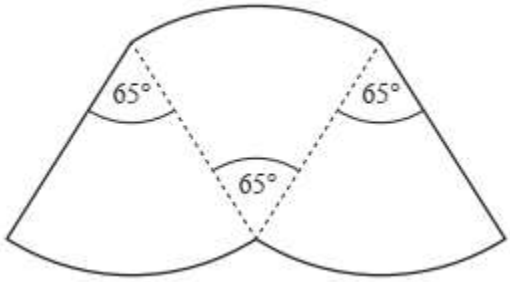
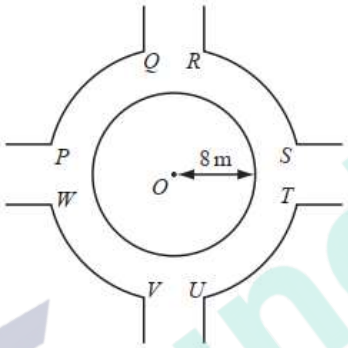
1. The diagram shows a shape made up of three identical

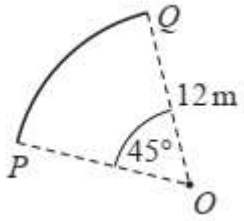


sectors of a circle, each with sector angle 65°. The perimeter of the shape is 20.5cm.
Calculate the radius of the circle. [4]
0580/42/F/M/17 Q8(b)

2. The diagram shows the junction of four paths.



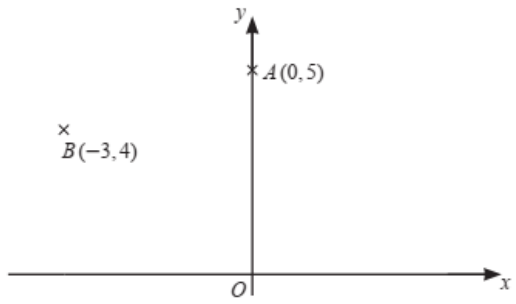
In the junction there is a circular area covered in grass.
This circle has centre O and radius 8m.
(a) Calculate the area of grass. [2]
(b) The arc PQ and the other three identical arcs, RS, TU and VW are each part of a circle, centre O, radius 12m.
The angle POQ is 45°.



The arcs PQ, RS, TU, VW and the circumference of the circle in **part(a)** are painted white. Calculate the total length painted white. [4]
0580/22/M/J/10 Q17)

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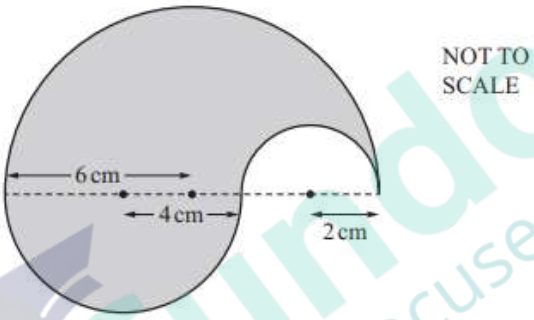
3. A and B lie on a circle, centre O.



Calculate the length of the arc AB.[6]

0580/42/O/N/19 Q8(b) (iii)

4. The diagram shows a shaded shape formed by three semi-circular arcs.



The radius of each semi-circle is shown in the diagram.

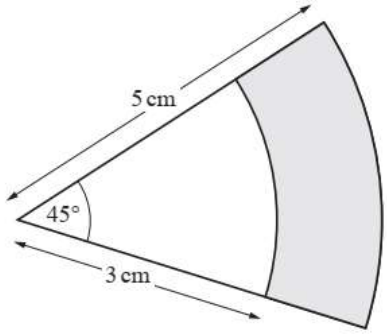
(i) Calculate the perimeter of the shaded shape. [2]

(ii) The shaded shape is made from metal 1.6mm thick.
Calculate the volume of metal used to make this shape.
Give your answer in cubic millimetres. [5]

0580/41/M/J/15 Q9(b)

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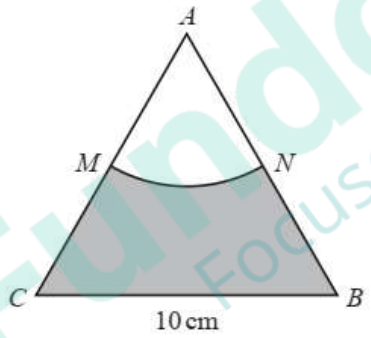
5. The diagram shows two sectors of circles with the same



centre. Calculate the shaded area. [3]

0580/21/O/N/19 Q17)

6. The diagram shows an equilateral triangle ABC with



sides of length 10cm.

