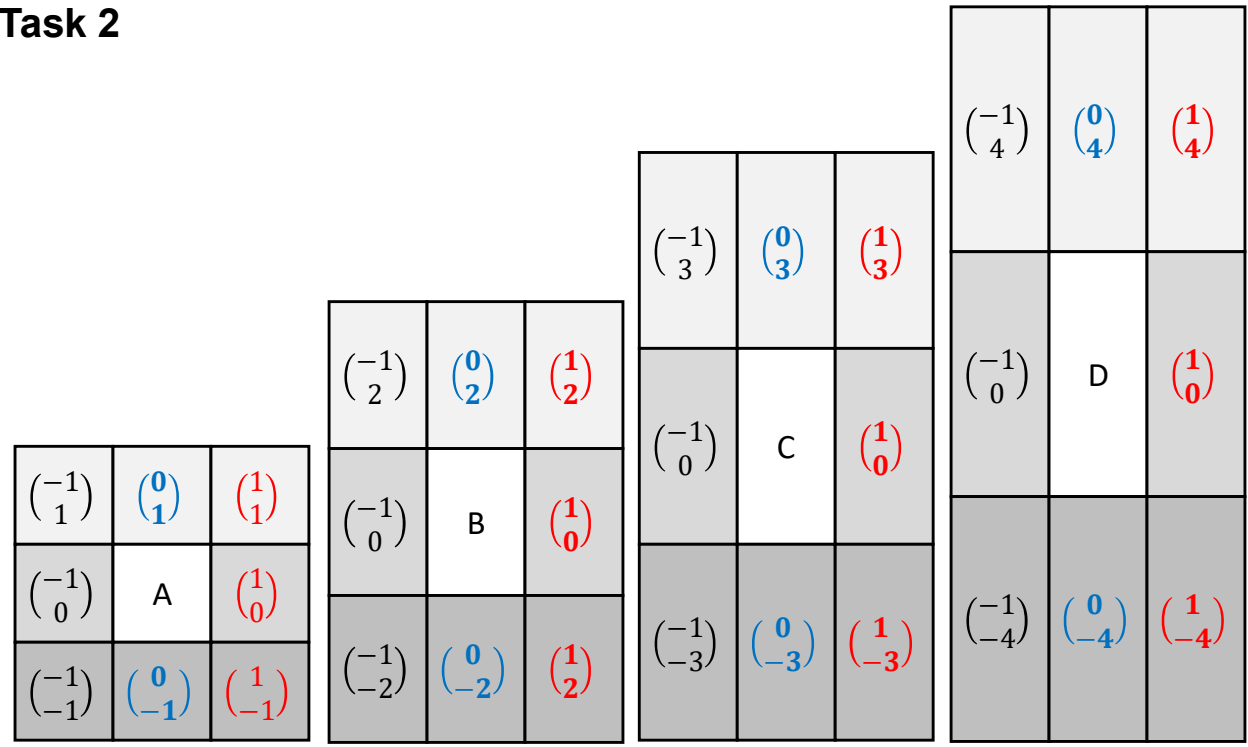


Task 1

F to C	$\begin{pmatrix} -7 \\ 8 \end{pmatrix}$
D to B	$\begin{pmatrix} -7 \\ 5 \end{pmatrix}$
B to C	$\begin{pmatrix} 2 \\ 0 \end{pmatrix}$
A to B	$\begin{pmatrix} 0 \\ -3 \end{pmatrix}$

Task 2



- The **horizontal** values in the vectors for :
- The **left-hand** rectangles are **-1**
 - The **middle column** rectangles are **0**
 - The **right-hand** rectangles are **1**

- The **vertical** values in the vectors for :
- The **top row** rectangles are **the value of the height** of the original rectangle
 - The **middle row** are **zero**
 - The **bottom row** rectangles are the **negative height** of the original rectangle

