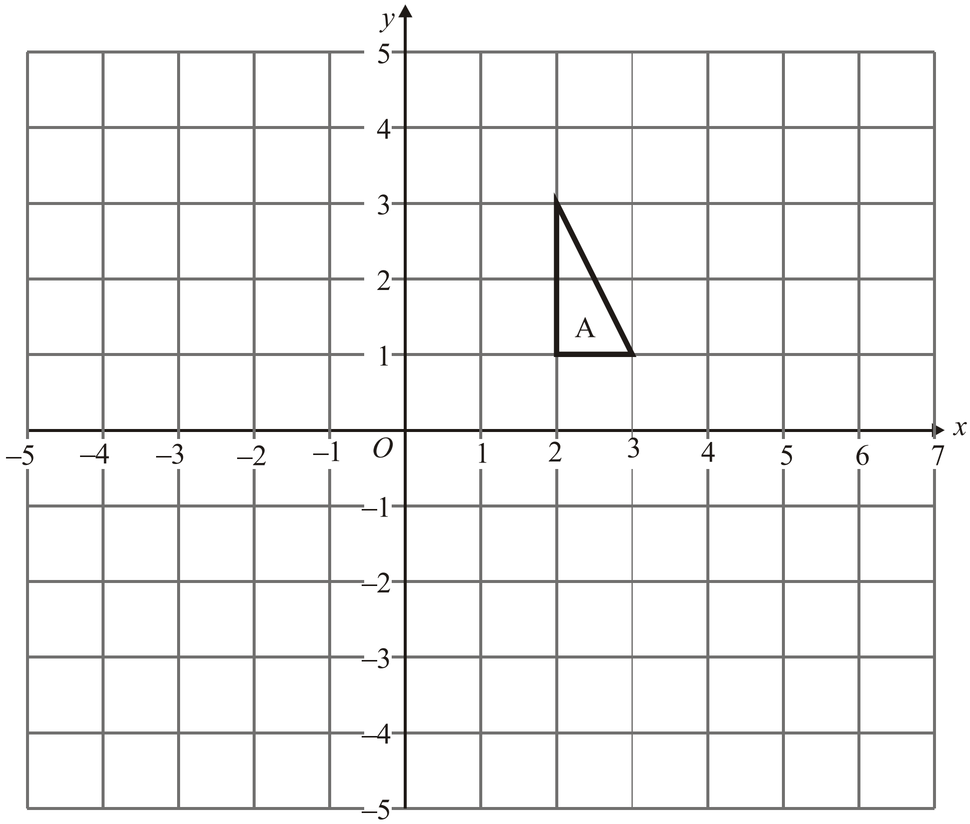
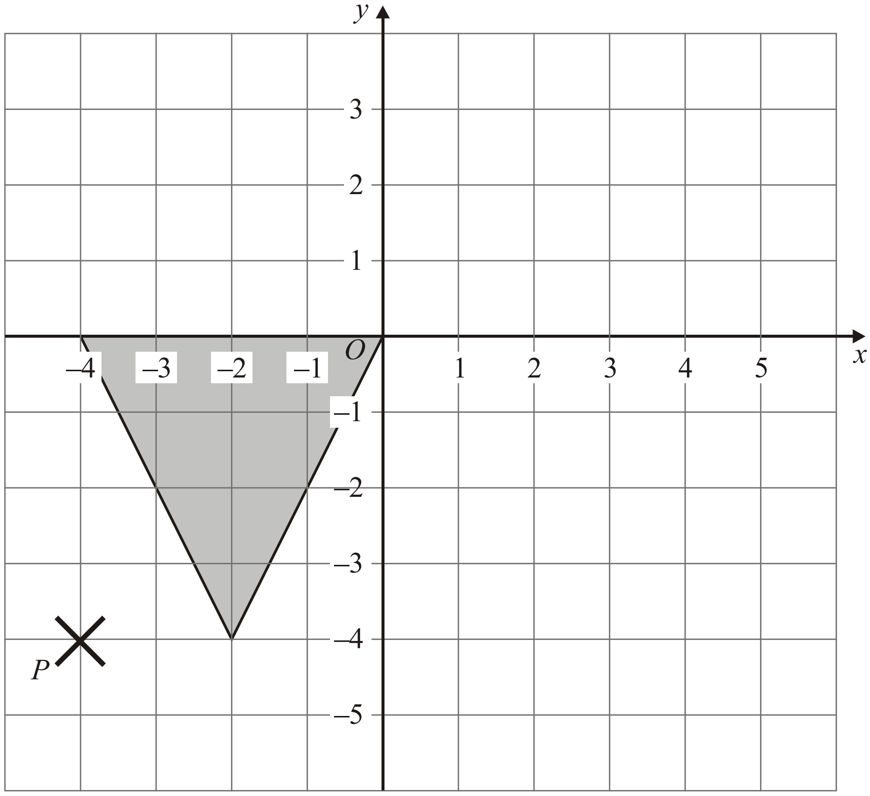
1.