AMN is a sector of a circle, centre A.

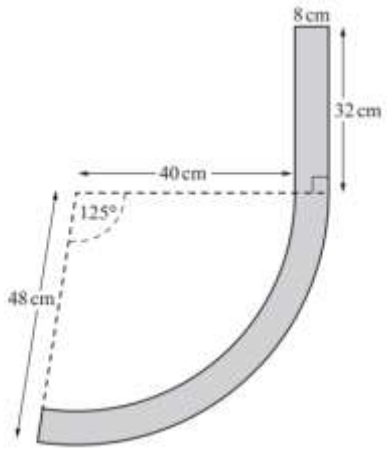
M is the mid-point of AC.

Work out the area of the shaded region. [4]

0580/22/O/N/18 Q21)

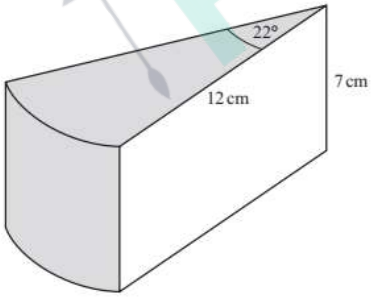
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7. The diagram shows the cross section of part of a park bench.



It is made from a rectangle of length 32 cm and width 8 cm and a curved section.
The curved section is made from two concentric arcs with sector angle 125°.
The inner arc has radius 40 cm and the outer arc has radius 48 cm.
Calculate the area of the cross section correct to the nearest square centimeter [5]
0580/22/O/N/16 Q17)

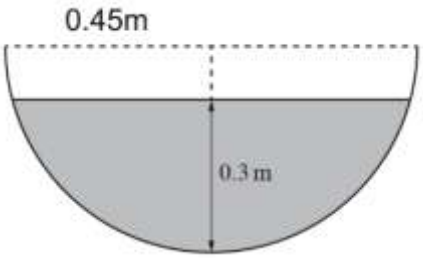
8. A circular cake has radius 12 cm and height 7 cm.



The uniform cross-section of a slice of the cake is a sector with angle 22°.
The top and the curved surface of the slice, shaded in the diagram, are covered with chocolate.
Calculate the area of the slice which is covered with chocolate.
0580/42/M/J/12 Q11) (b)

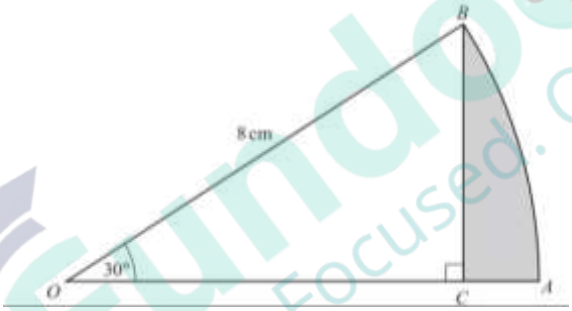
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9. Find area of the shaded region of the semicircle of



radius 0.45m.
Give your answer correct to 4 significant figures.
0580/41/M/J/22 Q5(b)(ii)

