**MP outers. Mostly transformations using matrices.** Name: .............................................................................

Date: ..............................................................................

Write your answers on this paper. Credit will be given for **N**eatness, **O**rganization of your mathematical argument and clearly shown **W**orkings out!

*Many questions will be based upon the following information:*

Vertices A,B,C,D of a shape in (x,y) coordinates are collected together in a 2 x 4 matrix

Transformation matrices are defined by

The *inverse* of a 2x2 matrix is given by

is the determinant of the matrix

**Questions**

1. Evaluate the following:

(a)

(b)

(c)

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(a)

(b)

(c)

(d)

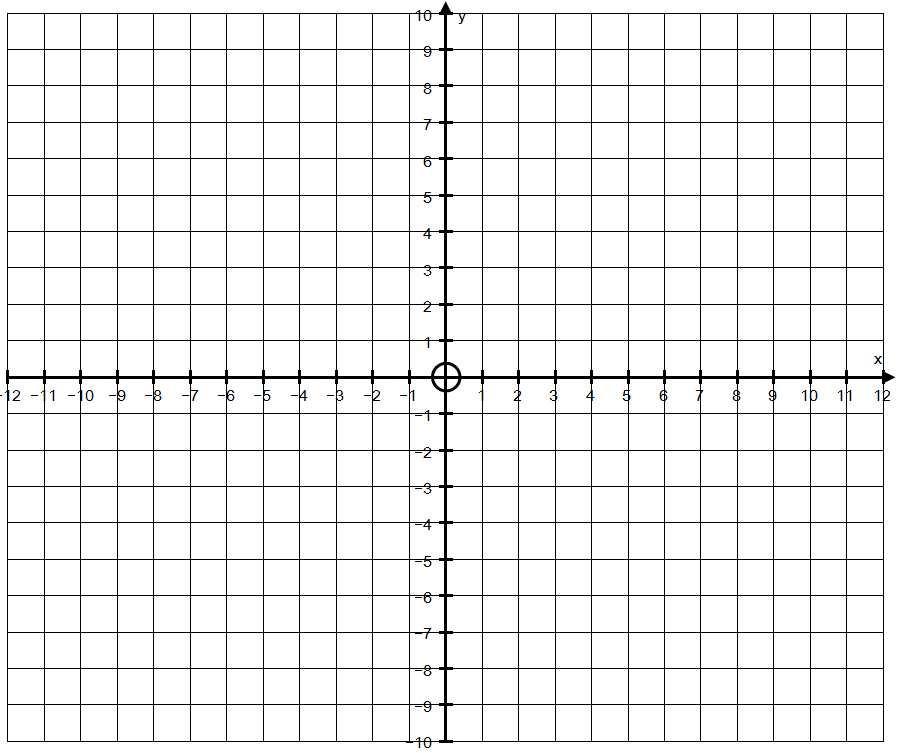
(d) What is the *determinant* of

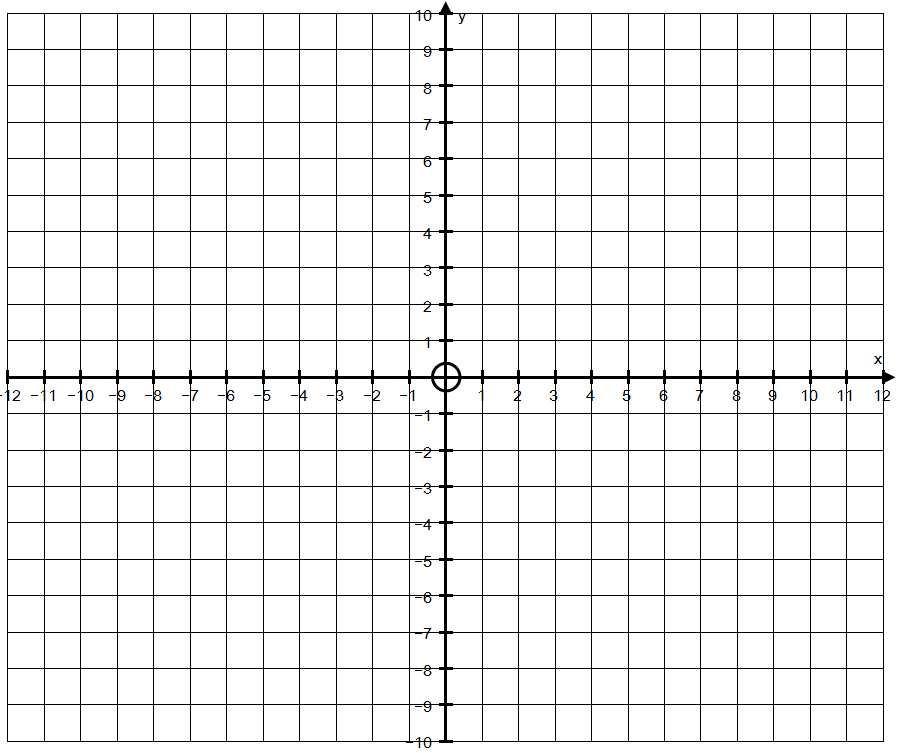
(i)