Enlarge triangle **A** by scale factor $-1\frac{1}{2}$, centre *O*.

(Total 3 marks)

2.



Enlarge the shaded triangle by a scale factor $1\frac{1}{2}$, centre P.

(Total 3 marks)

3.

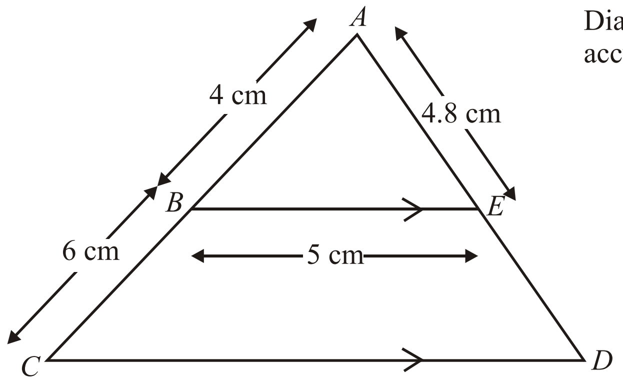


Diagram **NOT** accurately drawn

BE is parallel to *CD*.
ABC and *AED* are straight lines.
AB = 4 cm, *BC* = 6 cm, *BE* = 5 cm, *AE* = 4.8 cm.

(a) Calculate the length of *CD*.

.... cm
(2)

(b) Calculate the length of *ED*.

.... cm

(2)

(Total 4 marks)

4.

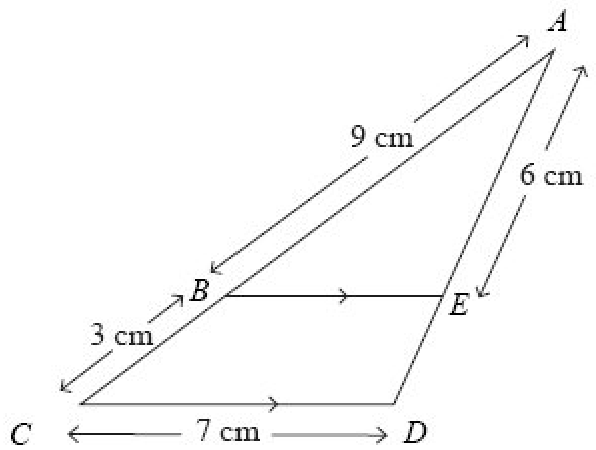


Diagram **NOT** accurately drawn

BE is parallel to *CD*.

AB = 9 cm, *BC* = 3 cm, *CD* = 7 cm, *AE* = 6 cm.

(a) Calculate the length of *ED*.

………………… cm

(2)