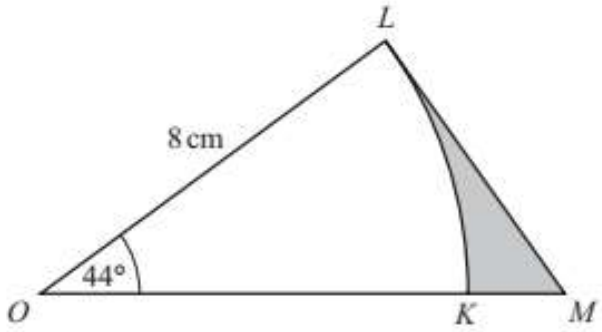
10. OAB is the sector of a circle, centre O, with radius 8cm



and sector angle 30°. BC is perpendicular to OA.
Calculate the area of the region shaded on the diagram.
[5]
0580/23/O/N/15 Q25)

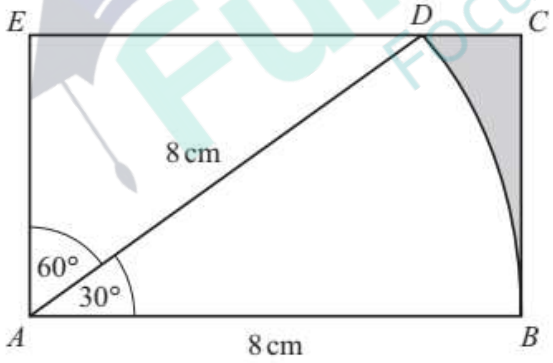
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11. In the diagram OKL is a sector of a circle, centre O and



radius 8 cm.
OKM is a straight line and ML is a tangent to the circle at L (means angle OLM is 90°).
Angle LOK = 44°. Calculate the area shaded in the diagram. [5]
0580/43/O/N/12 Q8(c)

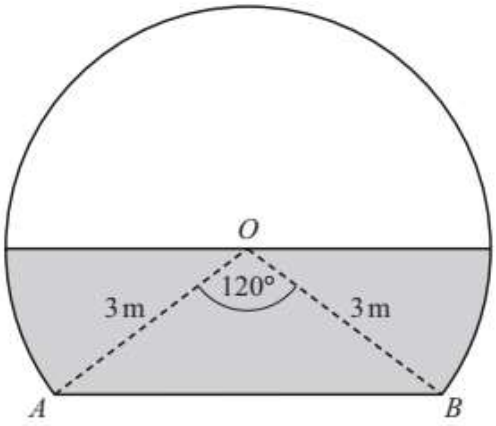
12. The diagram shows a rectangle ABCE. D lies on EC.



DAB is a sector of a circle radius 8cm and sector angle 30°. Calculate the area of the shaded region. [7]
0580/21/M/J/14 Q19)

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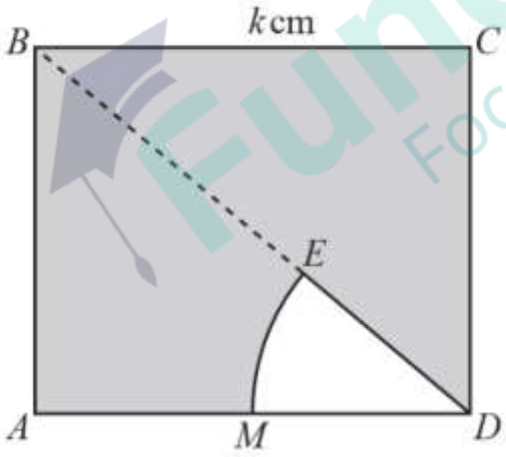
13. The diagram shows the entrance to a tunnel.



NOT TO SCALE

The circular arc has a radius of 3m and centre O.
AB is horizontal and angle AOB = 120°.
During a storm the tunnel filled with water, to the level shown by the shaded area in the diagram.
(a) Calculate the shaded area. [4]
(b) The tunnel is 50m long.
Calculate the volume of water in the tunnel. [1]
0580/23/O/N/13 Q16)

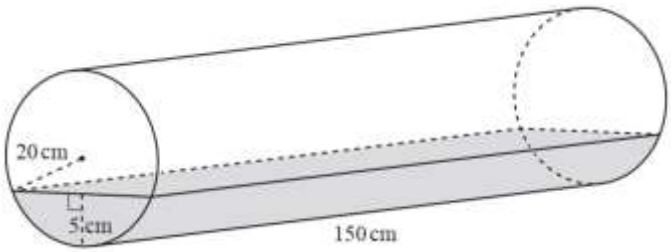
14. The diagram shows a square ABCD with side length kcm.



