



ACHIEVE ACADEMY

GCSE Maths — Higher Tier

Transformations & Vectors · Practice Booklet

NAME: _____

CLASS: _____

DATE: _____

☐ Developing

☒ Secure

☐ Greater Depth

Answer every question in the working space provided. Method marks are available for correct working even if the final answer is wrong. Check the time allowed with your tutor before you start.

Transformations & Vectors

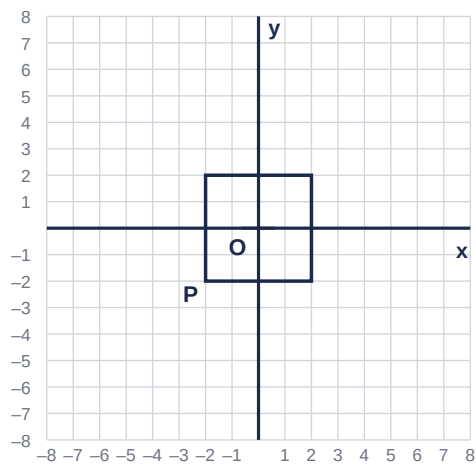
Total marks available: 103

● Transformations & Vectors

Q1

[3 marks]

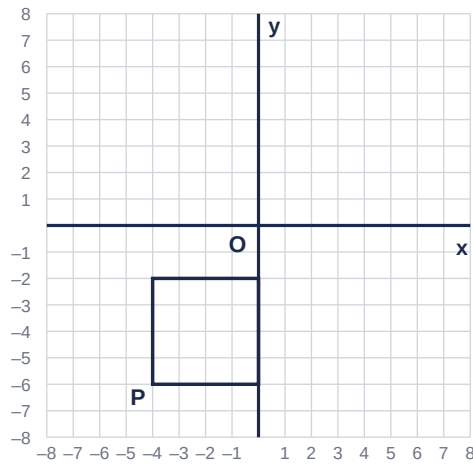
The rectangle P has vertices at $(-2, -2)$, $(2, -2)$, $(2, 2)$, $(-2, 2)$, as shown on the grid below. Enlarge P by scale factor $\frac{1}{2}$, centre the origin, O. Write down the coordinates of the vertices of the image.



Q2

[3 marks]

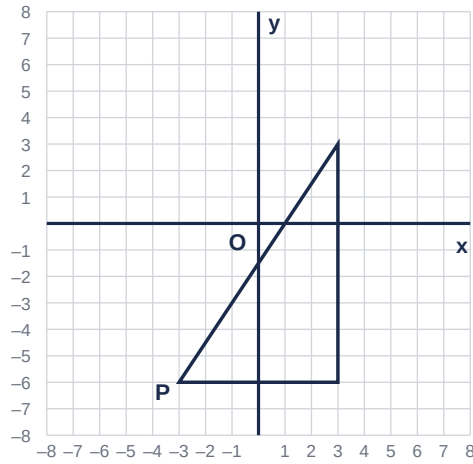
The rectangle P has vertices at $(-4, -6)$, $(0, -6)$, $(0, -2)$, $(-4, -2)$, as shown on the grid below. Enlarge P by scale factor $\frac{1}{2}$, centre the origin, O. Write down the coordinates of the vertices of the image.



Q3

[3 marks]

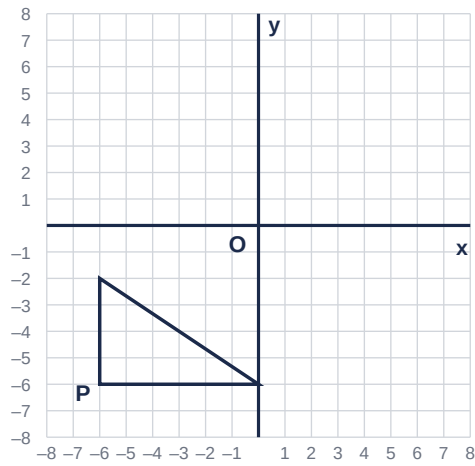
The triangle P has vertices at $(-3, -6)$, $(3, -6)$, $(3, 3)$, as shown on the grid below. Enlarge P by scale factor $1/3$, centre the origin, O. Write down the coordinates of the vertices of the image.



