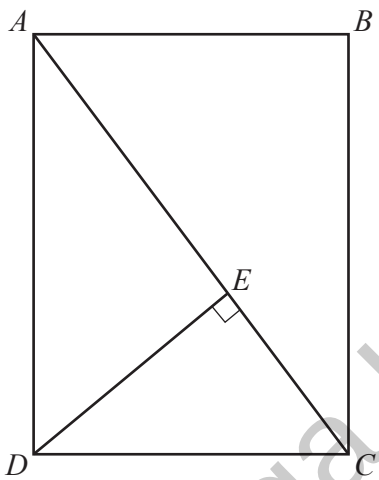
Name:

Section:

Congruence and Similarity Worksheet

1



NOT TO SCALE

The diagram shows a rectangle $ABCD$.
E is a point on the diagonal AC such that $D\hat{E}C = 90°$.

Prove that triangle ADC is similar to triangle DEC.
Give a reason for each statement you make.

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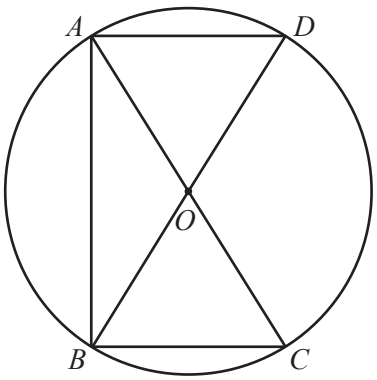
..... [3]

2



NOT TO SCALE

AC and *BD* are diameters of the circle, centre *O*.

Show that triangle *ABC* is congruent to triangle *BAD*.
Give a reason for each statement you make.

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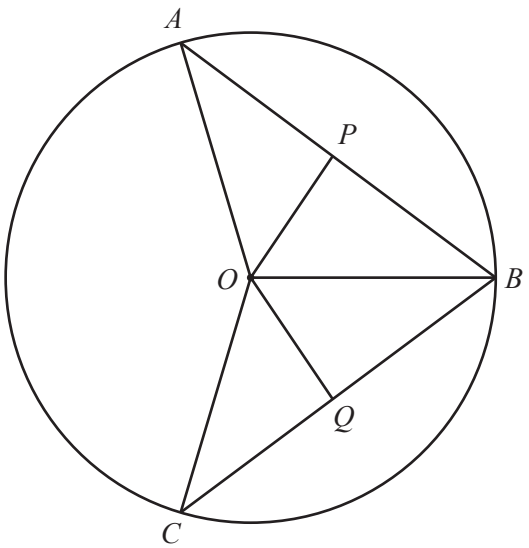
3



NOT TO SCALE

A, B and C are points on the circle centre O and $AB = BC$.
P is the midpoint of chord AB and Q is the midpoint of chord BC.

(a) Prove that triangle OAP is congruent to triangle OCQ.
Give a reason for each statement you make.

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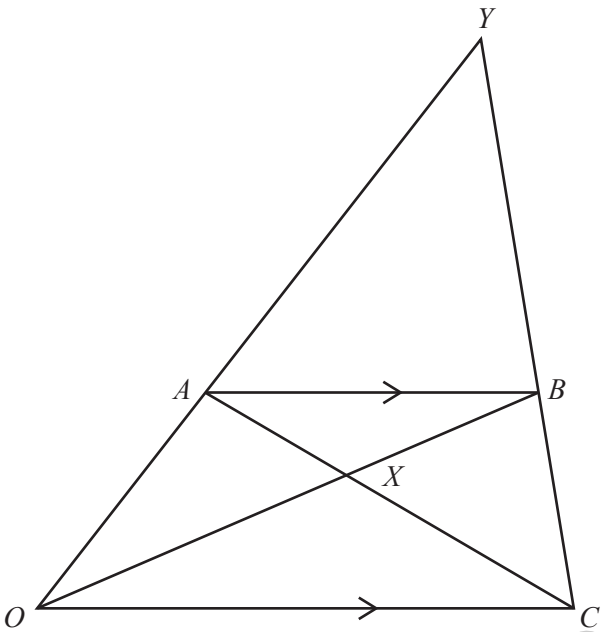
4



OYC is a triangle.
A is a point on *OY* and *B* is a point on *CY*.
AB is parallel to *OC*.
AC and *OB* intersect at *X*.