Exercise

1.	2.	3.	4.	5.	D1.
<p>a) A: (1,1) B: (3,2) C: (2,4) D: (4,5) E: (6,4) F: (7,1) G: (5,2) H: (4,1)</p>	<p>b) i) $\begin{pmatrix} 2 \\ 1 \end{pmatrix}$ ii) $\begin{pmatrix} 2 \\ -1 \end{pmatrix}$ iii) $\begin{pmatrix} -6 \\ 0 \end{pmatrix}$ iv) $\begin{pmatrix} -2 \\ -1 \end{pmatrix}$ v) $\begin{pmatrix} -2 \\ 1 \end{pmatrix}$ vi) $\begin{pmatrix} 6 \\ 0 \end{pmatrix}$</p>	<p>a) $\begin{pmatrix} 4 \\ 12 \end{pmatrix}$ b) $\begin{pmatrix} 4 \\ 12 \end{pmatrix}$ c) $\begin{pmatrix} -1 \\ 4 \end{pmatrix}$ d) $\begin{pmatrix} -12 \\ 4 \end{pmatrix}$ e) $\begin{pmatrix} -8 \\ 16 \end{pmatrix}$ f) $\begin{pmatrix} 16 \\ 8 \end{pmatrix}$</p>		<p>A $\begin{pmatrix} 0 \\ -4 \end{pmatrix}$, B $\begin{pmatrix} -4 \\ 0 \end{pmatrix}$, C $\begin{pmatrix} 0 \\ 4 \end{pmatrix}$, D $\begin{pmatrix} 4 \\ 0 \end{pmatrix}$</p> <p>A $\begin{pmatrix} -1 \\ -4 \end{pmatrix}$, B $\begin{pmatrix} -4 \\ 1 \end{pmatrix}$, C $\begin{pmatrix} 1 \\ 4 \end{pmatrix}$, D $\begin{pmatrix} 4 \\ -1 \end{pmatrix}$</p>	<p>a) Rectangle b) Rhombus</p>

Task 1

Try moving the slider to watch the shape rotate.

Try un-ticking the 'image' and the 'tracing paper' box.

Can you predict where the rotation will be?

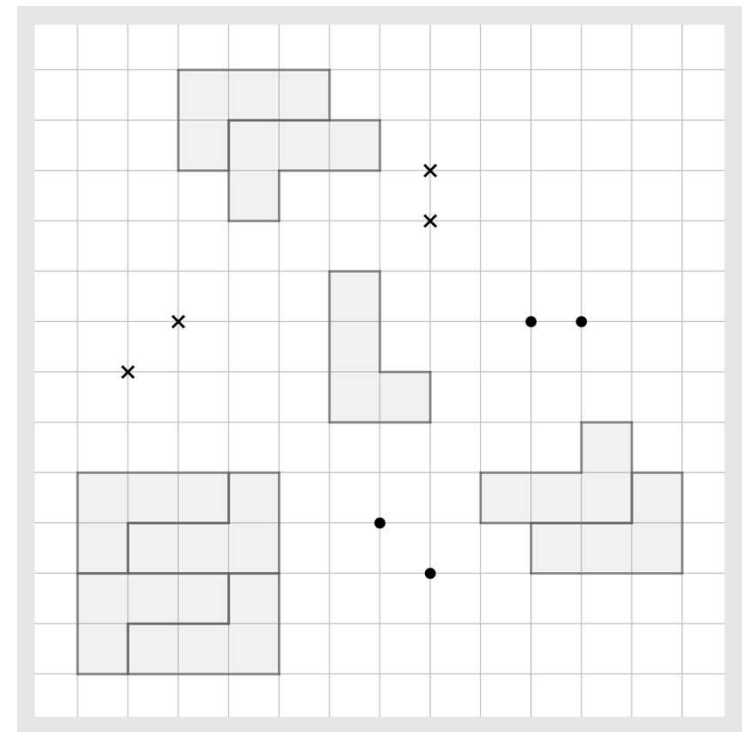
Can you still do it if you untick the circles?

What happens if you change the centre of rotation?

