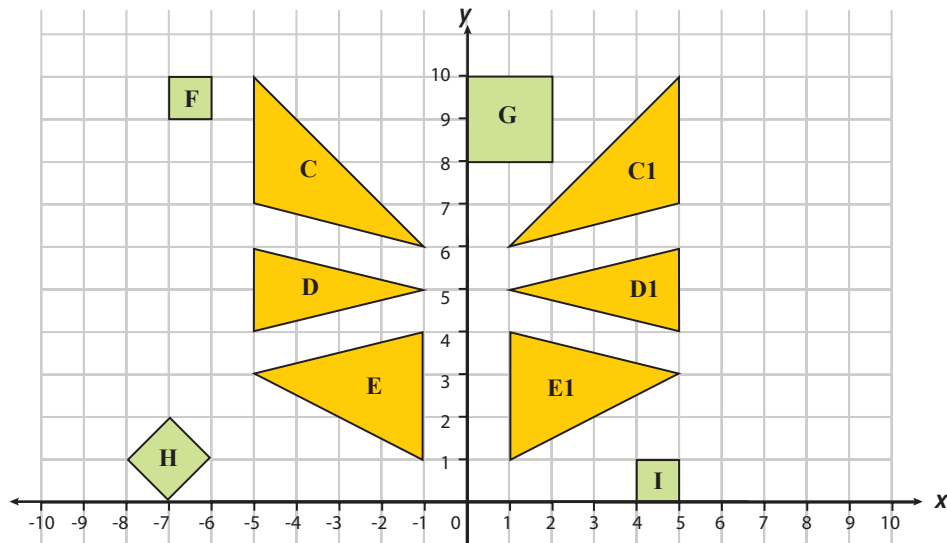
Practice Sheet Mild

Pattern of reflections



Practice Sheet Hot

Pattern of reflections



- Look at triangles: C, D and E. They have been reflected across the y -axis to give triangles C1, D1 and E1. Mark the pairs of vertices (corners) which are reflections of each other. Use crosses, and a different colour for each pair. How many pairs should there be?
- In the table, write the co-ordinates of the pairs of vertices you marked.

Colour of the two crosses	Vertex in shape on left	Vertex in shape on right
	(,)	(,)
	(,)	(,)
	(,)	(,)
	(,)	(,)
	(,)	(,)
	(,)	(,)
	(,)	(,)
	(,)	(,)
	(,)	(,)

What do you notice about each co-ordinate and its reflection?

