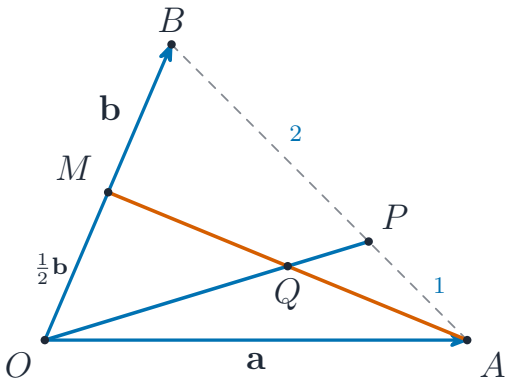
Exercise walk-through

5.4
Enlargement and describing transformations

Pearson Edexcel · International GCSE · Mathematics A

Figure: Vector geometry proofs



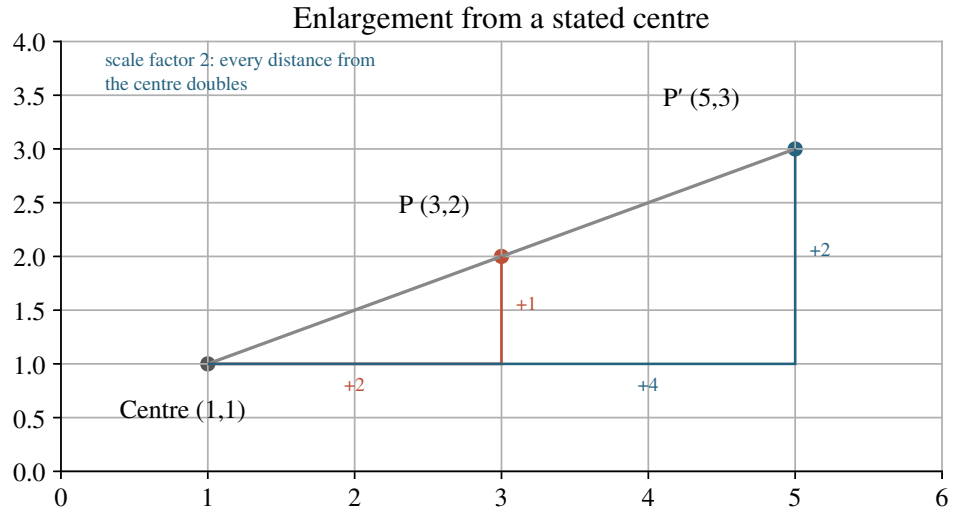
write $\overrightarrow{OQ}$ along OP and along AM,
then equate: $k = \frac{3}{4}$, $\lambda = \frac{1}{2}$

- Write OQ two ways, along OP and along AM
- Equate coefficients: k = 3/4, so OQ : OP = 3 : 4

Transformations: rotation, reflection, translation

- A **reflection** flips the shape in a **mirror line**, such as $x = 1$, $y = 2$ or $y = x$. Each point and its **image** are the same distance from the line.
- A **rotation** turns the shape about a centre through an angle, **clockwise** or **anticlockwise**.
- A **translation** slides the shape without turning it. Describe it with a **column vector**: $\begin{pmatrix} 3 \\ -2 \end{pmatrix}$ means 3 right and 2 down.

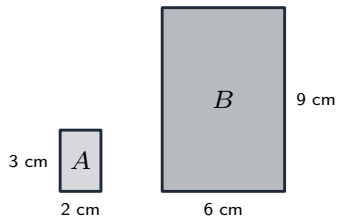
Figure: Enlargement and describing transformations



- **Scale factor** 2 from (1, 1): P(3, 2) $\rightarrow$ (5, 3)
- The **image** is twice as far from the centre

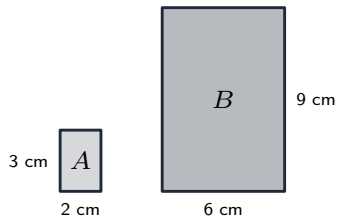
Exercise 2.1

2.1 Rectangle B is an enlargement of rectangle A. Find the scale factor and the number of times the area is multiplied. [2]



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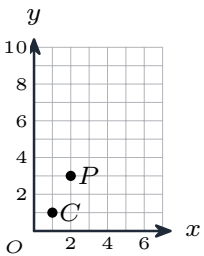


2.1

- scale factor **3**
- area multiplied by **9**

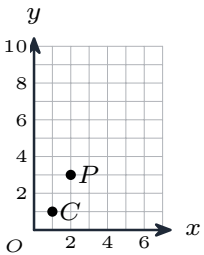
Exercise 2.2

2.2 The point $P(2,\ 3)$ is enlarged by scale factor 3. Find the image when the centre is O, and when the centre is $C(1,\ 1)$. [2]