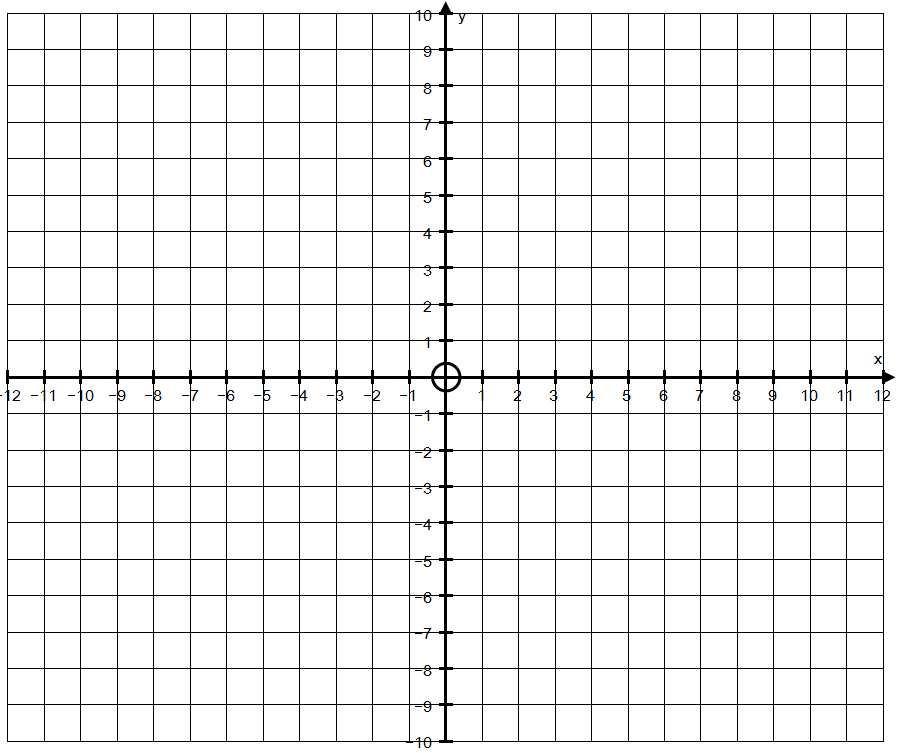
(ii)