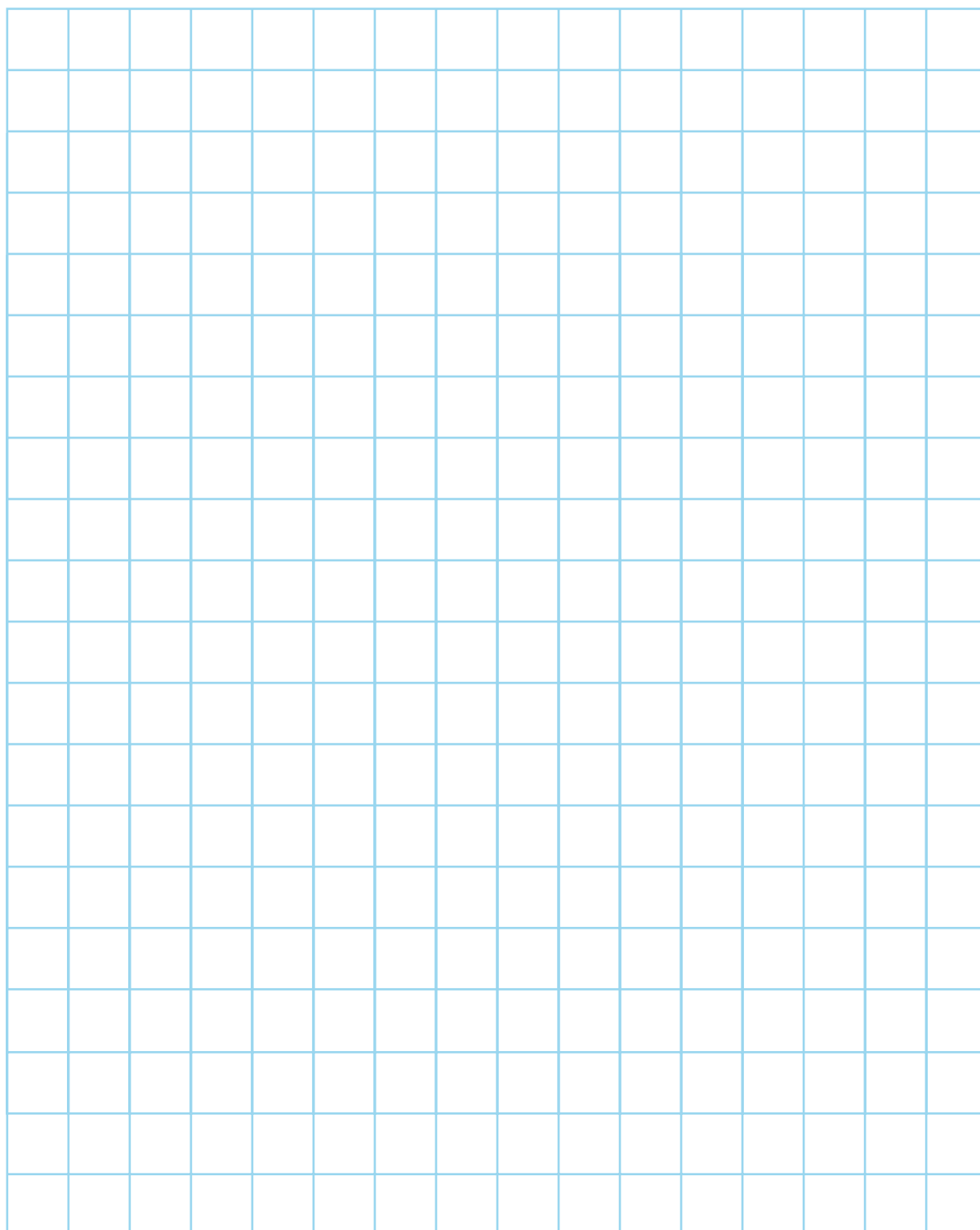
- Look at squares F, G, H and I. Can you predict the co-ordinates of their reflections across the y -axis?

Challenge

- Draw two more polygons and their reflections. Use the spare space on the grid.
- Name your pairs of polygons with letters, J and J1 and K and K1.
- Write down the co-ordinate pairs for each matching pair of vertices.

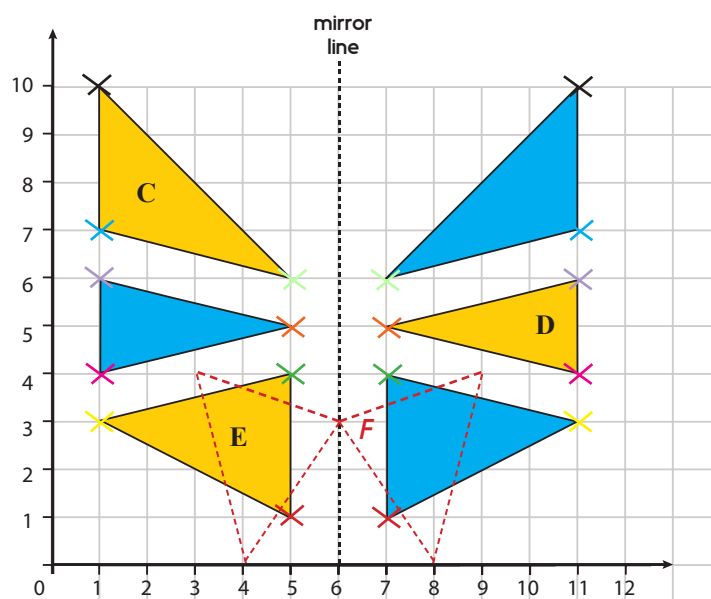
Practice Sheet Hot

Pattern of reflections



Practice Sheets Answers

Pattern of reflections (mild)



