# 5.4 Enlargement and describing transformations

Name: _____ Class: _____ Date: _____ **Total: 15 marks**

**KEY WORDS** enlargement • centre of enlargement

## Enlargement and describing transformations

## Objective

Enlarge shapes with a centre and positive scale factor (fractions included), know enlargements preserve angles but not lengths, and give complete descriptions of any transformation (objectives Foundation 5.2 J–M).

## 1 Key knowledge and worked examples

**Enlargement.** Specified by a centre and a scale factor (positive; fractions shrink). About the origin, $(x, y) \to (kx, ky)$. Lengths scale by $k$ but angles are preserved, so the image is SIMILAR, not congruent. Distances from the centre also scale by $k$ – ray lines through the centre confirm the image.

**Complete descriptions.** "Rotation, 90° anticlockwise about (0, 1)"; "reflection in the line $y = x$"; "translation by $\binom{3}{-2}$"; "enlargement, scale factor 2, centre (1, 1)". Every parameter named, or the mark is lost.

## 2 Practice

**2.1** Enlarge $(3, 2)$ by scale factor 2 about the origin. [1]

**2.2** Enlarge $(3, 2)$ by scale factor $\frac{1}{2}$ about the origin. [1]

**2.3** A square of side 4 cm is enlarged by scale factor 3. Find the image's side and area. [2]

**2.4** Under an enlargement, angles are preserved but lengths are not. What is the relationship between object and image? [1]

## 3 Exam-style questions

**3.1** *(Original.)* Triangle $T$ has vertices $(1,1)$, $(3,1)$, $(1,2)$. It is enlarged by scale factor 3, centre $(0,0)$. (a) Write down the image's vertices. (b) Find the ratio of the image's area to $T$'s area. [4]

**3.2** *(Original.)* Shape $S$ is drawn on a grid; its image $S'$ has every length three times as long, with corresponding rays from a fixed point $C(1,2)$ passing through corresponding vertices. Describe the transformation fully. [2]

**3.3** *(Original.)* A rectangle 4 cm by 3 cm is enlarged with scale factor $\frac{1}{4}$, centre $C$. (a) Find the image's dimensions. (b) State two things the enlargement preserves. (c) A student says "the image is congruent to the original because angles match". Correct the error. [4]