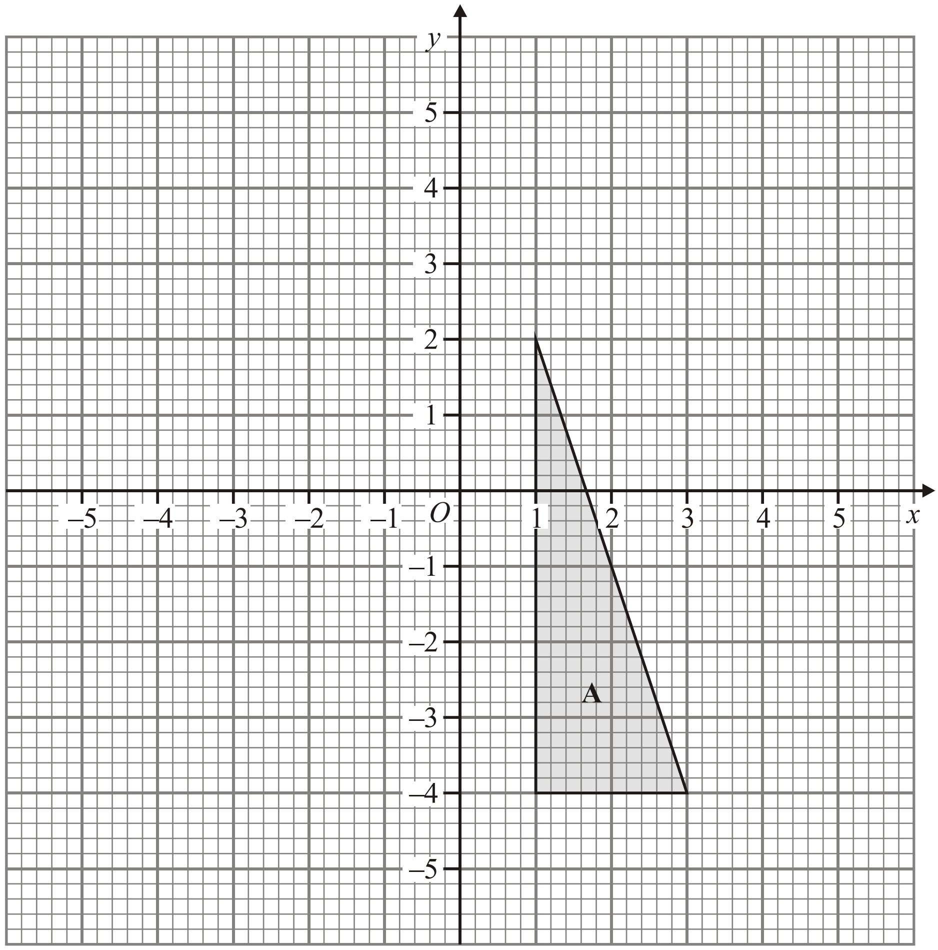
(b) Calculate the length of *BE*.

………………… cm

(2)

(Total 4 marks)

5.



Enlarge triangle **A** by scale factor $-\frac{1}{2}$, centre (–1, –2).

Label your triangle **B**.

(Total 3 marks)

6. The volumes of two mathematically similar solids are in the ratio 27 : 125

The surface area of the smaller solid is 36 cm^2.

Work out the surface area of the larger solid.

.... cm^2
(Total 3 marks)

7.

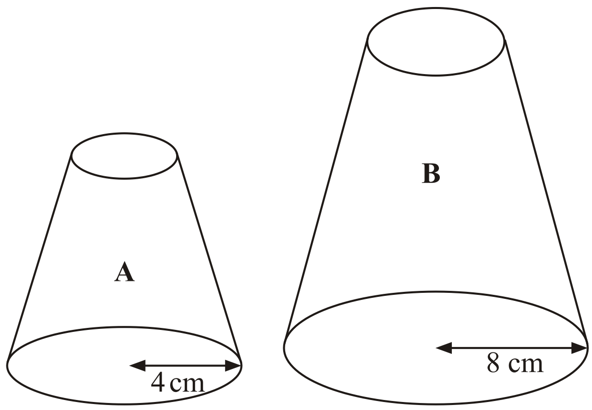


Diagram **NOT** accurately drawn

Two solid shapes, **A** and **B**, are mathematically similar.
The base of shape **A** is a circle with radius 4 cm.
The base of shape **B** is a circle with radius 8 cm.

The surface area of shape **A** is 80 cm^2.

(a) Work out the surface area of shape **B**.

.... cm^2

(2)

The volume of shape **B** is 600 cm^3.