Colour of the two crosses <i>(note that the children will have used different colours)</i>	Vertex in shape on the left	Vertex in shape on the right
Red	(5, 1)	(7, 1)
Yellow	(1, 3)	(11, 3)
Green	(5, 4)	(7, 4)
Pink	(1, 4)	(11, 4)
Orange	(5, 5)	(7, 5)
Purple	(1, 6)	(11, 6)
Light green	(5, 6)	(7, 6)
Blue	(1, 7)	(11, 7)
Black	(1, 10)	(11, 10)

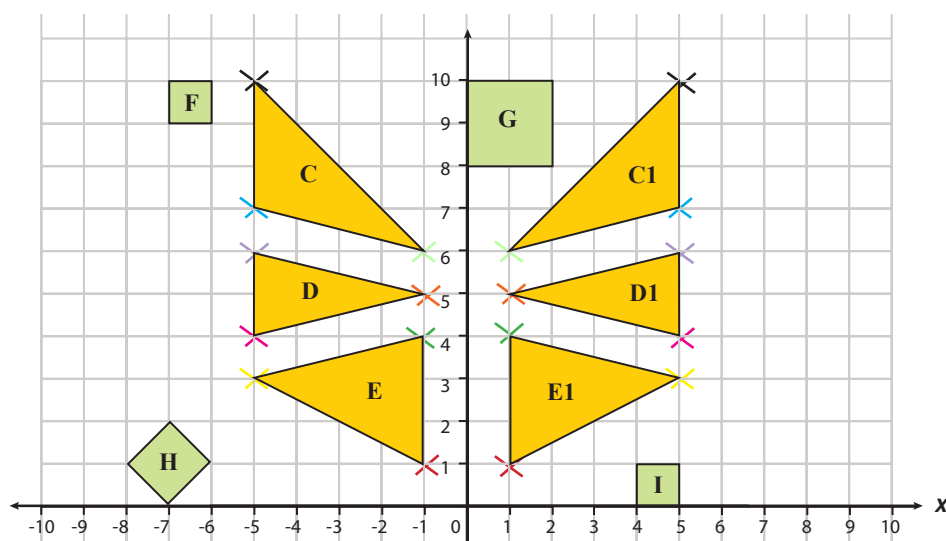
When the shape is reflected the y co-ordinate stays the same. The difference between the x co-ordinates is twice the difference between the vertex of the shape on the left and 6 - for example in the red co-ordinates $6 - 5 = 1$, double 1 is 2 and the difference between 7 and 5 is 2.

Challenge

Children should be able to predict the new vertices of Triangle F using the above information:
 (8, 0) will reflect to (4, 0) because $8 - 6 = 2$, double 2 is 4 so $8 - 4 = 4$ and the y co-ordinate remains the same.
 (6, 3) will reflect to (6, 3) because $6 - 6 = 0$ so in this case both the x and y co-ordinates remain the same.
 (9, 4) will reflect to (3, 4) because $9 - 6 = 3$, double 3 is 6 so $9 - 6 = 3$ and the y co-ordinate remains the same.
 Triangle F and its reflection are drawn with a red dotted line above.

Practice Sheets Answers continued

Pattern of reflections (hot)



1. There will be nine pairs of vertices.

2. Colour of the two crosses <i>(note that the children will have used different colours)</i>	Vertex in shape on the left	Vertex in shape on the right
Red	$(-1, 1)$	$(1, 1)$
Yellow	$(-5, 3)$	$(5, 3)$
Green	$(-1, 4)$	$(1, 4)$
Pink	$(-5, 4)$	$(5, 4)$
Orange	$(-1, 5)$	$(1, 5)$
Purple	$(-5, 6)$	$(5, 6)$
Light green	$(-1, 6)$	$(1, 6)$
Blue	$(-5, 7)$	$(5, 7)$
Black	$(-5, 10)$	$(5, 10)$

When the shape is reflected the y co-ordinate stays the same. The x co-ordinate on the right is the same distance away from the y axis but in the other direction (so it is the same number but is a positive rather than negative number) for example with the red vertices -1 becomes 1 .

