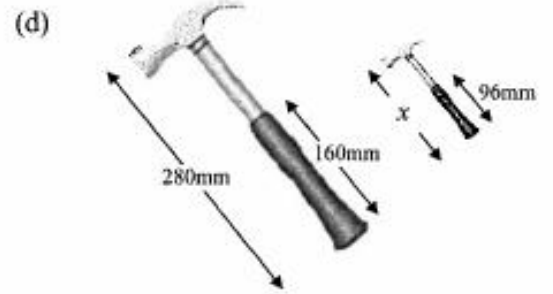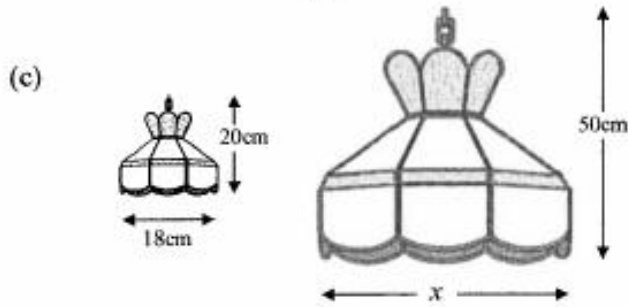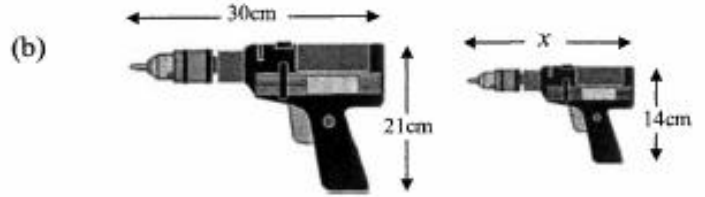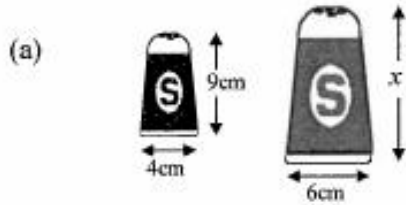# Similarity (1)

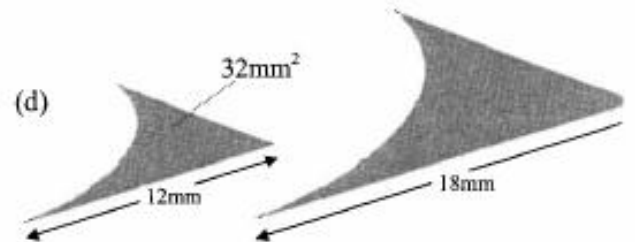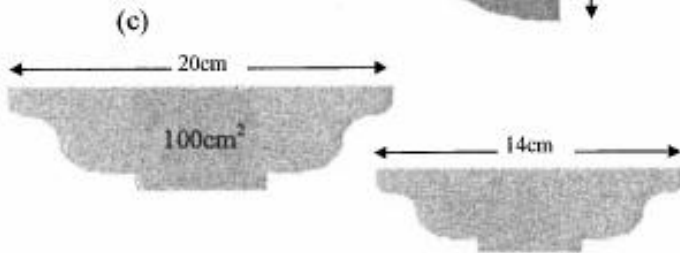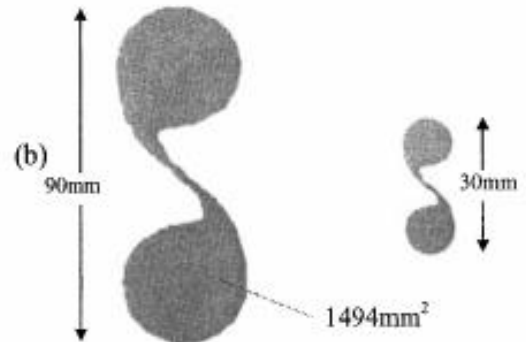1. Each diagram below shows a pair of similar shapes or objects. For each pair ....
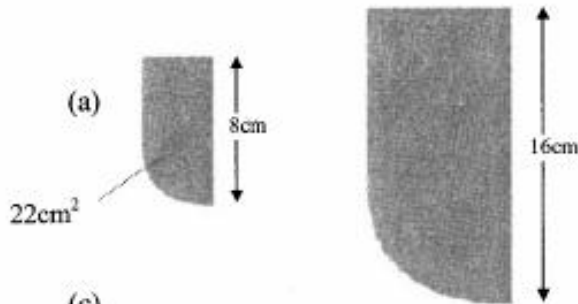
   i) state the scale factor (from left to right)   ii) calculate the length marked x.