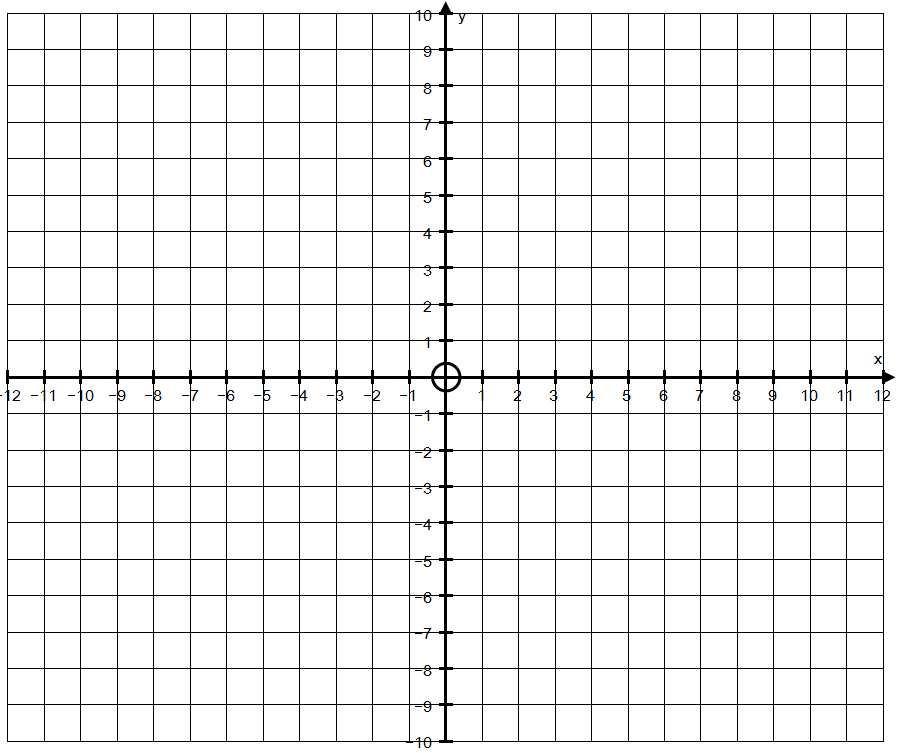
(iii)

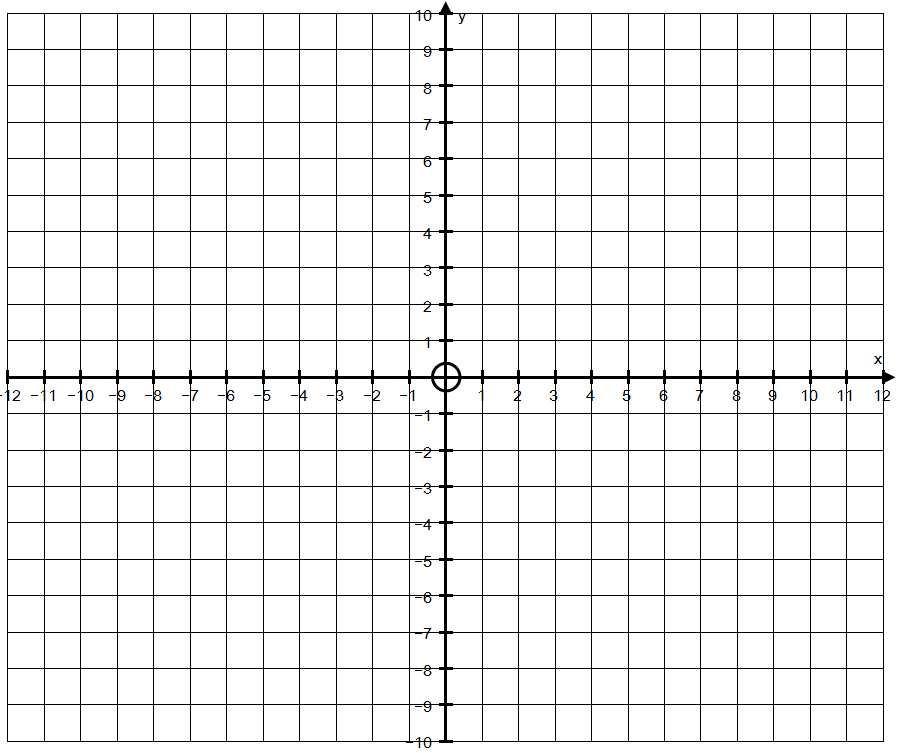
**2.** On the graphs below plot the shape ABCD and then where this shape transforms to under the matrix transformations given. In all cases describe carefully in words the transformation and label new vertices A', B', C', D'

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3. What transformation do you think the following matrices represent? Hint: don't try to evaluate them - try and spot the pattern using the work you have already done!

(a)

(a)

(a)

4. Using 'red and blue basis vector diagrams' derive matrices which represent the following transformations

(i) Reflection in the y-axis, then enlargement scale factor 3 about the origin

(ii) Reflection in y=x then rotation clockwise by 90 degrees, then stretch in y axis by 0.5. (All stages about the origin).