Q4

[3 marks]

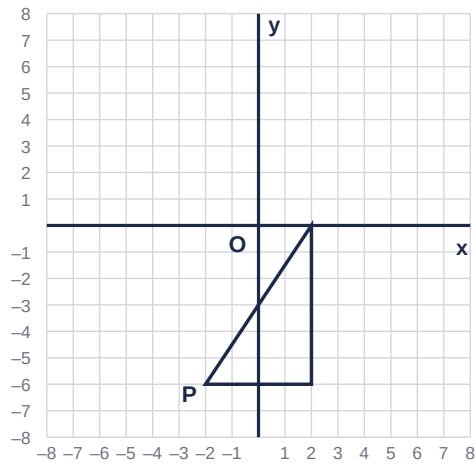
The triangle P has vertices at $(-6, -6)$, $(0, -6)$, $(-6, -2)$, as shown on the grid below. Enlarge P by scale factor $1/2$, centre the origin, O. Write down the coordinates of the vertices of the image.



Q5

[3 marks]

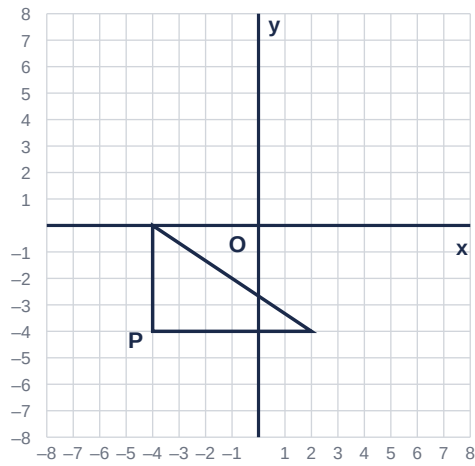
The triangle P has vertices at $(-2, -6)$, $(2, -6)$, $(2, 0)$, as shown on the grid below. Enlarge P by scale factor $1/2$, centre the origin, O. Write down the coordinates of the vertices of the image.



Q6

[3 marks]

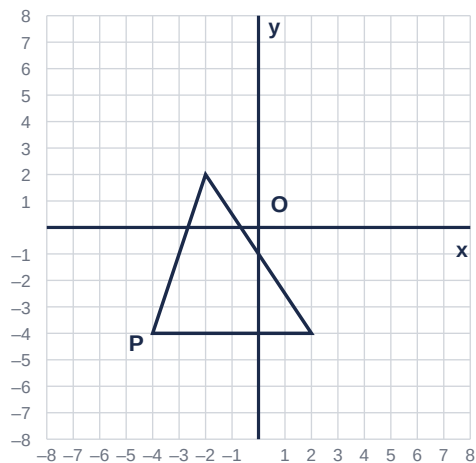
The triangle P has vertices at $(-4, -4)$, $(2, -4)$, $(-4, 0)$, as shown on the grid below. Enlarge P by scale factor $1/2$, centre the origin, O. Write down the coordinates of the vertices of the image.



Q7

[3 marks]

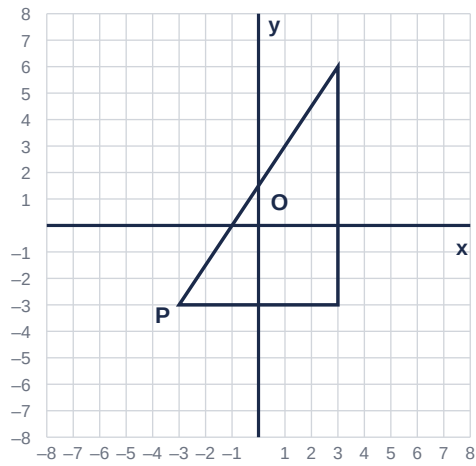
The triangle P has vertices at $(-4, -4)$, $(2, -4)$, $(-2, 2)$, as shown on the grid below. Enlarge P by scale factor $1/2$, centre the origin, O. Write down the coordinates of the vertices of the image.



Q8

[3 marks]

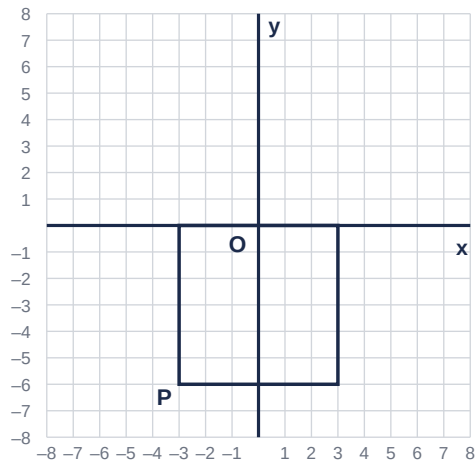
The triangle P has vertices at $(-3, -3)$, $(3, -3)$, $(3, 6)$, as shown on the grid below. Enlarge P by scale factor $1/3$, centre the origin, O. Write down the coordinates of the vertices of the image.