(a) Prove that triangle *ABX* is similar to triangle *COX*.
Give a reason for each statement you make.

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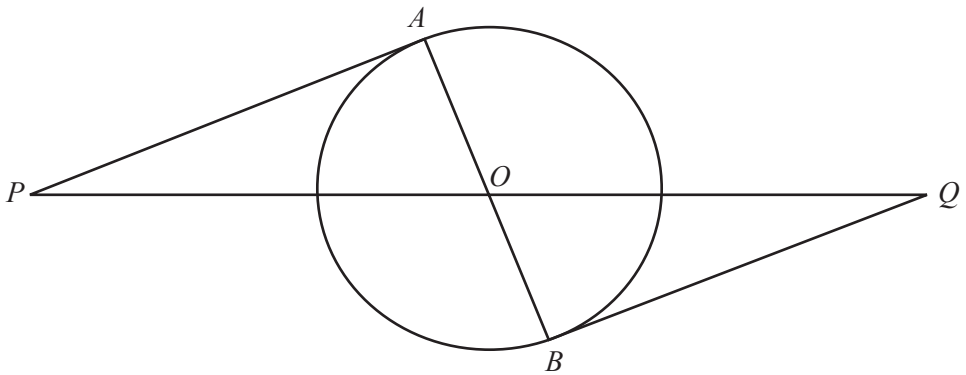
..... [3]

5



AB is a diameter of the circle, centre *O*.
PA and *QB* are tangents to the circle at *A* and *B* respectively.

Prove that triangle *PAO* is congruent to triangle *QBO*.
Give a reason for each statement you make.

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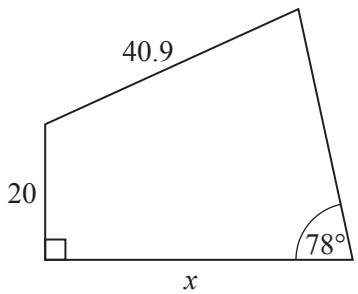
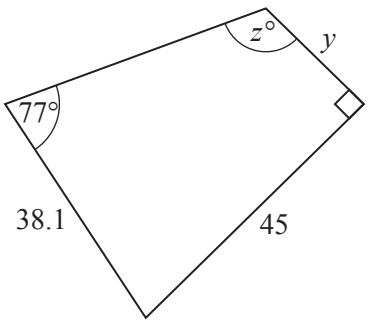
..... [3]

6





These two quadrilaterals are congruent. The lengths are in millimetres.

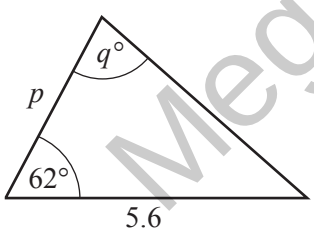
Find the values of x, y and z.

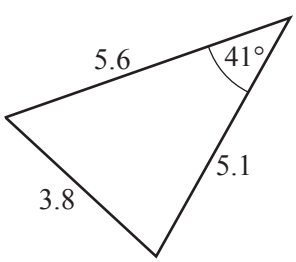
Answer $x =$ .....

$y =$ .....

$z =$ ..... [3]

7 These two triangles are congruent.
The lengths are in centimetres, correct to the nearest 0.1 cm.



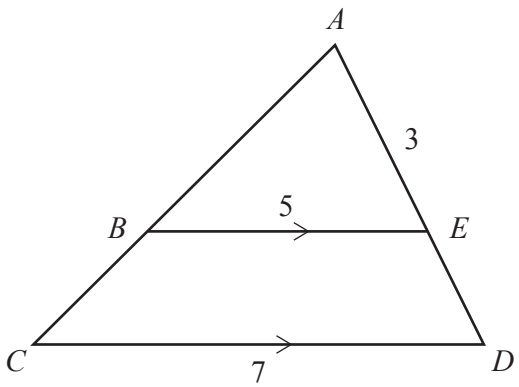


Find p and q.