   (a)
   9cm x
   4cm   6cm

   (b)
   30cm x
   21cm   14cm

   (c)
   20cm   50cm
   18cm x
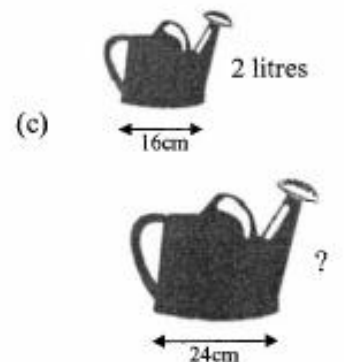
   (d)
   280mm   160mm x 96mm

2. Each pair of shapes below is mathematically similar.

   Calculate the **area** of each right-hand shape.

   (a)
   8cm   16cm
   22cm^2

   (b)
   90mm   30mm
   1494mm^2

   (c)
   20cm   14cm
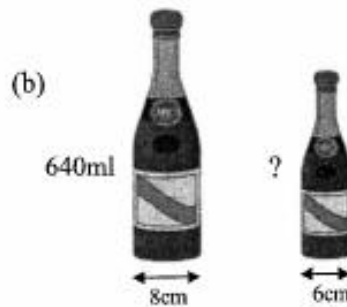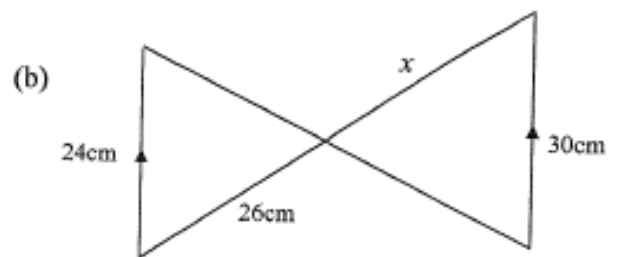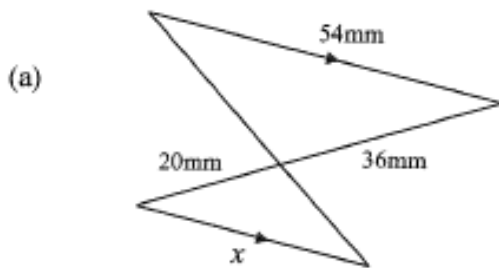   100cm^2

   (d)
   32mm^2
   12mm   18mm

3. Each pair of containers below is mathematically similar.

   Calculate the **volume** of each right-hand container.

   (a)
   10cm   20cm
   150ml   ?

   (b)
   640ml   ?
   8cm   6cm

   (c)
   2 litres
   16cm
   ?
   24cm
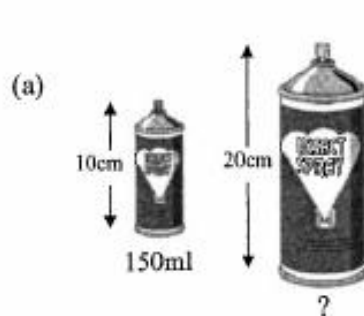
Similarity (2)

1. Calculate the length of the side marked x in each diagram below.

(a)

54mm

20mm   36mm

x

(b)

24cm x 30cm

26cm
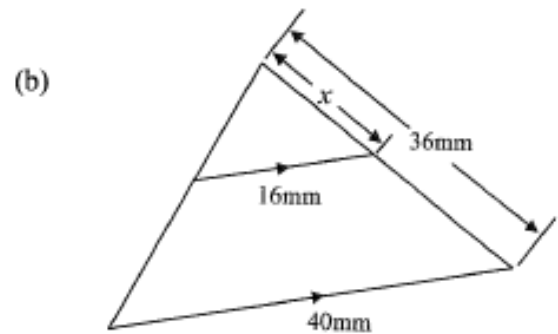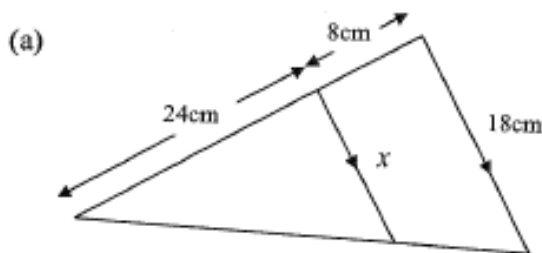
2. In the diagram $\angle ABC = \angle CED$, AB = 28cm, AC = 24cm and ED = 21cm.

