Triangle $PQR$ is an enlargement, centre $O$, of triangle $ABC$. $OAP$ and $OBQ$ are straight lines.

$OA = 2$ cm.
$AP = 6$ cm.
$BQ = 7.2$ cm.
$AC = 3.7$ cm.

(a) Work out the length of $OB$.

(b) Work out the length of $PR$.

The area of triangle $PQR$ is 72 cm$^2$.

(c) Work out the area of triangle $ABC$. 
12 The diagram shows triangle $ADC$.

Diagram NOT accurately drawn

$E$ is a point on $AD$ and $B$ is a point on $AC$ so that $EB$ is parallel to $DC$.

$AB = 14$ cm.

$EB = 16$ cm.

$DC = 20$ cm.

Calculate the length of $BC$.

Jan 2015 3H Paper

15

Diagram NOT accurately drawn

Zane buys mineral water in large bottles and in small bottles. The large bottles are mathematically similar to the small bottles. Large bottles have a height of 32 cm and a volume of 2000 cm$^3$ Small bottles have a volume of 500 cm$^3$

Work out the height of a small bottle.
Give your answer correct to 3 significant figures.
In the diagram $ABC$ and $ADE$ are straight lines. $BD$ is parallel to $CE$.

$AB = 9\, \text{cm}, \ BC = 13.5\, \text{cm}, \ AD = 10\, \text{cm}, \ BD = 17\, \text{cm}$

(a) Calculate the length of $CE$.

(b) Calculate the length of $DE$.

The area of triangle $ABD$ is $36\, \text{cm}^2$

(c) Calculate the area of quadrilateral $BDEC$. 

Diagram NOT accurately drawn
1 The ocean liner Queen Mary 2 is the longest of its type. It has a length of 345 metres.
A scale model is made of the Queen Mary 2
The scale of the model is 1 : 200
Work out the length of the scale model.
Give your answer in centimetres.

22 The diagram shows two triangles, A and B.

Triangle A

Diagram NOT accurately drawn

The area of triangle B is 3 times the area of triangle A.
Given that $b > 4$, find an expression for $a$ in terms of $b$. 
13 \( PQRS \) and \( PLMN \) are similar quadrilaterals.

\( PN = 12 \text{ cm}, \ NS = 8 \text{ cm}, \ PL = 9 \text{ cm} \) and \( RS = 13.5 \text{ cm} \).

\( LM \) is parallel to \( QR \) and \( MN \) is parallel to \( RS \).

(a) Work out the length of \( MN \).

(b) Work out the length of \( LQ \).

The area of \( PLMN \) is \( A \text{ cm}^2 \)

The area of \( PQRS \) is \( kA \text{ cm}^2 \)

(c) Find the value of \( k \).

The area of the shaded region is 105.6 cm\(^2\)

(d) Work out the value of \( A \).
23 $ABC$ is a triangle.

$AB = 12 \text{ cm}$
$AC = 14 \text{ cm}$
The area of triangle $ABC$ is $72 \text{ cm}^2$

Find, in degrees, the two possible sizes of angle $BAC$. Give your answers correct to the nearest degree.

May 2016 3H Paper

15 The diagram shows two mathematically similar vases, A and B.

Vase A has a surface area of $120 \text{ cm}^2$
Vase B has a surface area of $750 \text{ cm}^2$ and a volume of $1600 \text{ cm}^3$

Work out the volume of vase A.
Triangle $ABE$ is similar to triangle $ACD$.
$AED$ and $ABC$ are straight lines.
$EB$ and $DC$ are parallel.
$AE = 5\, \text{cm}$, $BC = 4.5\, \text{cm}$, $BE = 4\, \text{cm}$, $CD = 9\, \text{cm}$

(a) Calculate the length of $AD$.

(b) Calculate the length of $AB$.

The area of quadrilateral $BCDE$ is $x\, \text{cm}^2$
The area of triangle $ABE$ is $y\, \text{cm}^2$

(c) Find an expression for $y$ in terms of $x$.
   Give your answer as simply as possible.
The diagram shows triangle $ACD$. 
$B$ is a point on $AC$ and $E$ is a point on $AD$ so that $BE$ is parallel to $CD$.

$AE = 4\, \text{cm}$
$AC = 11.7\, \text{cm}$
$BE = 6\, \text{cm}$
$CD = 13.5\, \text{cm}$

(a) Calculate the length of $AB$.

(b) Calculate the length of $ED$. 

Diagram NOT accurately drawn
8 Louis makes a model of a plane.

The wingspan of the model is 50 centimetres.
The wingspan of the real plane is 80 metres.

(a) Work out the scale of the model.
   Give your answer in the form 1: n

The length of the real plane is 72 metres.

(b) Work out the length of the model.
   Give your answer in centimetres.
10. Here are two similar triangles.

\[ \triangle LMN \sim \triangle QPR \]

![Diagram of similar triangles with side lengths labeled: 21 cm, 14 cm, \( y \) cm for the larger triangle; 15 cm, \( x \) cm, 18 cm for the smaller triangle.]

*Diagrams NOT accurately drawn*

\[ LM \text{ corresponds to } PQ. \]
\[ MN \text{ corresponds to } QR. \]

(a) Find the value of \( x \).

(b) Find the value of \( y \).
8. The scale of a map is 1 : 50 000
On the map, the distance between two schools is 19.6 cm.

Work out the real distance between the schools.
Give your answer in kilometres.

May 2009 3H Paper

3.

On the grid, enlarge triangle T with a scale factor of $2 \frac{1}{2}$ and centre (0, 0).
12. 

The area of circle $S$ is 4 cm$^2$. 
The radius of circle $T$ is 3 times the radius of circle $S$. 

Work out the area of circle $T$. 

May 2005 3H Paper

4. 

On the grid, enlarge triangle $T$ with a scale factor of 3 and centre (2, 1).
12. The height of a hall is 12 m.
   A scale model is made of the hall.
   The height of the scale model of the hall is 30 cm.

   (a) Express the scale of the model in the form $1:n$

   The length of the scale model of the hall is 95 cm.

   (b) Work out the real length of the hall.
       Give your answer in metres.