Q9

[3 marks]

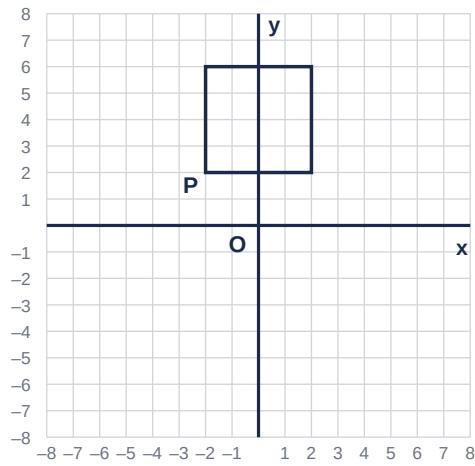
The rectangle P has vertices at $(-3, -6)$, $(3, -6)$, $(3, 0)$, $(-3, 0)$, as shown on the grid below. Enlarge P by scale factor $\frac{1}{3}$, centre the origin, O. Write down the coordinates of the vertices of the image.



Q10

[3 marks]

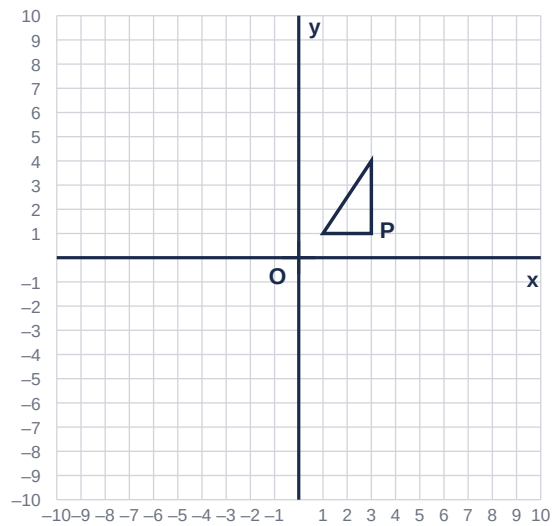
The rectangle P has vertices at $(-2, 2)$, $(2, 2)$, $(2, 6)$, $(-2, 6)$, as shown on the grid below. Enlarge P by scale factor $\frac{1}{2}$, centre the origin, O. Write down the coordinates of the vertices of the image.



Q11

[3 marks]

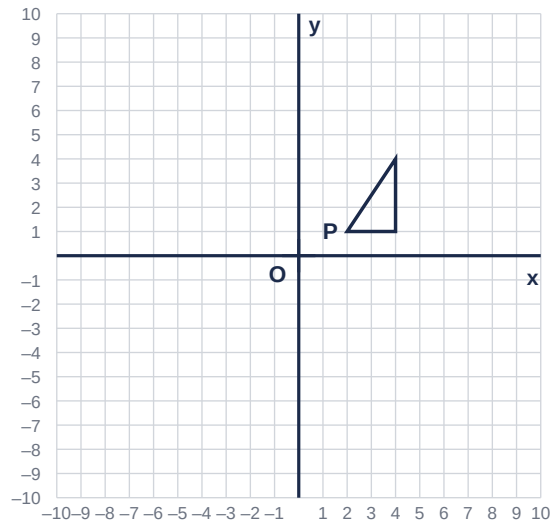
The triangle P has vertices at (1, 1), (3, 1), (3, 4), as shown on the grid below. Enlarge P by scale factor -1 , centre the origin, O. Write down the coordinates of the vertices of the image.



Q12

[3 marks]

The triangle P has vertices at (2, 1), (4, 1), (4, 4), as shown on the grid below. Enlarge P by scale factor -2 , centre the origin, O. Write down the coordinates of the vertices of the image.