Answer $p =$ .....

$q =$ ..... [2]

8



In the diagram, $BE = 5$ cm, $CD = 7$ cm and $AE = 3$ cm.

BE is parallel to CD.

(a) Express CD as a percentage of BE.

Answer ..... % [1]

(b) Find ED.

Answer ..... cm [2]

9 Two bottles are geometrically similar.
The ratio of the areas of their bases is 1 : 4.

Write down the ratios of their

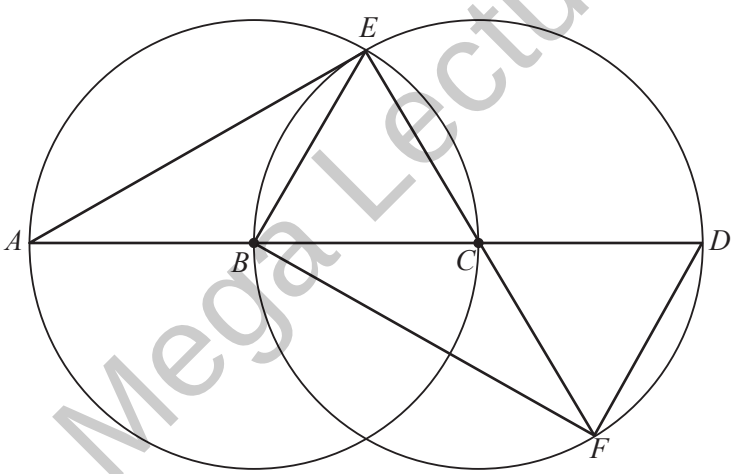
(a) heights,

Answer ..... : ..... [1]

(b) volumes.

Answer ..... : ..... [1]

10 **(a)** The diagram shows two circles with equal radii.
A, *E* and *C* are points on the circle, centre *B*.
B, *E*, *D* and *F* are points on the circle, centre *C*.
ABCD is a straight line.



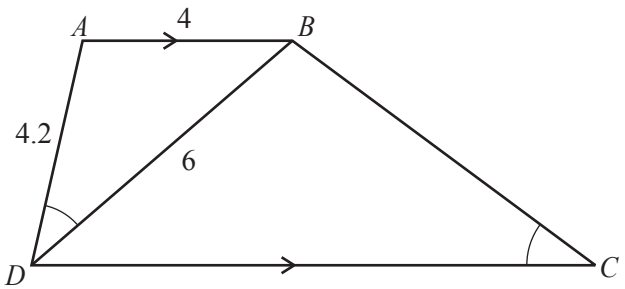
(i) Show that triangles *AEC* and *FBE* are congruent.

[3]

(ii) State another triangle that is congruent to triangle *AEC*.

Answer Triangle ..... [1]

11 In the diagram, AB is parallel to DC and $A\hat{D}B = B\hat{C}D$.



(a) Explain why triangles ABD and BDC are similar.

[2]

(b) $AB = 4$ cm, $BD = 6$ cm and $AD = 4.2$ cm.

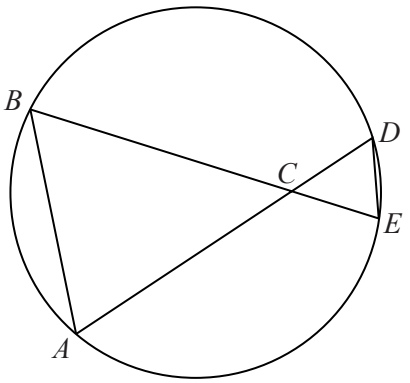
(i) Calculate BC.

Answer ..... cm [2]

(ii) Write down the value of $\dfrac{\text{area of triangle } ABD}{\text{area of triangle } BDC}$.

