Enlargements

1) Draw X and Y axes and label from -20 to 20 on X and -20 to 10 on Y.
Plot the shape S with vertices at A (1,1), B (1,5), C (3,5), and D (5,1).

(a) Draw and label the following shapes:
P: the image of S after an enlargement centre (-2,3), scale factor 3
Q: the image of S after an enlargement centre (3,10), scale factor 2
(b) State the centre and scale factor of the enlargement which would transform:
   (i) P onto Q   (ii) Q onto P

2) Draw X and Y axes and label from -10 to 10 on both axes. Plot the shape S with
vertices at A (1,1), B (1,5), C (3,5), and D (5,1).
(a) Draw and label the following shapes:
Q: the image of S after an enlargement centre (3,10), scale factor 2.

R: the image of S after an enlargement centre (-9,7), scale factor $\frac{1}{2}$.

(b) What enlargement would transform: (i) R onto Q   (ii) Q onto R

3) Draw X and Y axes and label from -15 to 15 on the x-axis and -10 to 10 on the y-axis.
Plot the shape S with vertices at A (3,2), B (7,2), C (7,4), and D (5,6).

(a) Draw and label the following shapes:
P: the image of S after an enlargement scale factor 3, centre (5,4)

Q: the image of S after an enlargement scale factor $\frac{1}{2}$, centre (-15,4)

(b) What transformation would take   (i) Q onto P   (ii) P onto Q?

4) (a) Find the area (in square units) of the shapes S, P, Q and R in questions 1 and 2.
(b) By what must we multiply the area of shape S to find the area of shape P?
(c) By what must we multiply the area of shape S to find the area of shape Q?
(d) By what must we multiply the area of shape R to find the area of shape Q?
(e) Look at your answers to (b), (c) and (d); then copy and complete the following rule:
"An enlargement with scale factor n multiplies the area of a shape by a factor ____"

5) Draw X and Y axes and label from -13 to 13 on each axis. Plot the shape S with
vertices at A (5,1), B (3,5), and C (1,3).

(a) Draw and label the following shapes:
P: the image of S after an enlargement with s.f. -2, centre (-1,0)

Q: the image of S after an enlargement with s.f. $-\frac{1}{2}$, centre (-3,3)

(b) What transformation would take Q onto P?
(c) Plot and label the following shape
R: the image of Q after an enlargement with s.f. -2, centre (-1,0)
(d) What single transformation would take   (i) S to R   (ii) P to R?