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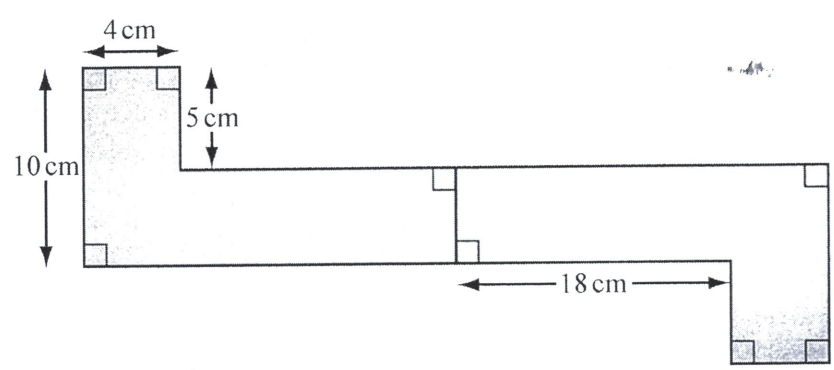**E-mail:rashed.saba@gmail.com**

MATHEMATICS -CORE

TOPIC- Shaded area

1

NOT TO
SCALE

The shaded shape has rotational symmetry of order 2.

Work out the shaded area.

Answer .... cm² [3]
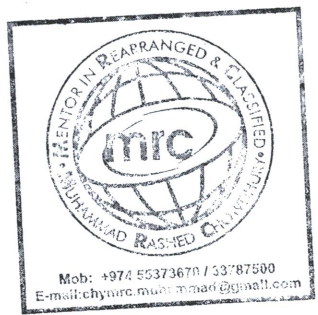
0 2
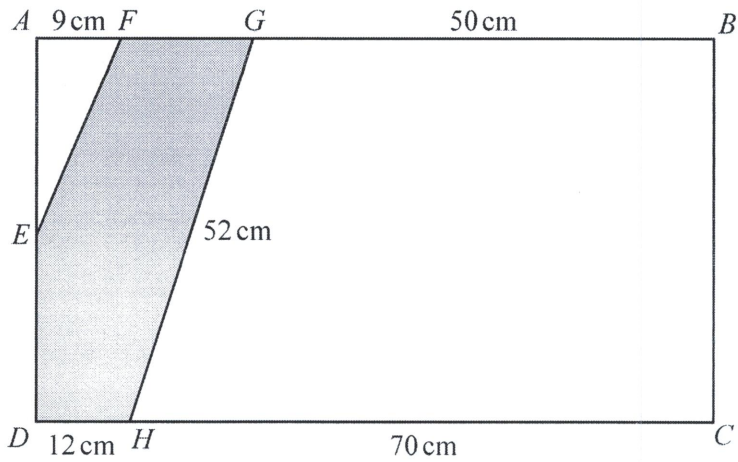
NOT TO SCALE

The diagram shows a rectangle *ABCD* divided into three sections by the lines *EF* and *HG*.
AF = 9 cm, *GB* = 50 cm, *DH* = 12 cm, *HC* = 70 cm and *HG* = 52 cm.

(a) Write down the mathematical name of

   (i) quadrilateral *BCHG*,

Answer(a)(i) .... [1]

   (ii) the shaded polygon.

Answer(a)(ii) .... [1]

(b) **(i)** Show by calculation that *BC* = 48 cm.

Answer(b)(i)

[2]

   (ii) Calculate the area of rectangle *ABCD*.

Answer(b)(ii) .... cm² [2]

(c) Calculate

    (i) the perimeter of *BCHG*,

Answer(c)(i) .... cm [1]

    (ii) the area of *BCHG*.

Answer(c)(ii) .... cm^2 [2]

(d) *E* is the midpoint of *AD*.

    Find the area of triangle *AEF*.

Answer(d) .... cm^2 [3]

(e) Work out the area of the shaded polygon.

Answer(e) .... cm^2 [1]

