**A picture containing drawing

Description automatically generated**Invariant Points

Draw as many coordinate grids and diagrams as you need to in your book.

**Question 1**

A triangle has vertices , and .

For each of the transformations below, write down the letter(s) of any vertices that are invariant.

a) Rotation about the point .

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b) Enlargement by scale factor , centre .

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

c) Reflection in the line .

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d) Reflection in the line .

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**Question 2**

A triangle has vertices , and .

For each of the transformations below, write down the letter(s) of any vertices that are invariant.

a) Rotation about the point .

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b) Enlargement by scale factor , centre .

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c) Reflection in the line .

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d) Reflection in the line .

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**Question 3**

A triangle has vertices , and .

* David says, “if is reflected in the line there is one invariant point”.
* Yash says, “if is reflected in the line there are two invariant points”.
* Suzie says, “if is reflected in the line there are two vertices that are invariant”.

Which student is incorrect? You must explain your answer.

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**Question 4**

A quadrilateral has vertices , , and .

* is reflected in the line ,
* followed by a reflection in the line ,
* followed by a rotation of about .

Which of the vertices are invariant?

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**Question 5**

A triangle has vertices , and .

is rotated of about and then translated by the vector .

Write down the coordinates of the invariant point.

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**Question 6**

A square has vertices , , and .

Square is transformed by a combined transformation of a reflection in the line followed by a rotation.

Under the combined transformation, two vertices of the square are invariant.

Describe fully one possible rotation.

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**Question 7**

A quadrilateral has vertices , , and .

Describe the transformation given:

a) Points and are invariant. maps onto and maps onto .

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b) Points and are invariant. maps onto and maps onto .

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