Angle of rotation : 90° clockwise

- Tracing paper
- Circles
- Angle of rotation
- Image
- Point of rotation

Task 2



Exercise

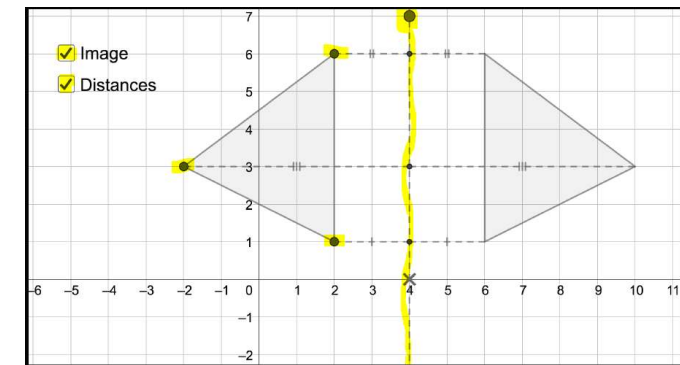
1.	2.	3.	4.	5.	6.	D1.
	<p>E.g.</p> <p>'B to H is a rotation of 180° in either direction'</p> <p>'F to D is a rotation of 90° clockwise'</p> <p>Etc..</p>	<p>a) Rotation 90° clockwise about the origin.</p> <p>b) Rotation 90° clockwise about the origin.</p> <p>c) Rotation 180° about the origin.</p> <p>d) Rotation 90° anticlockwise about the origin.</p> <p>e) Rotation 90° anticlockwise about the origin</p> <p>f) Rotation 180° about the origin.</p> <p>(alternative direction rotations possible for each)</p>	<p>a) Rotation 90° clockwise about $(-1,0)$</p> <p>b) Rotation 90° clockwise about $(0,-1)$</p> <p>c) Rotation 180° clockwise about the origin</p> <p>d) Rotation 90° anticlockwise about $(0,1)$</p> <p>e) Rotation 90° anticlockwise about $(1,0)$</p> <p>f) Rotation 180° clockwise about the origin.</p> <p>(alternative direction rotations possible for each)</p>	<p>a) [Complex shape with colored triangles and dots]</p> <p>b) [Complex shape with colored triangles and dots]</p> <p>c) [Complex shape with colored triangles and dots]</p>	<p>a) [Complex shape with colored triangles and dots]</p> <p>b) [Complex shape with colored triangles and dots]</p> <p>c) [Complex shape with colored triangles and dots]</p>	<p>All shapes rotated 180°:</p> <p>A about F</p> <p>B about G</p> <p>C about H</p> <p>D about E</p>

Task 1

Try moving the vertices on the original shape.
What happens to the reflection?

Try moving the reflection line.
What happens to the reflection?

Try un-ticking the 'image' and the 'distance' box.
Can you predict where the reflection will be?



Task 2

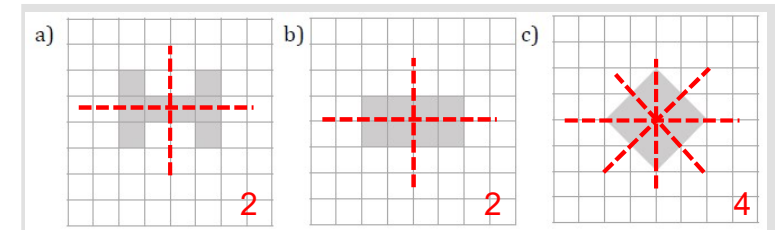
T is a reflection of S in the line $x = 5$

U is a reflection of S in the line $y = 3$

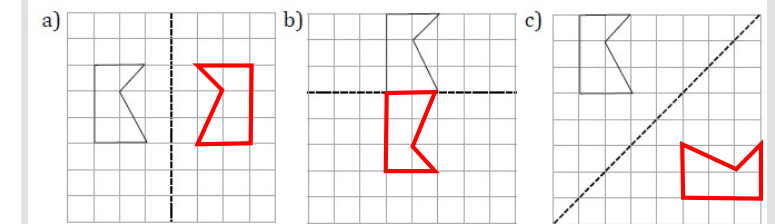
If S translated by:	...then T translated by:	... and U translated by:
$\begin{pmatrix} 1 \\ 0 \end{pmatrix}$	$\begin{pmatrix} -1 \\ 0 \end{pmatrix}$	$\begin{pmatrix} 1 \\ 0 \end{pmatrix}$
$\begin{pmatrix} 0 \\ 1 \end{pmatrix}$	$\begin{pmatrix} 0 \\ 1 \end{pmatrix}$	$\begin{pmatrix} 0 \\ -1 \end{pmatrix}$
$\begin{pmatrix} 1 \\ -1 \end{pmatrix}$	$\begin{pmatrix} -1 \\ -1 \end{pmatrix}$	$\begin{pmatrix} 1 \\ 1 \end{pmatrix}$

Exercise

1.



2.



3.