3
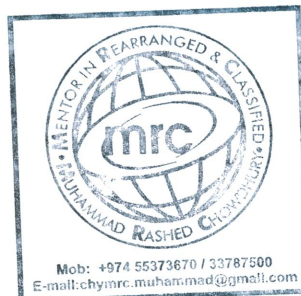
NOT TO
SCALE
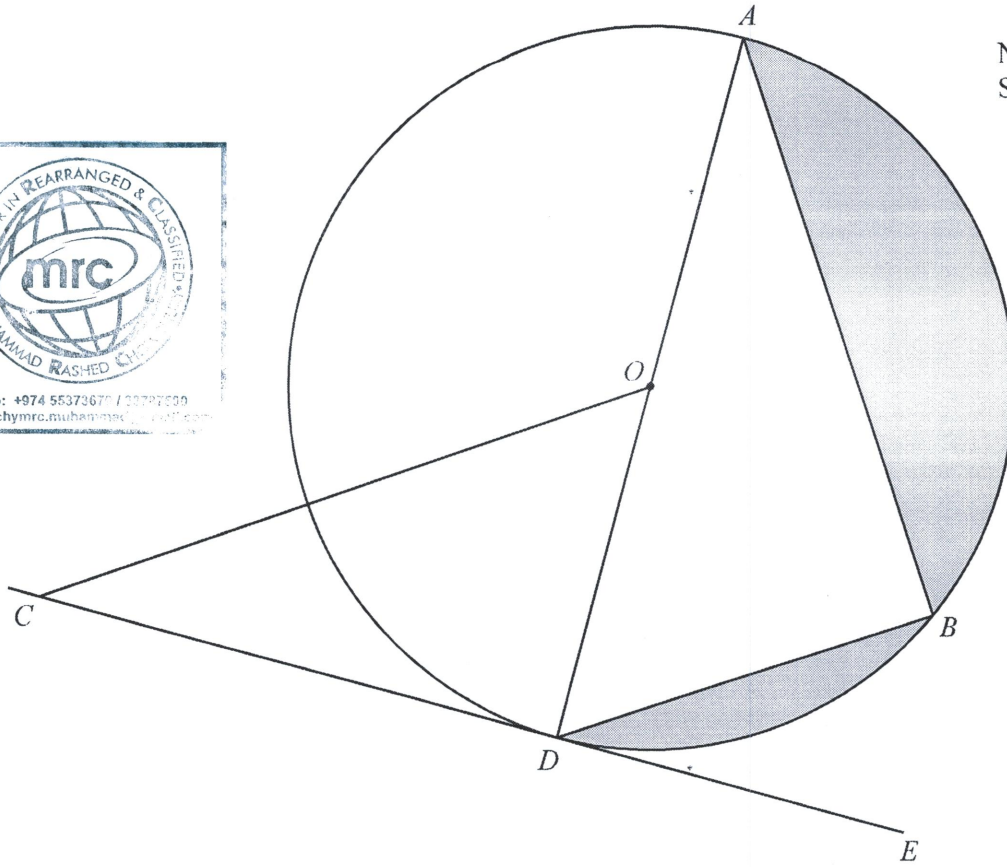
The diagram shows a circle, centre O and diameter AD.
B is on the circumference of the circle and the line CDE touches the circle at D.
$AD = 21\,\text{cm}$ and $CD = 16\,\text{cm}$.

(a) Calculate

   (i) the circumference of the circle,

   Answer(a)(i) .... cm **[2]**

   (ii) the area of the circle.

   Answer(a)(ii) .... cm^2 **[2]**

(b) (i) Write down the size of angle *ABD*.

Answer(b)(i) Angle *ABD* = ... [1]

(ii) *BD* = 9 cm.

Show that *AB* = 19.0 cm, correct to 3 significant figures.

Answer(b)(ii)

[3]

(c) (i) Calculate the area of triangle *ABD*.

Answer(c)(i) .... cm² [2]

(ii) Work out the total area of the shaded segments of the circle.

Answer(c)(ii) .... cm² [2]

(d) (i) Write down the mathematical name of the line *CDE*.

Answer(d)(i) .... [1]

(ii) Write down the mathematical name of the line *OD*.

Answer(d)(ii) .... [1]

(iii) Use trigonometry to calculate the size of angle *OCD*.

Answer(d)(iii) Angle *OCD* = ... [2]
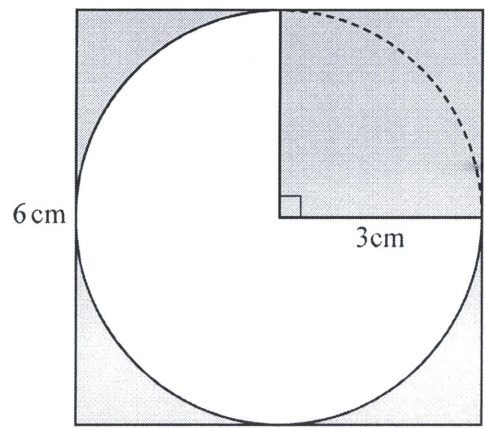
04 (a)
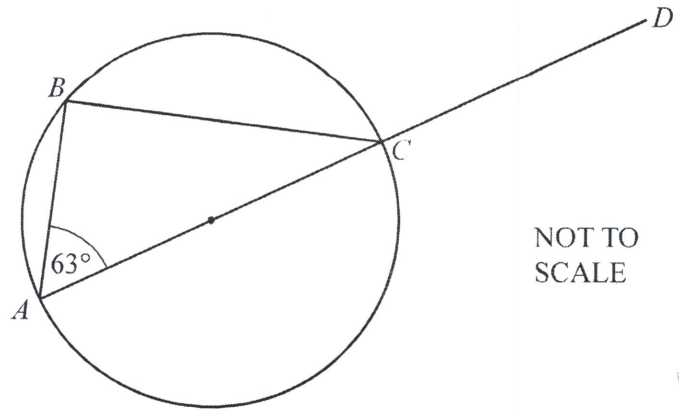
NOT TO SCALE

