

## Reflections

### Notes

#### Equations of straight lines – a reminder

**Vertical lines** are of the form  $x = \text{"a number"}$

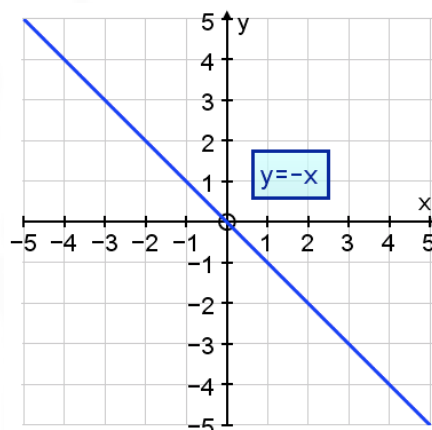
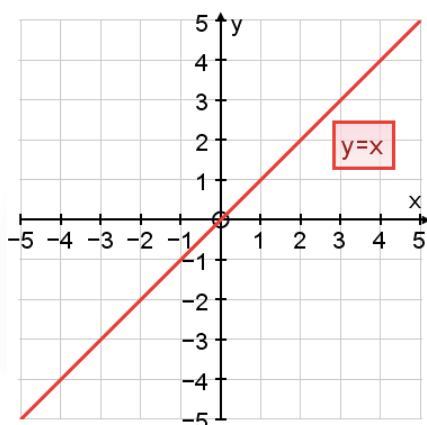
E.g.  $x = 3$  is the vertical line passing through 3 on the  $x$ -axis

**Horizontal lines** are of the form  $y = \text{"a number"}$

E.g.  $y = -2$  is the horizontal line passing through  $-2$  on the  $y$ -axis

**Diagonal lines** are of the form  $y = mx + c$  where  $m$  is the gradient and  $c$  is the  $y$ -intercept

The two most common diagonal straight lines are  $y = x$  and  $y = -x$ .



### How to draw a line

We looked at this at the start of the unit on simultaneous equations.

1. Choose a value for  $x$  (say  $x = 0$ ).
2. Substitute this value into the equation to find the  $y$ -coordinate.
3. Repeat steps 1 and 2 to find 2nd point (say with  $x = 1$ ).

**E.g.** Draw  $y = 2x - 5$

Choose an  $x$ -value and substitute:  $x = 0$  so  $y = -5$  plot  $(0, -5)$

Choose a 2nd  $x$ -value and substitute:  $x = 1$  so  $y = 2 - 5 = -3$  plot  $(1, -3)$

### Reflections

What stays the same, and what changes, when a shape is reflected?

Stays the same: size, shape, distance from line of reflection.

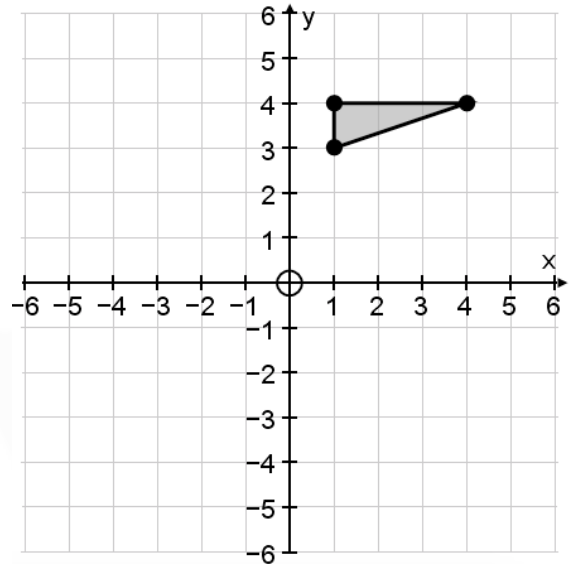
Changes: orientation (i.e. the object flips over).

**N.B.** When drawing a reflected shape and the **line of reflection is diagonal**, rotate your page so that the line of reflection is vertical (or horizontal).

A shape is reflected **in** a line (note the preposition used).

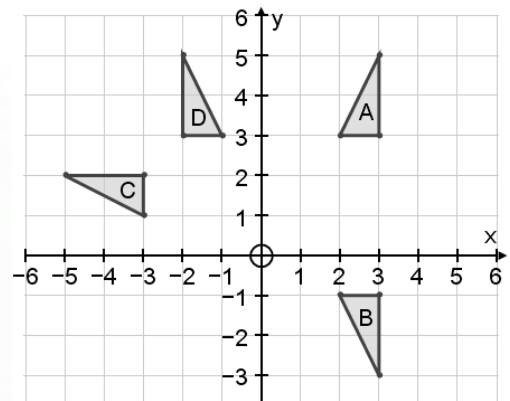
**E.g. 1** Reflect the shape in the line:

- (a)  $y = -1$ . Label the shape A
- (b)  $y = x$ . Label the shape B
- (c)  $x = 2$ . Label the shape C
- (d) What happens to points of the shape that lie on the line of reflection?



**E.g. 2** Describe the transformation that takes:

- (a) triangle *B* to triangle *A*
- (b) triangle *A* to triangle *D*
- (c) triangle *C* to triangle *D*



**Working:** (a)  $y = 1$

**E.g. 3** Explain what happens to its  $x$ - and  $y$ -coordinates when a point is:

- (a) ...is reflected in the  $x$ -axis?
- (b) ...is reflected in the  $y$ -axis?
- (c) ...is reflected in the line  $y = x$ ?
- (d) ...is reflected in the line  $y = -x$ ?

**Working:** (a)  $x$ -coordinate remains the same,  $y$ -coordinate changes sign.

**E.g. 4** A shape is reflected in a line. Dotted lines are drawn between corresponding points on the object and image. What can be said about these lines and the line of reflection?

**Video:** [Reflections](#)

**Video:** [Describing reflections](#)

**Video:** [Finding the mirror line](#)

[Solutions to Starter and E.g.s](#)

### Exercise

9-1 class textbook:	p279 M9.4 Qu 1-10
A*-G class textbook:	p239 M9.4 Qu 1-11
9-1 homework book:	p96 M9.4 Qu 1-4
A*-G homework book:	p68 M9.4 Qu 1-4

### Summary

**Vertical lines** are of the form  $x = \text{"a number"}$

**Horizontal lines** are of the form  $y = \text{"a number"}$

**Diagonal lines** are of the form  $y = mx + c$  where  $m$  is the gradient and  $c$  is the  $y$ -intercept

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### Reflections

When drawing a reflected shape and the **line of reflection is diagonal**, rotate your page so that the line of reflection is vertical (or horizontal).

**Homework book answers (only available during a lockdown)**