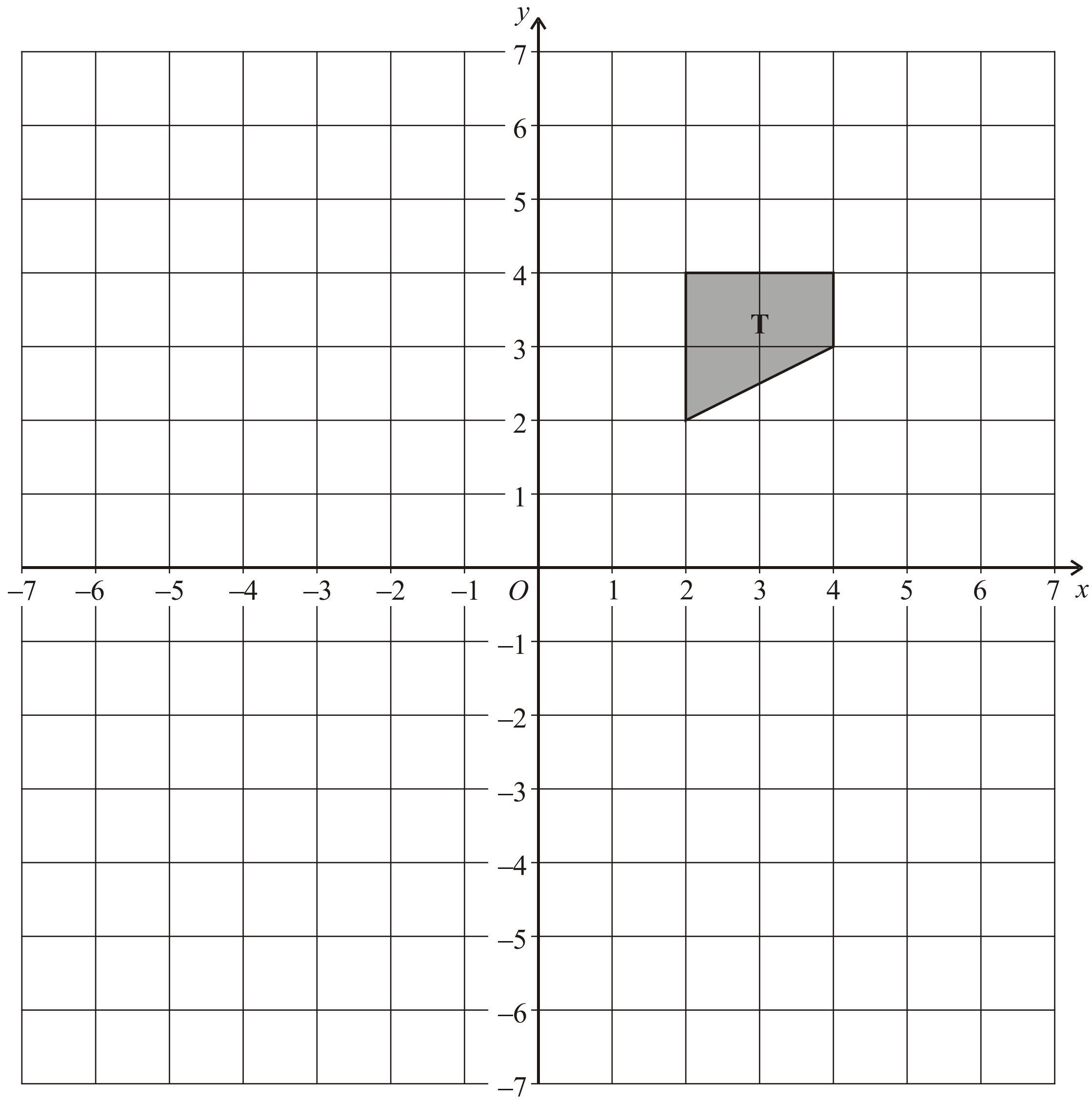
(b) Work out the volume of shape **A**.

.... cm^3

(2)

(Total 4 marks)

8.



Enlarge shape **T** with scale factor −1.5, centre (0, 2).

(Total 3 marks)

9.