A, B and C lie on a circle with diameter AC.
AC is extended to D and angle BAC = 63°.

Work out angle BCD.
Give reasons to explain your answer.

Answer(a) Angle BCD = ... because ....

....

.... [4]
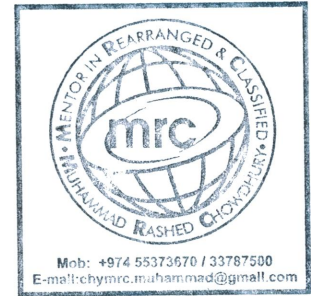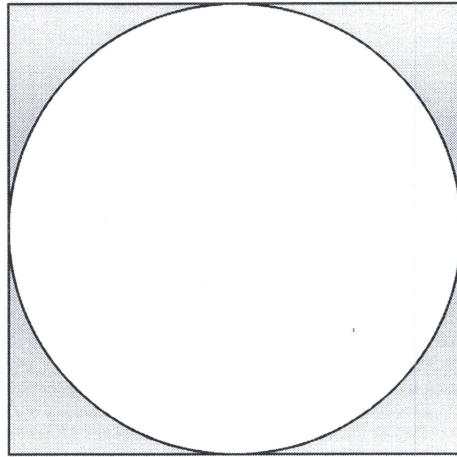
(b)

NOT TO SCALE

6 cm

3 cm

The diagram shows a circle with radius 3 cm inside a square of side 6 cm.

Calculate the shaded area.

Answer(b) .... cm² [5]

05

The diagram shows a circle inside a square.
The circumference of the circle touches all four sides of the square.

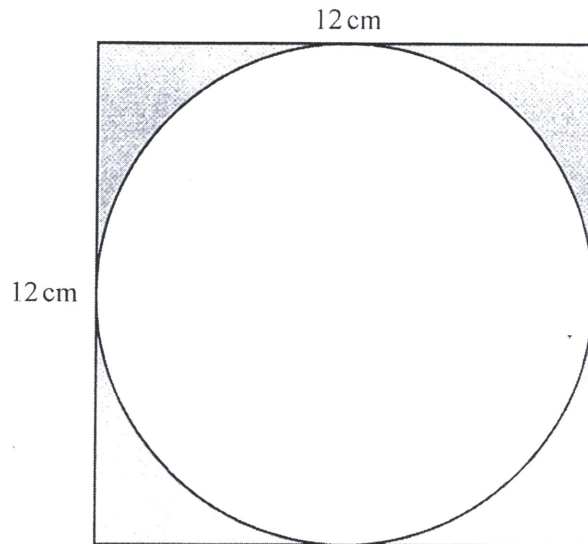**(a)** Calculate the area of the circle when the side of the square is 15 cm.

Answer(a) .... cm² [2]

(b) Draw all the lines of symmetry on the diagram. [2]

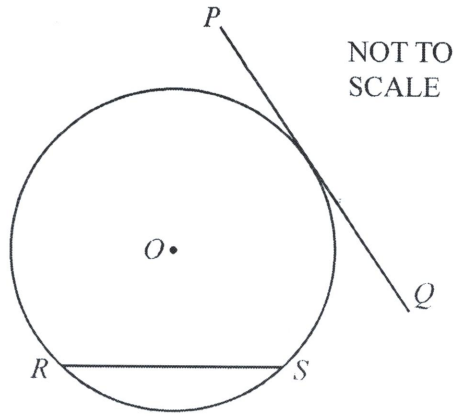**Question 22 is printed on the next page.**

06

12 cm

12 cm

NOT TO
SCALE

The diagram shows a circle inside a square of side 12 cm.
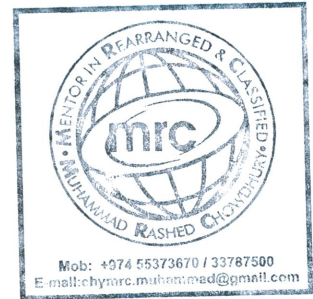The circle touches each side of the square.