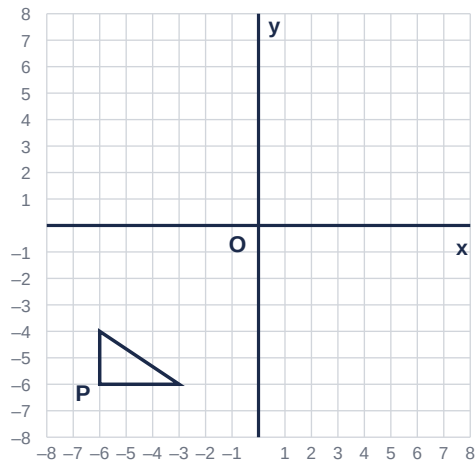


A large dashed rectangular box for writing the answer.

Q13

[4 marks]

The triangle P has vertices at $(-6, -6)$, $(-3, -6)$, $(-6, -4)$, as shown on the grid below. First rotate P by 270° anticlockwise about the origin, O, then translate the result by the vector $(3, -1)$. Write down the coordinates of the vertices of the final image.

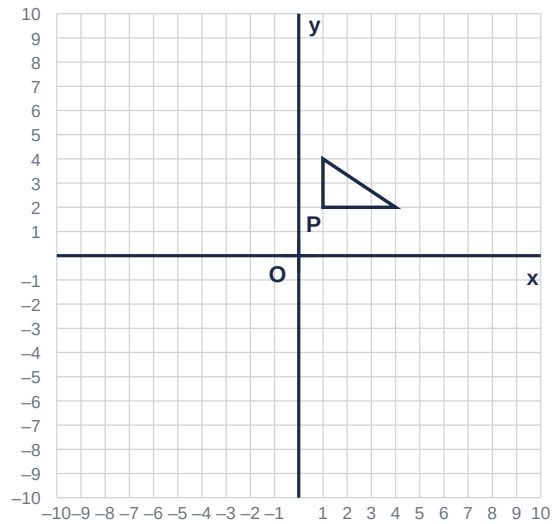


A large dashed rectangular box for writing the answer.

Q14

[3 marks]

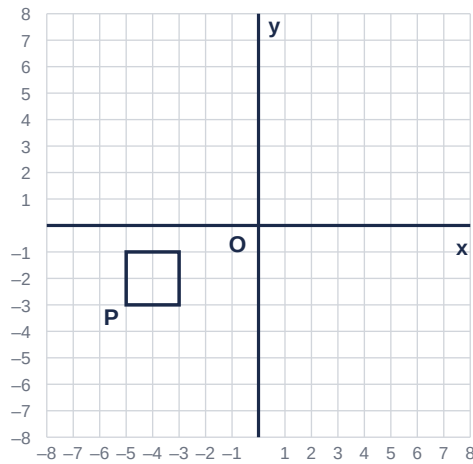
The triangle P has vertices at (1, 2), (4, 2), (1, 4), as shown on the grid below. Enlarge P by scale factor -2 , centre the origin, O. Write down the coordinates of the vertices of the image.



Q15

[4 marks]

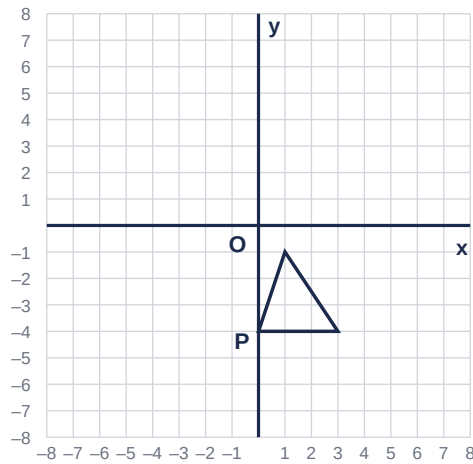
The rectangle P has vertices at $(-5, -3)$, $(-3, -3)$, $(-3, -1)$, $(-5, -1)$, as shown on the grid below. First translate P by the vector $(-1, 4)$, then rotate the result by 90° anticlockwise about the origin, O. Write down the coordinates of the vertices of the final image.



Q16

[4 marks]

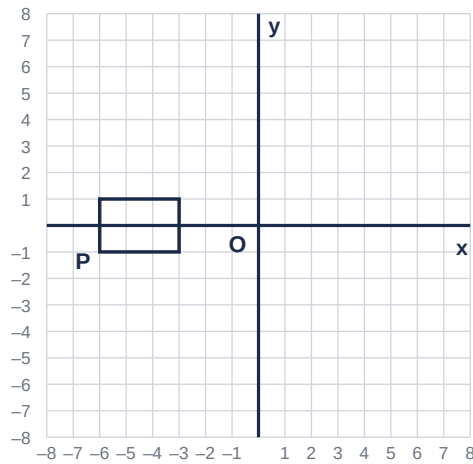
The triangle P has vertices at $(0, -4)$, $(3, -4)$, $(1, -1)$, as shown on the grid below. First rotate P by 270° anticlockwise about the origin, O, then reflect the result in the y-axis. Write down the coordinates of the vertices of the final image.