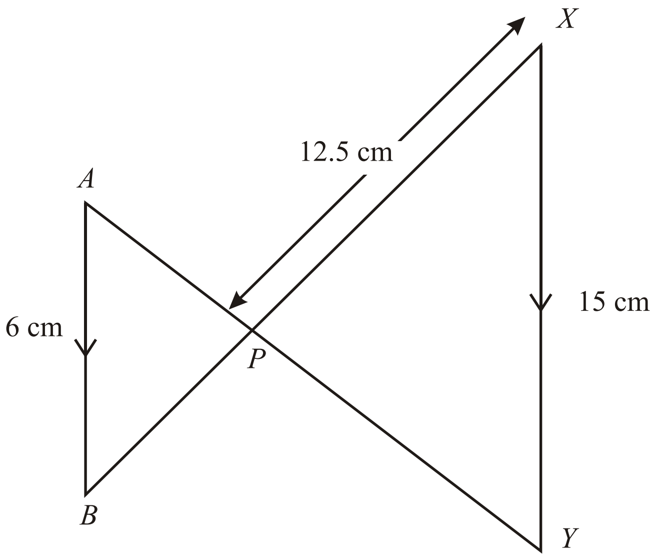


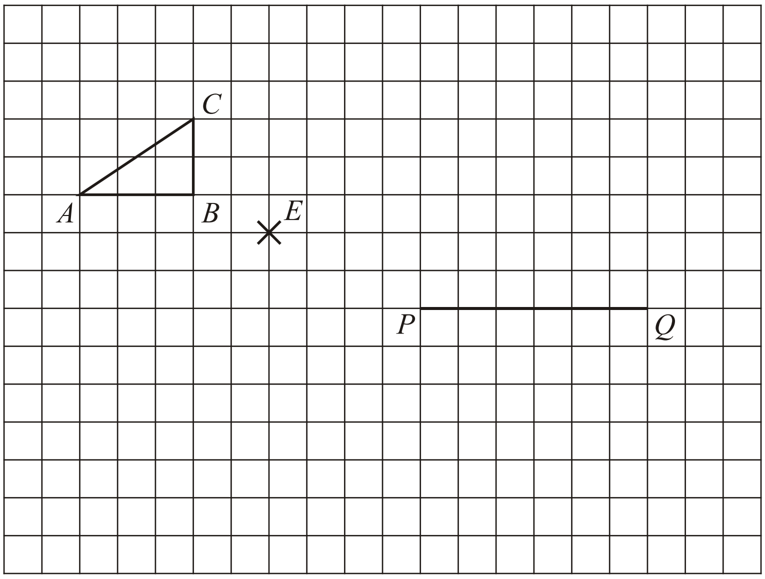
Diagram **NOT** accurately drawn

AB is parallel to *XY*.
The lines *AY* and *BX* intersect at *P*.
AB = 6 cm.
XP = 12.5 cm.
XY = 15 cm.

Work out the length of *BP*.

.... cm
(Total 3 marks)

10. The triangle *ABC* is to be enlarged, using *E* as the centre, to give the triangle *PQR*. The line *PQ* is the image of the line *BA*.



(a) Write down the scale factor of the enlargement.

....

(1)

(b) Complete the triangle *PQR*.

(1)

(Total 2 marks)

11.

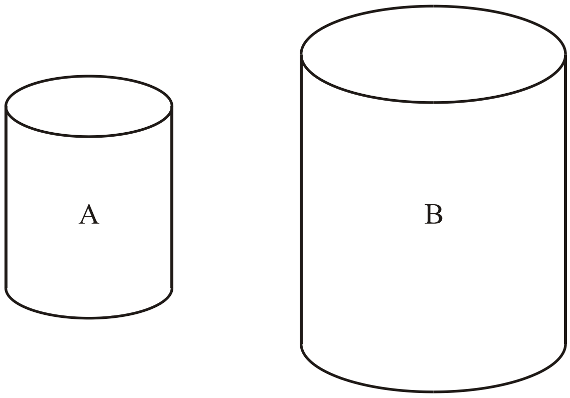


Diagram **NOT** accurately drawn

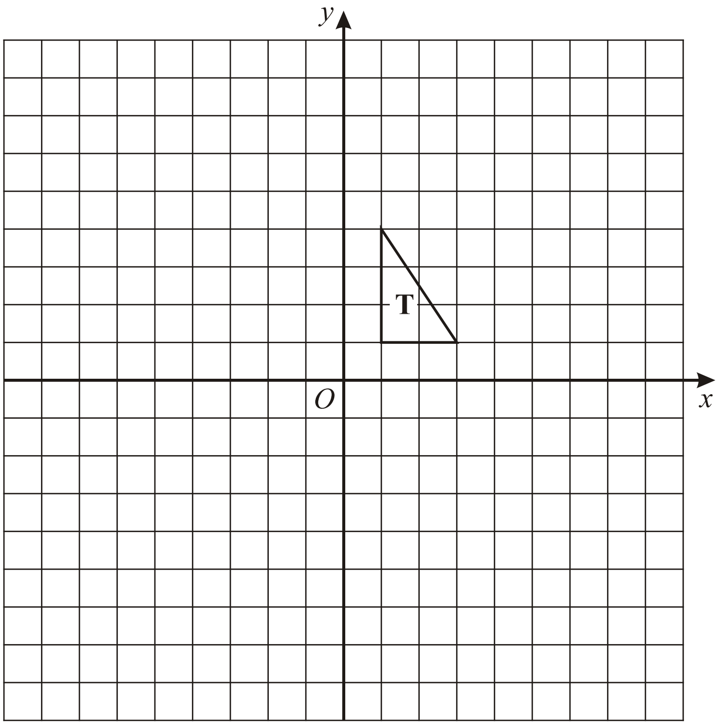
The two cylinders, A and B, are mathematically similar.
The height of cylinder B is twice the height of cylinder A.