MDE is a sector of a circle, centre D.
E lies on the diagonal, BD, of the square.
M is the midpoint of AD.
Find the percentage of the square that is shaded. [4]
0580/23/M/J/22 Q20)

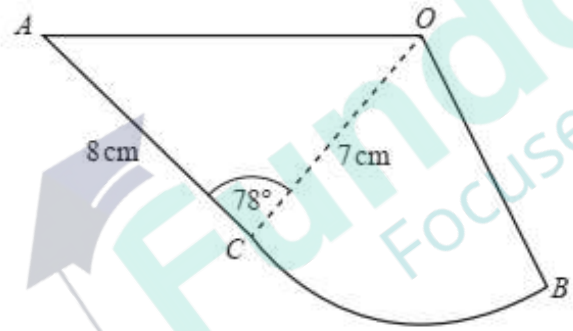
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15. The diagram shows a cylinder of length 150cm on horizontal ground.
The cylinder has radius 20cm.
The cylinder contains water to a depth of 5cm, as shown



in the diagram.
Calculate the volume of water in the cylinder.
Give your answer in litres. [7]
0580/43/M/J/21 8(c)

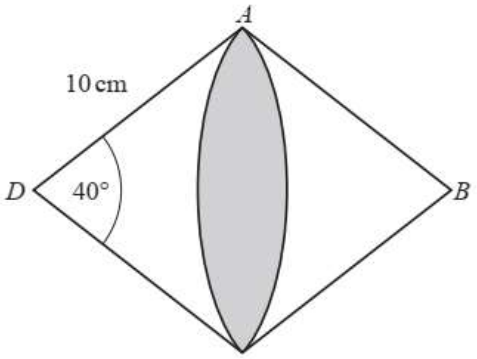
16. The diagram shows a design made from a triangle AOC



joined to a sector OCB.
AC = 8cm, OB = OC = 7cm and angle ACO = 78°.
(a) Use the cosine rule to show that OA = 9.47cm, correct to
2 decimal places. [4]
(b) Calculate angle OAC [3]
(c) The perimeter of the design is 29.5cm.Show that angle COB = 41.2°,
correct to 1 decimal place.[5]
(d) Calculate the total area of the design. [4]
0580/42/M/J/18 Q5)

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17. ABCD is a rhombus with side length 10cm. Angle ADC = 40°. DAC is a sector of a circle with centre D.

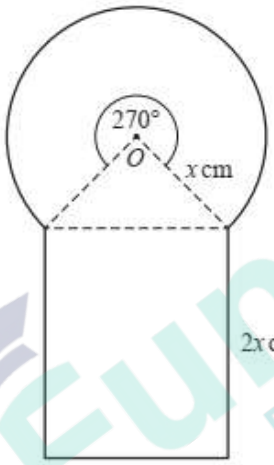


BAC is a sector of a circle with centre B.

Calculate the shaded area. [4]

0580/21/M/J/17 Q19)

18. The diagram shows a sector of a circle, a triangle and a



rectangle.

The sector has centre O, radius x cm and angle 270°.

The rectangle has length $2x$ cm.

The total area of the shape is kx^2 cm^2 .

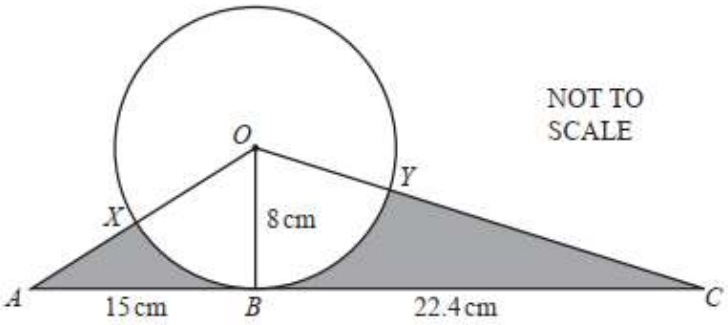
(a) Find the value of k. [5]