3. Children should be able to use the information above to predict the co-ordinates of squares F, G, H and I if they were reflected across the y -axis.

Square F original vertices $(-7, 9)$ $(-7, 10)$ $(-6, 9)$ $(-6, 10)$	new vertices	$(7, 9)$ $(7, 10)$ $(6, 9)$ $(6, 10)$
Square G original vertices $(0, 8)$ $(0, 10)$ $(2, 10)$ $(2, 8)$	new vertices	$(0, 8)$ $(0, 10)$ $(-2, 10)$ $(-2, 8)$
Square H original vertices $(-7, 0)$ $(-6, 1)$ $(-8, 1)$ $(-7, 2)$	new vertices	$(7, 0)$ $(6, 1)$ $(8, 1)$ $(7, 2)$
Square I original vertices $(4, 0)$ $(4, 1)$ $(5, 0)$ $(5, 1)$	new vertices	$(-4, 0)$ $(-4, 1)$ $(-5, 0)$ $(-5, 1)$

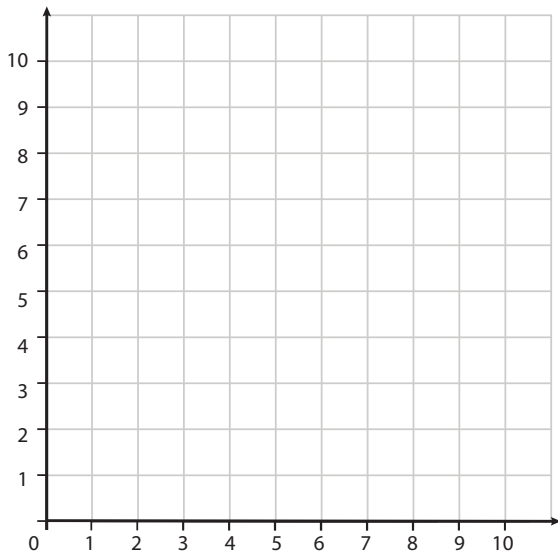
Challenge

Children's drawings for this challenge will all vary.

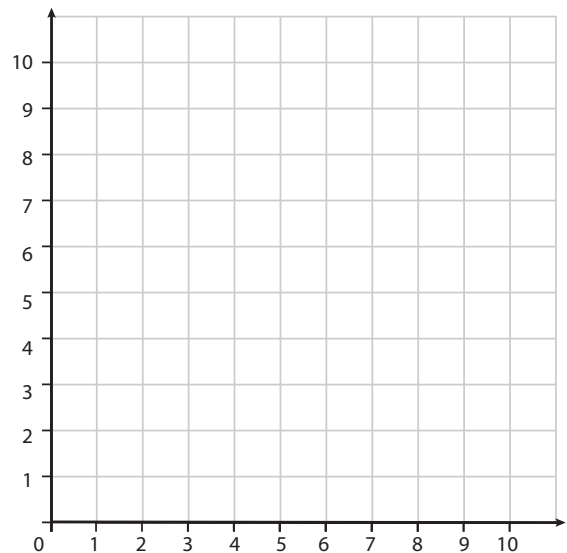
A Bit Stuck

Plotting shapes

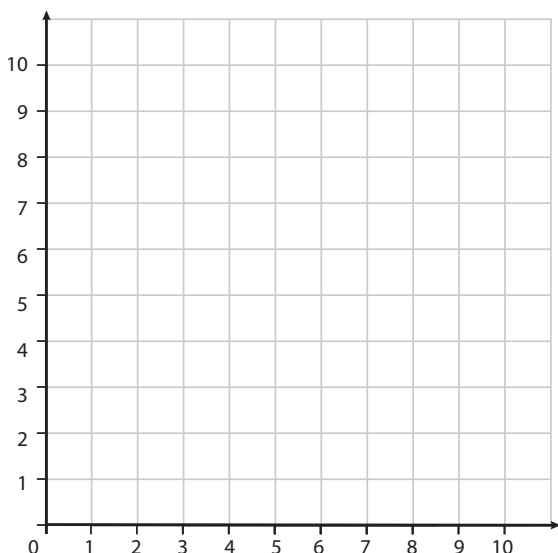
Plot the points on the grid, join them and find the missing point to make the shape.