The total surface area of cylinder A is 180 cm^2.

Calculate the total surface area of cylinder B.

....
(Total 3 marks)

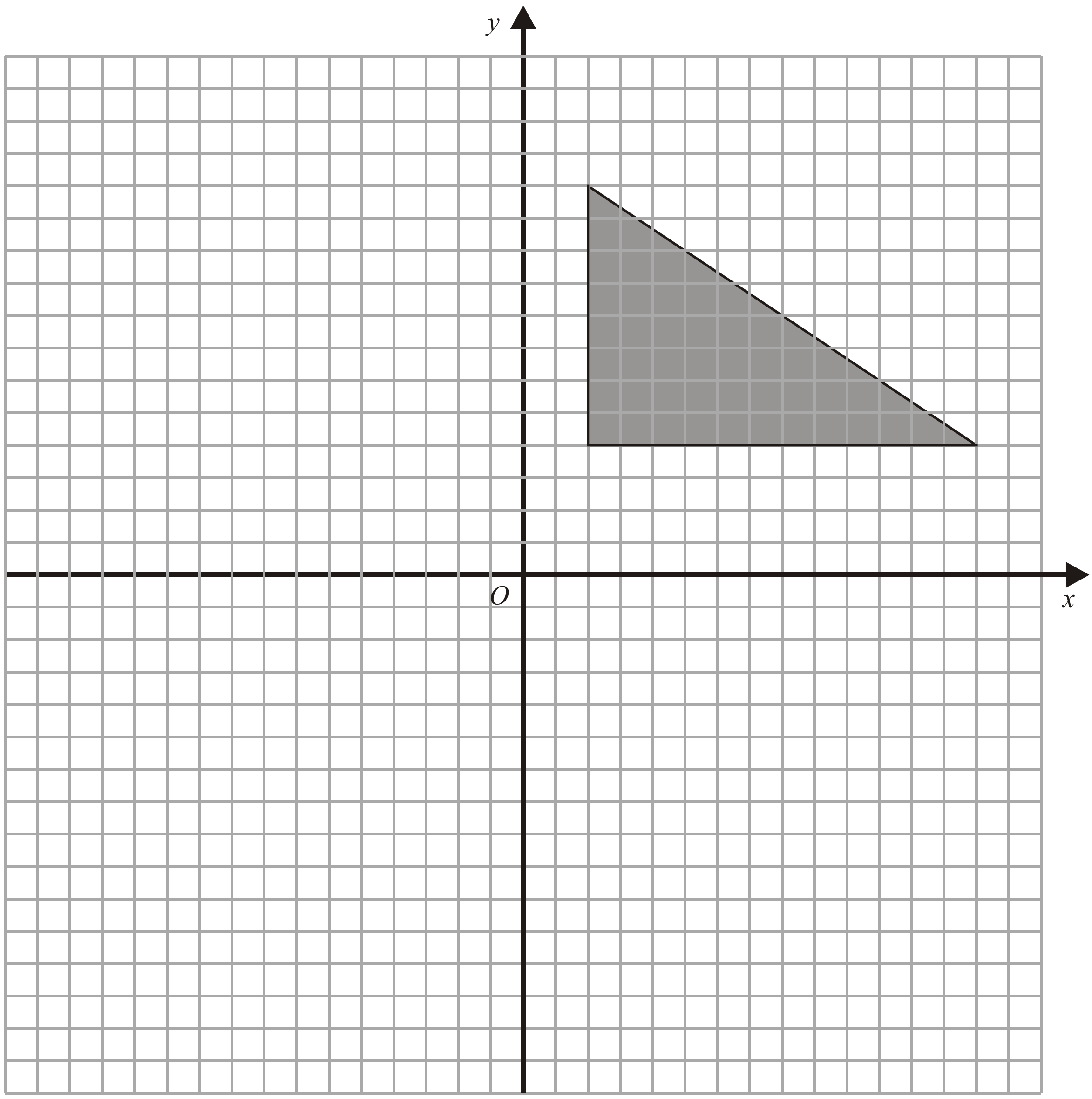
12.



Enlarge triangle **T**, scale factor –2, centre *O*.

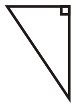
(Total 2 marks)

13.