Calculate the area of the shaded part of the diagram.

Answer .... cm² [3]

07 **(a)**

NOT TO
SCALE

The diagram shows a circle, centre O, and lines PQ and RS.

Write down the mathematical name for

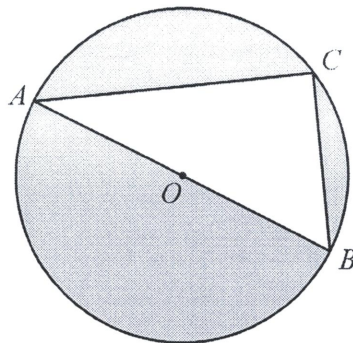**(i)** line PQ,

.... [1]

(ii) line RS.

.... [1]

(b)

NOT TO
SCALE

A, B and C are points on the circle, centre O.

(i) Complete the statement.

Angle $ACB = 90°$ because .... [1]

(ii) $AC = 8$ cm and $BC = 5$ cm.

Calculate the area of triangle ABC.

....cm^2 [2]

(iii) Show that the diameter of the circle is 9.43 cm, correct to 2 decimal places.

[2]

(iv) Calculate the area of the circle.
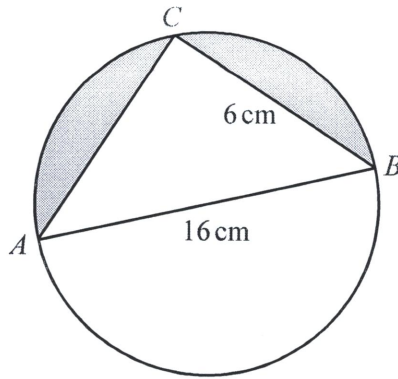
....cm^2 [2]

(v) Calculate the percentage of the circle that is shaded.

.... % [2]
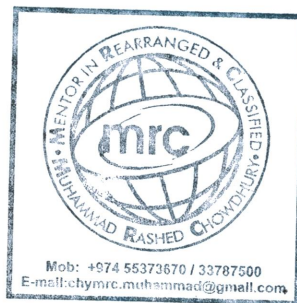
Question 9 is printed on the next page.

NOT TO SCALE

In the diagram AB is the diameter of the circle and C is a point on the circumference.
$AB = 16\,$cm and $BC = 6\,$cm.

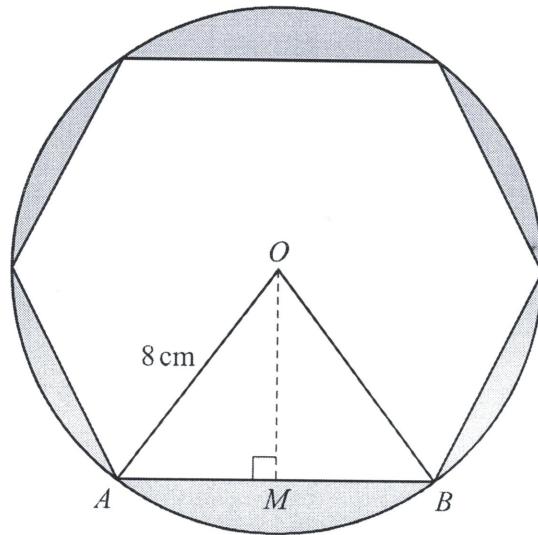**(i)** Give a reason why angle $ACB = 90°$.

Answer(c)(i) ....

.... [1]

(ii) Calculate AC.

Answer(c)(ii) $AC =$ .... cm [3]

(iii) Calculate the shaded area.

Answer(c)(iii) ....cm^2 [5]

9   The diagram shows a regular hexagon inside a circle, centre O and radius 8 cm.
    Each vertex of the hexagon is on the circumference of the circle.
    A and B are two vertices of the hexagon and M is the midpoint of AB.

NOT TO
SCALE

(a) Calculate

(i) angle AOB,

Answer(a)(i) Angle $AOB =$ .... [1]

(ii) angle AOM.

Answer(a)(ii) Angle $AOM =$ .... [1]

(b) Write down the length AB.

Answer(b) $AB =$ .... cm [1]

(c) Show that the length of $OM = 6.93$ cm, correct to 3 significant figures.

Answer(c)

[2]

(d) Calculate the area of triangle *AOB*.

Answer(d) .... cm^2 [2]

(e) Calculate the shaded area.

Answer(e) .... cm^2 [4]

Question 10 is printed on the next page.