Answer ..... [1]

12 A, B, D and E are points on a circle.



AD and BE intersect at C.

(i) Show that triangles ABC and EDC are similar.
Give your reasons.

Answer .....

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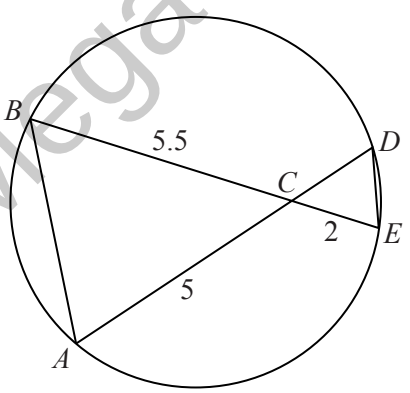
..... [2]

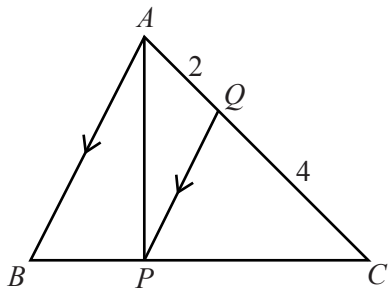
(ii)



Given that $AC = 5$ cm, $BC = 5.5$ cm and $CE = 2$ cm, find the length of the chord AD.

Answer ..... cm [2]

13 In the diagram, the points P and Q lie on the sides BC and AC of triangle ABC.



AB is parallel to QP.
$AQ = 2$ cm and $QC = 4$ cm.

The area of triangle CPQ is 6 cm^2.

Find the area of

(a) triangle AQP,

..... cm^2 [1]

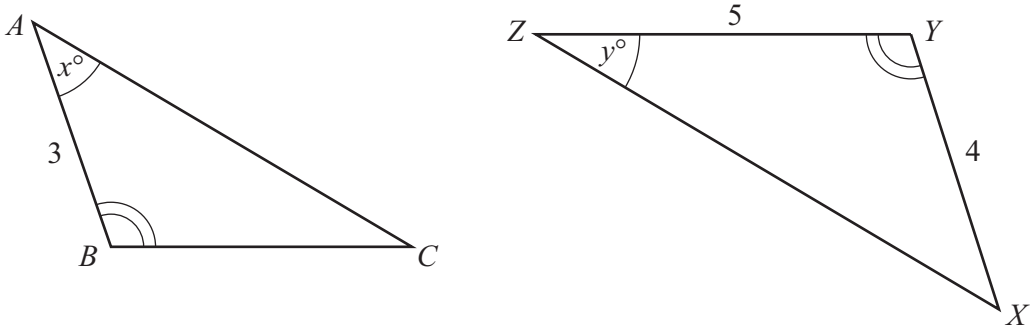
(b) triangle ABC,

..... cm^2 [1]

(c) triangle ABP.

..... cm^2 [1]

14



The triangles ABC and XYZ are similar and $A\hat{B}C = X\hat{Y}Z$.

$B\hat{A}C = x°$, $Y\hat{Z}X = y°$ where $x \neq y$.
$AB = 3\,\text{cm}$, $XY = 4\,\text{cm}$ and $YZ = 5\,\text{cm}$.

(a) Express $A\hat{B}C$ in terms of x and y.

Answer $A\hat{B}C =$ ..... [1]

(b) Find BC.

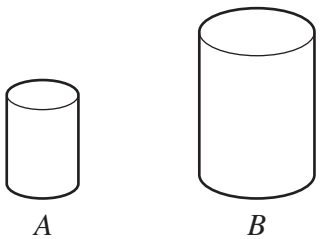
Answer $BC =$ ..... cm [1]

(c) Write down the value of $\dfrac{\text{area of triangle } ABC}{\text{area of triangle } XYZ}$.

Answer ..... [1]

15 These two cylinders are similar.
The ratio of their volumes is 8 : 27.
The height of cylinder *A* is 12 cm.

Find the height of cylinder *B*.



Answer ..... cm [2]