Enlarge the triangle by a scale factor of $-\frac{1}{2}$, centre O

(Total 2 marks)

1.  3

Vertices at $(-3, -1\frac{1}{2}), (-4\frac{1}{2}, -1\frac{1}{2}), (-3, -4\frac{1}{2})$

B1 for all sides × 1½
B1 for correct orientation with 2 vertices almost correct
B1 cao

[3]

2. Correct triangle drawn 3

Vertices of new triangle at (–1, –4) (–4, 2) and (2, 2)

B3 cao
(B2 for 3 correct vertices no triangle or triangle with 2 correct vertices
(B1 for triangle with two of six co-ordinates correct from using P as centre or any isosceles triangle with base 6 and height 6)

[3]

3. (a) 12.5 2

$\frac{CD}{5} = \frac{10}{4}$

B1 for sight of $\frac{10}{4}$ *or* $\frac{4}{10}$ *or 2.5 or 0.4 or 1.25 oe*
B1cao for 12.5

(b) 7.2 2

$4.8 \times 2.5 - 4.8$

M1 for 4.8 × "2.5" or sight of 12
A1 cao

[4]

4. (a) 2 2

SF=$\frac{12}{9}$

$\frac{12}{9} \times 6 = 8$

M1 for $\frac{12}{9}$ or $\frac{9}{12}$ or 1.33... seen or 0.75 seen or 8 seen
or $\frac{6}{9}$ or $\frac{9}{6}$ or 0.66... or 1.5 or $\frac{1}{3}$ or 3 oe seen
A1 cao

(b) 5.25 2

SF = $\frac{9}{12}$, $\frac{9}{12} \times 7 = 5.25$

M1 for $\frac{BE}{7} = \frac{9}{12}$ oe
A1 cao

[4]

5. Vertices at (–2, –1), (–2, –4), (–3, –1)
See working column 3

B1 for all sides × $\frac{1}{2}$
B1 for correct orientation with two vertices almost correct
B1 cao

[3]

6. Volume 27 : 125

Length 3 : 5

= 100

Area 9 : 25 3

M1 for recognising need for cube root of 27 or 125
M1 for recognising need to square their scale factor A1 for 100

[3]

7. (a) $\left(\dfrac{8}{4}\right)^2 \times 80$

320 — 2

M1 for $\left(\dfrac{8}{4}\right)^2$ *or* $\left(\dfrac{4}{8}\right)^2$ *oe or* $8^2:4^2$ *or* $4^2:8^2$ *or 1:4 or 4:1*

A1 for 320 cao

(b) $\left(\dfrac{4}{8}\right)^3 \times 600$

75 — 2

M1 for $600 \times \left(\dfrac{4}{8}\right)^3$ *or* $600 \times \left(\dfrac{8}{4}\right)^3$ *oe*

A1 for 75 cao

[4]

8. (−3, 2), (−3, −1), (−6, −1) and (−6, 0.5) — 3

B1 for correct size

B1 for correct orientation with length of at least 2 sides correct ± 2mm and at least 3 vertices in correct position ± 2mm

B1 fully correct

SC: B2 if (2,0) used as centre and answer is fully correct

[3]

9. 5 — 3

$\dfrac{BP}{12.5} = \dfrac{6}{15}$

M1 for sight of $\dfrac{15}{6}$ *oe or sight of* $\dfrac{6}{15}$ *oe OR correct ratio involving 4 terms*

M1 for $BP = 6 \times \dfrac{12.5}{15}$

A1 cao

[3]

10. (a) – 2 1

B1

(b) shape *PQR* 1

B1 for R in correct position ± 2mm, PQR joined

[2]

11. 720cm^2 3

180×2^2

M1 for scale factor 2^2
A1 for 720
B1 (indep) for cm^2

[3]

12. (–2, –2), (–2, –8), (–6, –2) 2

B2 fully correct (± 2 mm)
(B1 correct size and correct orientation but in wrong position ***or*** *2 out of 3 vertices in correct position, ± 2 mm and triangle in correct orientation)*

[2]

13. vertices at (–1, –2), (–1, –6), (–7, –2)
Enlargement 2

B2 correct enlargement ± ½ square
(B1 for enlargement of –1 or ½, centre (0, 0) or triangle of correct size and orientation or 2 out of 3 vertices correct ± ½ square)

[2]

1. Negative enlargement is a topic, which does not seem to be understood by many candidates. Some just drew a triangle of the same size somewhere on the grid; better attempts had a triangle of the correct size. Those who displayed an understanding of the topic had the correct orientation and within the correct quadrant but often a triangle with at least one side too long/short.