Q17

[4 marks]

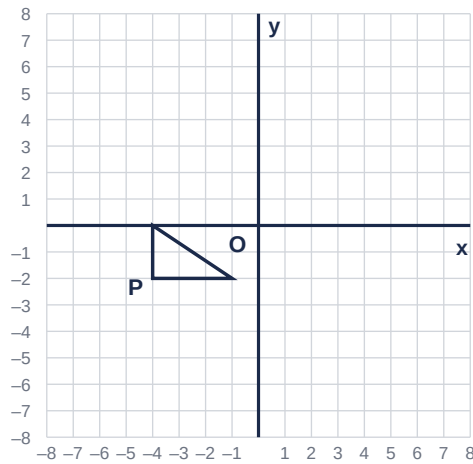
The rectangle P has vertices at $(-6, -1)$, $(-3, -1)$, $(-3, 1)$, $(-6, 1)$, as shown on the grid below. First rotate P by 90° anticlockwise about the origin, O, then reflect the result in the y-axis. Write down the coordinates of the vertices of the final image.



Q18

[4 marks]

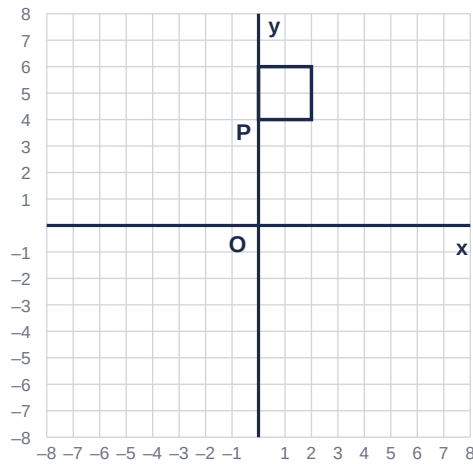
The triangle P has vertices at $(-4, -2)$, $(-1, -2)$, $(-4, 0)$, as shown on the grid below. First translate P by the vector $(2, 1)$, then reflect the result in the x-axis. Write down the coordinates of the vertices of the final image.



Q19

[4 marks]

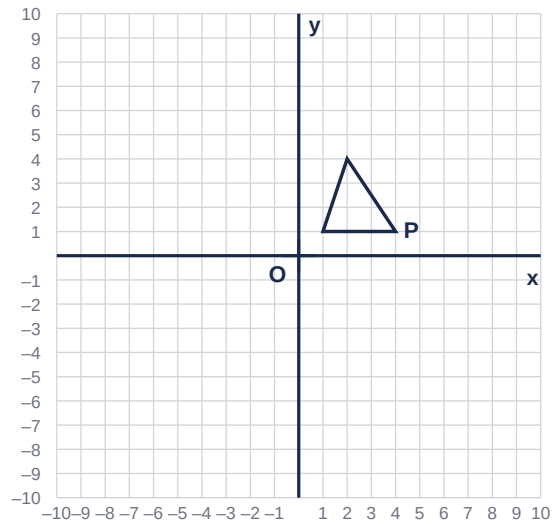
The rectangle P has vertices at $(0, 4)$, $(2, 4)$, $(2, 6)$, $(0, 6)$, as shown on the grid below. First rotate P by 180° anticlockwise about the origin, O, then reflect the result in the y-axis. Write down the coordinates of the vertices of the final image.



Q20

[3 marks]

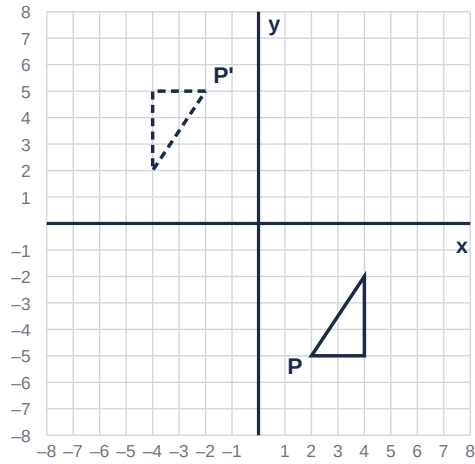
The triangle P has vertices at (1, 1), (4, 1), (2, 4), as shown on the grid below. Enlarge P by scale factor -2 , centre the origin, O. Write down the coordinates of the vertices of the image.