(b) Find the value of x when the total area is 110 cm^2 [2]

0580/42/O/N/17 Q10)

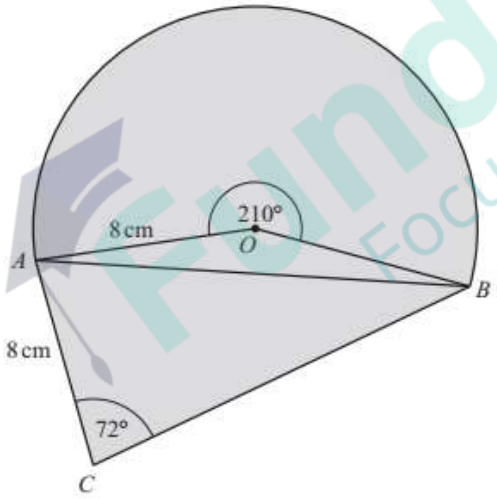
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19. The diagram shows a circle, centre O.



The straight line ABC is a tangent to the circle at B.
OB = 8cm, AB = 15cm and BC = 22.4cm.
AO crosses the circle at X and OC crosses the circle at Y.
(a) Calculate angle XOY. [5]
(b) Calculate the length of the arc XBY [2]
(c) Calculate the total area of the two shaded regions [4]
0580/41/O/N/18 Q10)

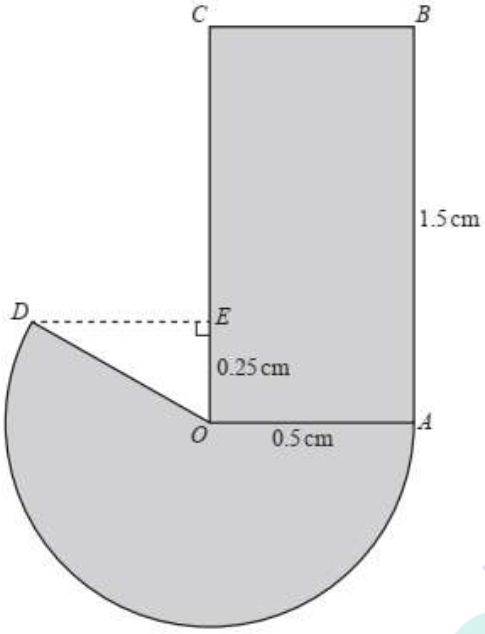
20. The diagram shows a design for a logo made from a



sector and two triangles. The sector, centre O, has
radius 8cm and sector angle 210°.
AC = 8cm and angle ACB = 72°.
(a) Show that angle OAB = 15°. [2]
(b) Calculate the length of the straight line AB [4]
(c) Calculate angle ABC [3]
(d) Calculate the total area of the logo design
(e) The logo design is an enlargement with scale factor 4 of the actual logo. Calculate the area of the actual logo. [2] **0580/42/M/J/16 Q7)**

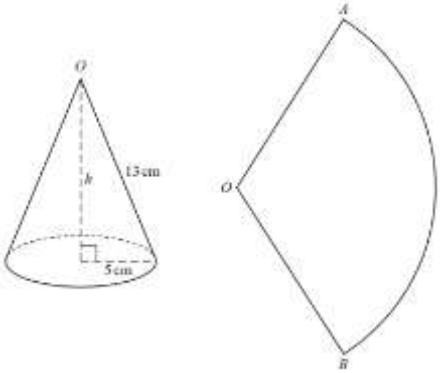
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21. The diagram shows a company logo made from a rectangle and a major sector of a circle.