2. The success rate seemed to be very centre based. The vast majority of candidates gained at least partial credit for either a correct sized triangle or, less often, for using centre *P* correctly but with the wrong scale factor.

3. **Paper 4**

This question commonly appears on the Intermediate paper, yet this time is was very badly done, one of the worst attempted questions on the paper, with nearly 95% of candidates achieving no marks on either part. It was rare to see a correct scale factor. Most jumped straight into the incorrect method of adding and subtracting values between the two triangles.

Paper 6

Although these questions are standard the response to them was not as successful as we may have hoped. There was a great deal of confusion in what was the appropriate scale factor, especially in part (a), where the answer 7.5 was frequently seen. All the candidates who drew the two triangles themselves as separate shapes got the correct answers to both parts.

4. These questions always prove to be challenging for some candidates. Part (a) was generally well answered as many candidates noted the 9 : 3 ratio. Part (b) proved to be more difficult with 7 ÷ 3 = 2.33 and 7 ÷ 3 × 2being common incorrect answers. Candidates who used a scale factor of $\frac{12}{9}$ were generally successful although marks were lost when this was used as 1.3.

5. Many candidates gained at least one mark for halving the size of the triangle, but only the best could locate this in the correct position. The most common errors were to enlarge the triangle by scale factor $\frac{1}{2}$ (i.e. ignore the minus sign) or to halve the size of the triangle and then reflect in the y-axis (i.e. interpreting the minus sign as a reflection).

6. About a quarter of the candidates recognised the need to find the linear scale factor of the enlargement by taking the cube root of the ratio, but only the best went on to square this to find the area scale factor. A common incomplete approach was $\sqrt[3]{27} : \sqrt[3]{125} = 3 : 5$, so $\frac{5}{3} \times 36 = 60$.

A common incorrect approach was
27 : 125 = 3 : 15(sic), so 3 × 12 : 15 × 12 = 36 : <u>180</u>.

7. Only the best candidates were able to score full marks in this question. For the surface area in part (a), the vast majority of candidates simply multiplied 80 by 2 (the linear scale of the enlargement). Similarly for the volume in part (b), the vast majority of candidates simply divided 600 by 2.

8. A number of candidates gained marks for their image being the correct size but this was frequently placed anywhere on the graph paper with no thought given to its position. A minority of candidates answered this question correctly.

9. **Paper 16**

This was not done well other than by the more able candidates. Quite often a correct scale factor of 2.5 was obtained but then candidates failed to divide it into 12.5 correctly or were unable to go any further. It was rare to see the more formal method of equating the ratios between corresponding sides of similar triangles, to find the unknown side.
Weaker candidates often stumbled across 2.5 by subtracting 12.5 from 15, but then usually subtracted this from 6 to give an answer of 3.5
It must be noted that a significant number of candidates quoted an answer of 5, without showing any working, some of which I feel sure were guesses.

Paper 18

Many candidates were able to score full marks on this question showing either a good use of scale factors or use of similar triangles. A minority of candidates incorrectly attempted to use Pythagoras' Theorem (or the sine or cosine rule) and thus scored no marks.

10. The most common, incorrect, answer for part (a) was 2. It is important that candidates do read the question carefully and realise the important of the ordering of the letters in an enlargement question. The majority of candidates also drew a x2 enlargement in (b). Of those candidates who did answer (b) successfully, most had used construction guidelines drawn through the centre of the enlargement to help them.

11. The majority of candidates gained at least one mark in this question for including cm^2 with their answer. The common, incorrect answer given was 360 cm^2. Few candidates appreciated the need to multiply the surface area of cylinder *A* by 2^2 rather than the length scale factor of 2.

12. About half of the candidates were able to gain some credit for their answer to this question. The majority of candidates incorrectly placed the enlargement in the first quadrant. Many candidates were under the assumption that a negative enlargement automatically gives a reduction in size.

13. A fully correct enlargement was seen from approximately half of the candidates. Common incorrect solutions included and enlargement of $\frac{1}{2}$ or -1, centre (0,0). Candidates that used construction lines instead of counting squares generally scored all available marks although some candidates using this method lost a mark due to inaccurate measuring. Candidates using this method would be well advised to check the size of their final enlarged shape.