Q21

[3 marks]

The triangle P has vertices at $(2, -5)$, $(4, -5)$, $(4, -2)$. It is transformed onto its image P' with vertices at $(-2, 5)$, $(-4, 5)$, $(-4, 2)$, as shown on the grid below. Describe fully the single transformation that maps P onto P'.



Q22

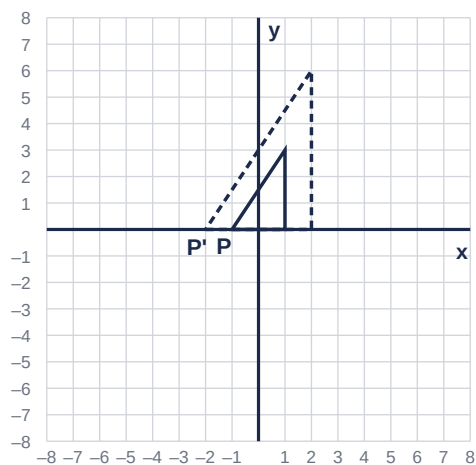
[4 marks]

Points A and B have position vectors $\mathbf{a} = (-1, 0)$ and $\mathbf{b} = (0, 4)$. Find the vector AB, and calculate its magnitude, $|\mathbf{AB}|$, to 3 significant figures.

Q23

[3 marks]

The triangle P has vertices at $(-1, 0)$, $(1, 0)$, $(1, 3)$. It is transformed onto its image P' with vertices at $(-2, 0)$, $(2, 0)$, $(2, 6)$, as shown on the grid below. Describe fully the single transformation that maps P onto P'.



Q24

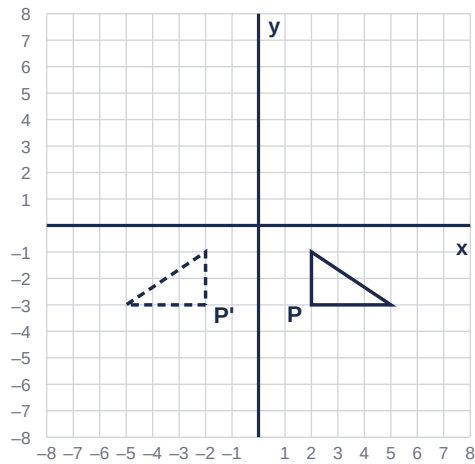
[4 marks]

Points A and B have position vectors $\mathbf{a} = (-3, 4)$ and $\mathbf{b} = (6, 1)$. Find the vector AB, and calculate its magnitude, $|\mathbf{AB}|$, to 3 significant figures.

Q25

[3 marks]

The triangle P has vertices at $(2, -3)$, $(5, -3)$, $(2, -1)$. It is transformed onto its image P' with vertices at $(-2, -3)$, $(-5, -3)$, $(-2, -1)$, as shown on the grid below. Describe fully the single transformation that maps P onto P'.



Q26

[4 marks]

Points A and B have position vectors $\mathbf{a} = (-1, 2)$ and $\mathbf{b} = (2, 0)$. Find the vector AB, and calculate its magnitude, $|\mathbf{AB}|$, to 3 significant figures.

Q27

[4 marks]

Points A and B have position vectors $\mathbf{a} = (3, 2)$ and $\mathbf{b} = (-3, -2)$. Find the vector AB, and calculate its magnitude, $|\mathbf{AB}|$, to 3 significant figures.

Q28

[4 marks]

Points A and B have position vectors $\mathbf{a} = (2, 3)$ and $\mathbf{b} = (2, 2)$. Find the vector AB, and calculate its magnitude, $|\mathbf{AB}|$, to 3 significant figures.

Q29

[4 marks]

Points A and B have position vectors $\mathbf{a} = (3, -3)$ and $\mathbf{b} = (1, 3)$. Find the vector AB, and calculate its magnitude, $|\mathbf{AB}|$, to 3 significant figures.

Q30

[4 marks]

Points A and B have position vectors $\mathbf{a} = (6, 5)$ and $\mathbf{b} = (-2, -1)$. Find the vector $\mathbf{AB}$, and calculate its magnitude, $|\mathbf{AB}|$, to 3 significant figures.