(a) Explain why the triangles ABC and CDE are similar.

(b) Calculate the length of CD.

(c) Given that the area of triangle ABC is 144 square centimetres, calculate the area of triangle CDE.

A

28cm

24cm

C

D

21cm

E

B

3. Calculate the length of the side marked x in each diagram below.

(a)

8cm

24cm   18cm

x

(b)

x

36mm

16mm

40mm
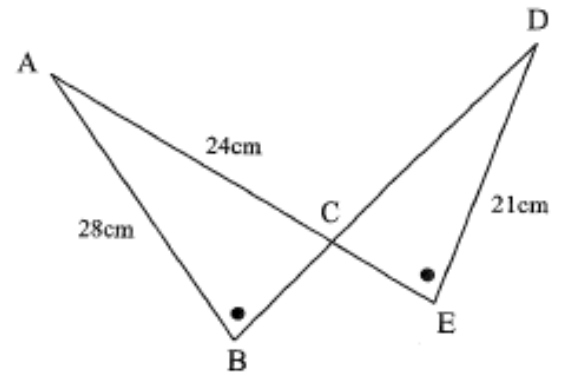
4. The digram opposite shows an aluminium pipe frame. The cross members QS and PT are parallel.

RS = 48cm, QS = 24cm and PT = 32cm as shown.

Calculate the length of ST

R

Q   24cm   48cm

P

S

32cm

T
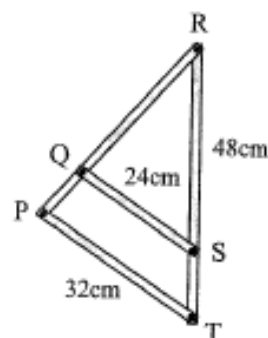
5. In the diagram a ladder is laid against two walls as shown.

The higher wall is 1·6 metres high, and the lower wall is 0·7 metres. The distance between the two left hand faces of the walls is 0·9 metres.

Calculate the distance between the foot of the ladder and the lower wall.

1·6m

0·7m

0·9m
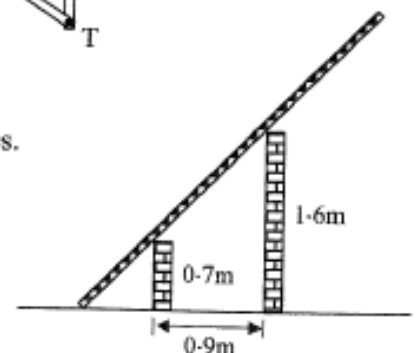
Similarity (1)

1. (a) i) $k = \frac{3}{2}$ or $1 \cdot 5$ ii) $13 \cdot 5\, cm$ (b) i) $k = \frac{2}{3}$ or $0 \cdot 666..$ ii) $20\, cm$

   (c) i) $k = \frac{5}{2}$ or $2 \cdot 5$ ii) $45\, cm$ (d) i) $k = \frac{3}{5}$ or $0 \cdot 6$ ii) $168\, mm$

2. (a) $88\ cm^2$ (b) $166\ mm^2$ (c) $49 cm^2$ (d) $72\ mm^2$

3. (a) $1200\ ml$ (b) $270\ ml$ (c) $6 \cdot 75\ $ litres

Similarity (2)

1. (a) $x = 30 mm$ (b) $x = 32 \cdot 5\, cm$

2. (a) Because they are equiangular   (b) $CD = 18 cm$ (c) $81\ cm^2$

3. (a) $x = 13 \cdot 5\, cm$ (b) $x = 14 \cdot 4\, mm$

4. $ST = 16 cm$

5. distance $= 0 \cdot 7\, m$