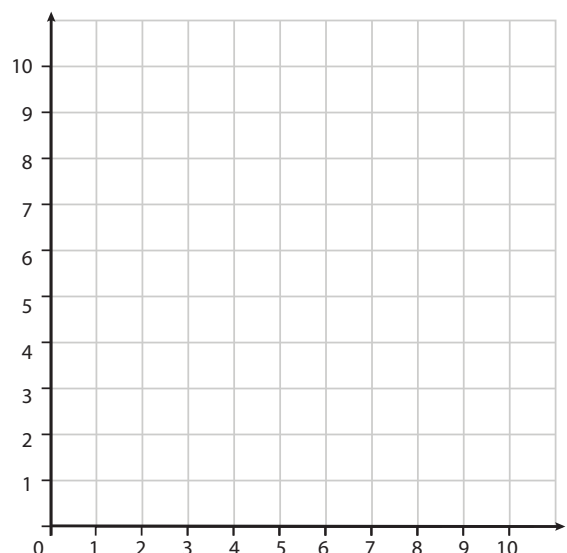
1. Square
A (3,8) B (3,2) C (6,5)



2. Rectangle
A (9,1) B (9,8) C (5,8)



3. Right-angled triangle
A (2,1) B (8,1)



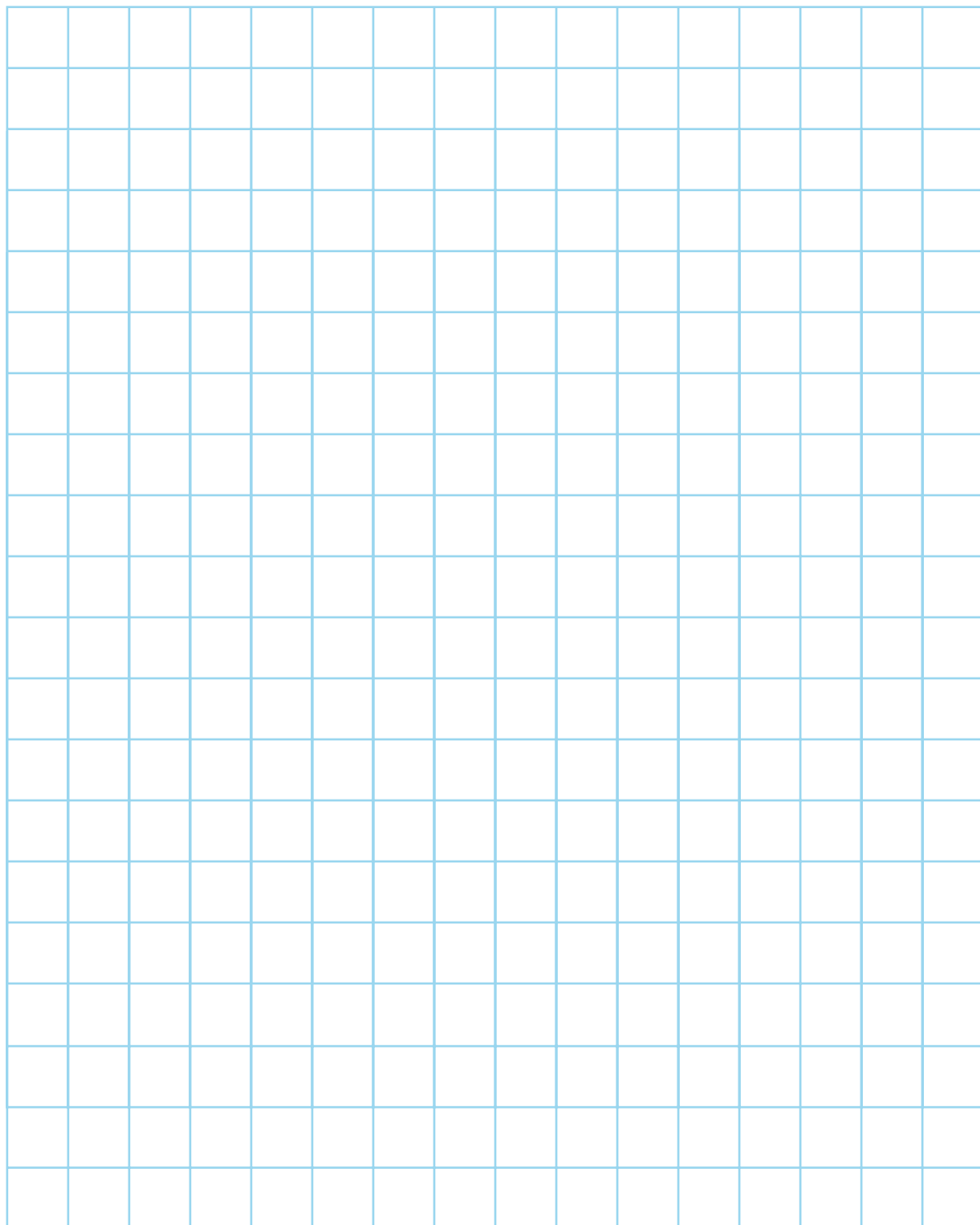
4. Isosceles triangle
A (0,2) B (0,8)