- A: $x = -2$
- B: $x = 2$
- C: $y = 1$
- D: $y = -3$

4.

- a) Reflection in line $x = 1$
- b) Reflection in x-axis **or** line $y = 0$
- c) Rotation 180° about $(1,0)$ clockwise **or** anticlockwise
- d) Reflection in x-axis **or** line $y = 0$
- e) Reflection in line $x = 1$
- f) Rotation 180° about $(1,0)$ clockwise **or** anticlockwise

5.

- i) Reflection in line M_1
- ii) Reflection in line M_1
- iii) Reflection in line M_2

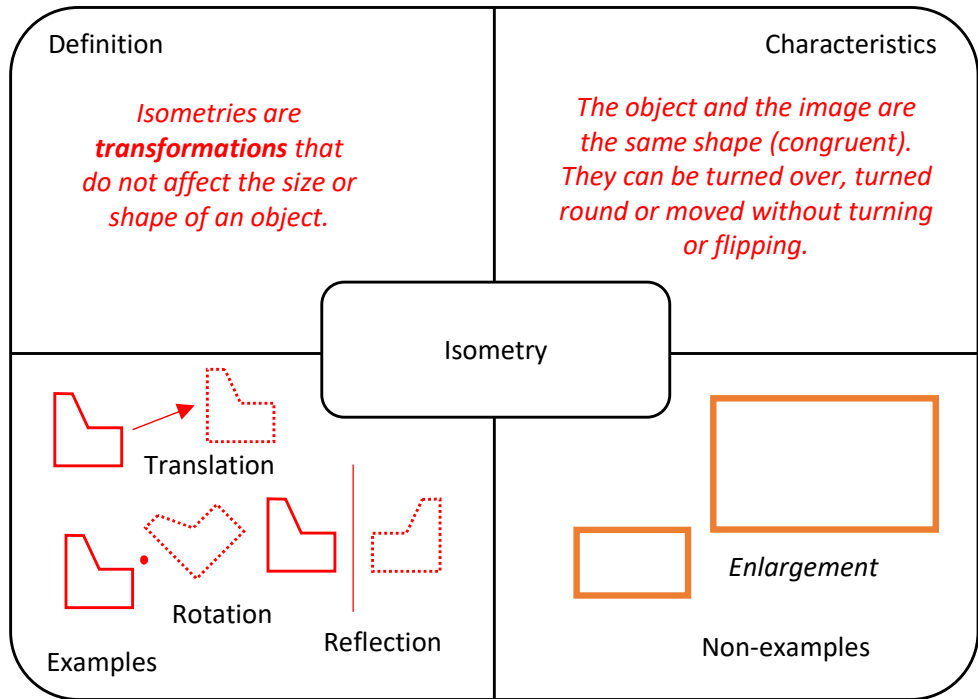
6.

- E. Reflection in line $y = 9$
- F. Reflection in line $x = 8$
- G. Reflection in line $y = 5$
- H. Reflection in line $x = 5$

D1.

- a) Reflection in line $x = -2$
- b) Reflection in line $x = -2$
- c) Reflection in line $x = -2$, **then** reflection in line $y = 2$

Task 1



Task 2

Reflection in the line $y = 3$

Rotation through 180° centre (1,3) OR centre (2.5, 3)
OR centre (5,3)

Translation with vector $\begin{pmatrix} 0 \\ 3 \end{pmatrix}$ if the bottom shape is the object or $\begin{pmatrix} 0 \\ -3 \end{pmatrix}$ is the object.

Exercise

1.	2.	3.	4.	5.	D1.
<p>a) Reflection in line $x = 1$</p> <p>b) Translation by $\begin{pmatrix} -4 \\ 2 \end{pmatrix}$</p> <p>c) Reflection in line $y = 3$</p> <p>d) Rotation 180° about (4,1) in either direction</p>	<p>a) Rotation 90° clockwise / 270° anticlockwise about (2,1)</p> <p>b) Rotation 180° about (1,3) in either direction</p>		<p>Translation by $\begin{pmatrix} 8 \\ 0 \end{pmatrix}$</p> <p>Reflection in line $x = 2$</p> <p>Rotation 180° about (2,2) in either direction</p>	<p>Also possible to reflect:</p>	<p>Multiple solutions ensuring the dot transforms correctly.</p> <p>Testing transformations with tracing paper is recommended.</p>