The circle has centre O and radius OA.
OA = OD = 0.5 cm and AB = 1.5cm.
E is a point on OC such that OE = 0.25cm and angle OED = 90°
(a) Calculate the perimeter of the logo. [5]
(b) Calculate the area of the logo. [3]
0580/42/F/M/19 Q6

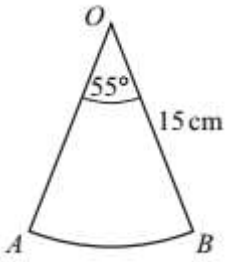
22. (a) (i) Find curved surface area of the cone with radius 5cm and slant height 13cm.[2]
(b) The cone is now cut along a slant height and it opens out to make the sector AOB of a circle. Calculate angle AOB. [4]

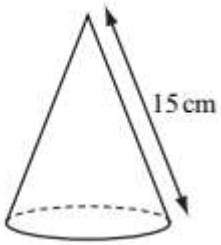


0580/41/O/N/13 Q3 (a)

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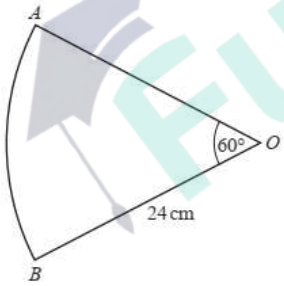
23. (a) A sector OAB has an angle of 55° and a radius of 15 cm. Calculate the area of the sector and show that it rounds to 108 cm^2, correct to 3 significant figures. [3]
(b)The sector radii OA and OB in part (a) are joined to form a cone.
Calculate the base radius of the cone. [2]
[The curved surface area, A, of a cone with radius r and slant height l is A = πrl.]

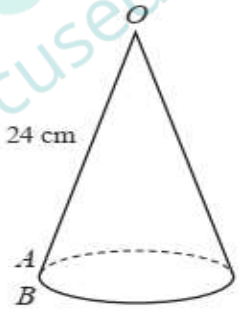




0580/42/M/J/11 Q7)

24. (a) The sector of a circle, centre O, radius 24cm, has angle AOB = 60°.
Calculate
(i) the length of the arc AB, [2]
(ii) the area of the sector OAB [2]





(b) The points A and B of the sector are joined together to make a hollow cone as shown in the diagram. The arc AB of the sector becomes the circumference of the base of the cone.
Calculate
(i) the radius of the base of the cone, [2]
(ii) the height of the cone, [2]
(iii) the volume of the cone.
0580/04/O/N/09 Q7(a)

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25. Brad travelled from his home in New York to Chamonix.

• He left his home at 1630 and travelled by taxi to the airport in New York.
This journey took 55 minutes and had an average speed of 18km/h.

• He then travelled by plane to Geneva, departing from New York at 2215.
The flight path can be taken as an arc of a circle of radius 6400km with a sector angle of 55.5°.
The local time in Geneva is 6 hours ahead of the local time in New York.
Brad arrived in Geneva at 1125 the next day.

• To complete his journey, Brad travelled by bus from Geneva to Chamonix.
This journey started at 1300 and took 1 hour 36 minutes.
The average speed was 65km/h.
The local time in Chamonix is the same as the local time in Geneva.

Find the overall average speed of Brad's journey from his home in New York to Chamonix.
Show all your working and give your answer in km/h.
[11]

0580/41/M/J/19 Q11)

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Answers

1) 3.79	10) 2.9	19) (a) 132.3 (b) 18.4 or 18.5 (c) 75.7 to 75.9
2) (a) 201 (b) 87.9 or 88.0	11) 6.33	20) (b)15.5 (c)29.5 (d)194 (e)12.1
3) 3.22	12) 1.39	21) (a) 5.83 (b)1.21
4) (i) 37.7 (ii) 12100	13) (a) 8.61 (b) 430	22) (i) 204 (b) 138.5
5) 6.28	14) 90.2	23) (b)108 (c)(i)2.29
6) 30.2	15) 13.6	24) (i)25.1 (ii) 301 or 302 (b) (i) 3.99 – 4.01 (ii) 23.7 (iii) 394 – 398
7) 1024	16) (b) 46.3 (d) 45.0	25) 392 to 393 (from $\frac{16.5km+6199.409km+104km}{55min+4h50min+7h10min+1h35min+1h36min}$ = (6316 to 6322.4)/16.1)
8) 59.9	17) 5.53	
9) 0.1856m^2	18) (a)5.68 (b)4.4	

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