Challenge

Draw your own set of 0 to 10 axes. Plot co-ordinates (4,4) and (0,4). Find the missing pairs of co-ordinates to form the vertices of 3 different squares.

A Bit Stuck

Plotting shapes



A Bit Stuck! Answers

Plotting shapes

1. (0, 5)
2. (5, 1)
3. Lots of possible answers including co-ordinates starting with 2, e.g. (2, 2) up to (2, 10) or starting 8, e.g. (8, 2) up to (8, 10).
4. Isosceles triangle missing co-ordinates could be (1, 5), (2, 5), (3, 5), etc.

Challenge

Missing pairs of co-ordinates to form a square are:
(0, 0) and (4, 0); (0, 8) and (4, 8); and (2, 2) and (2, 6)

Check your understanding

Questions

What shape will you get if you join these points **in this order** on a co-ordinate grid?

(0, 3) (2, 5) (6, 5) (6, 1) (2, 1) (2, 3)

A square has vertices at (0, 2) and (0, 6). What are the co-ordinates of its two other vertices?

A triangle is moved 3 spaces to the right on the co-ordinate grid. Its new co-ordinates are: (2, 5), (-1, 2) and (5, 2).

What were its original co-ordinates?

Draw a rhombus and then reflect it in the y-axis.

Check your understanding

Answers

What shape will you get if you join these points on a co-ordinate grid?

(0, 3) (2, 5) (6, 5) (6, 1) (2, 1) A pentagon.

A square has vertices at (0, 2) and (0, 6). What are the co-ordinates of its two other vertices? (4, 2) and (4, 6) or (-4, 2) and (-4, 6).

The difference between the given y co-ordinates is 4 so the difference between the x co-ordinates must also be 4.

A further solution is if the square is at a tilt with the third and fourth co-ordinates (2, 4) and (-2, 4).

A triangle is moved 3 spaces to the right on the co-ordinate grid. Its new co-ordinates are: (2, 5), (-1, 2) and (5, 2).

What were its original co-ordinates? (-1, 5) (-4, 2) and (2, 2).

As it has moved right each of the x co-ordinates must have originally been 3 less than those given. The y co-ordinates are unchanged by the move.

Draw a rhombus and then reflect it in the y -axis.

Be sure to use a sharp pencil and ruler for drawings like this. You can use a mirror to judge the accuracy of the reflection.

Check Your Understanding

Resource sheet