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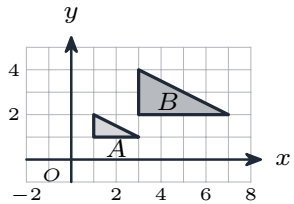


2.2

- centre O: $(6,\ 9)$
- centre C: $(1,\ 1) + 3\begin{pmatrix}1\\2\end{pmatrix} = (4,\ 7)$

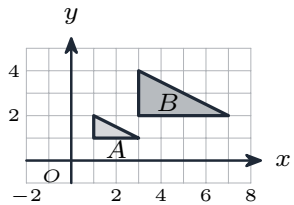
Exercise 3.1

3.1 Describe fully the single transformation that maps triangle A onto triangle B. [3]



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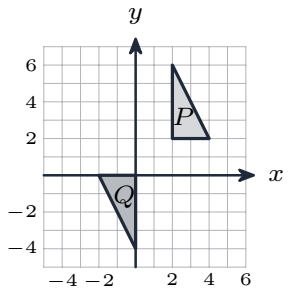
3.1

- enlargement
- scale factor 2
- centre $(-1,\ 0)$

Exercise 3.2 (a)

3.2 Triangle P has corners $(2,\ 2)$, $(4,\ 2)$ and $(2,\ 6)$. Triangle Q is also shown.

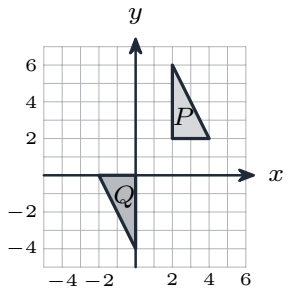
(a) P is enlarged by scale factor $\frac{1}{2}$, centre O. Write down the corners of the image. [2]



Exercise 3.2 (a)

3.2 Triangle P has corners $(2,\ 2)$, $(4,\ 2)$ and $(2,\ 6)$. Triangle Q is also shown.

(a) P is enlarged by scale factor $\frac{1}{2}$, centre O. Write down the corners of the image. [2]



(a) $(1,\ 1)$, $(2,\ 1)$, $(1,\ 3)$

Exercise 3.2 (b)

3.2 Triangle P has corners $(2,\ 2)$, $(4,\ 2)$ and $(2,\ 6)$. Triangle Q is also shown.

(b) P is enlarged by scale factor $-\frac{1}{2}$, centre O. Write down the corners of the image. [3]

Exercise 3.2 (b)

3.2 Triangle P has corners $(2,\ 2)$, $(4,\ 2)$ and $(2,\ 6)$. Triangle Q is also shown.

(b) P is enlarged by scale factor $-\frac{1}{2}$, centre O. Write down the corners of the image. [3]

(b) $(-1,\ -1)$; $(-2,\ -1)$; $(-1,\ -3)$

Exercise 3.2 (c)

3.2 Triangle P has corners $(2,\ 2)$, $(4,\ 2)$ and $(2,\ 6)$. Triangle Q is also shown.

(c) Find the area of P. Find the area of the image in (a), and the area of the image after an enlargement of P by scale factor 3. [4]

Exercise 3.2 (c)

3.2 Triangle P has corners $(2,\ 2)$, $(4,\ 2)$ and $(2,\ 6)$. Triangle Q is also shown.

(c) Find the area of P. Find the area of the image in (a), and the area of the image after an enlargement of P by scale factor 3. [4]

(c) $\frac{1}{2} \times 2 \times 4 = \mathbf{4}$; $4 \times \frac{1}{4} = \mathbf{1}$; $4 \times 9 = \mathbf{36}$

Exercise 3.2 (d)

3.2 Triangle P has corners $(2,\ 2)$, $(4,\ 2)$ and $(2,\ 6)$. Triangle Q is also shown.

(d) Describe fully the enlargement that maps P onto Q. Name another single transformation that also maps P onto Q. [5]

Exercise 3.2 (d)

3.2 Triangle P has corners $(2,\ 2)$, $(4,\ 2)$ and $(2,\ 6)$. Triangle Q is also shown.

(d) Describe fully the enlargement that maps P onto Q. Name another single transformation that also maps P onto Q. [5]

(d) enlargement; scale factor -1; lines through matching corners, e.g. $(2,\ 2)$ to $(0,\ 0)$ and $(4,\ 2)$ to $(-2,\ 0)$; centre $(1,\ 1)$; rotation of $180°$ about $(1,\ 1)$