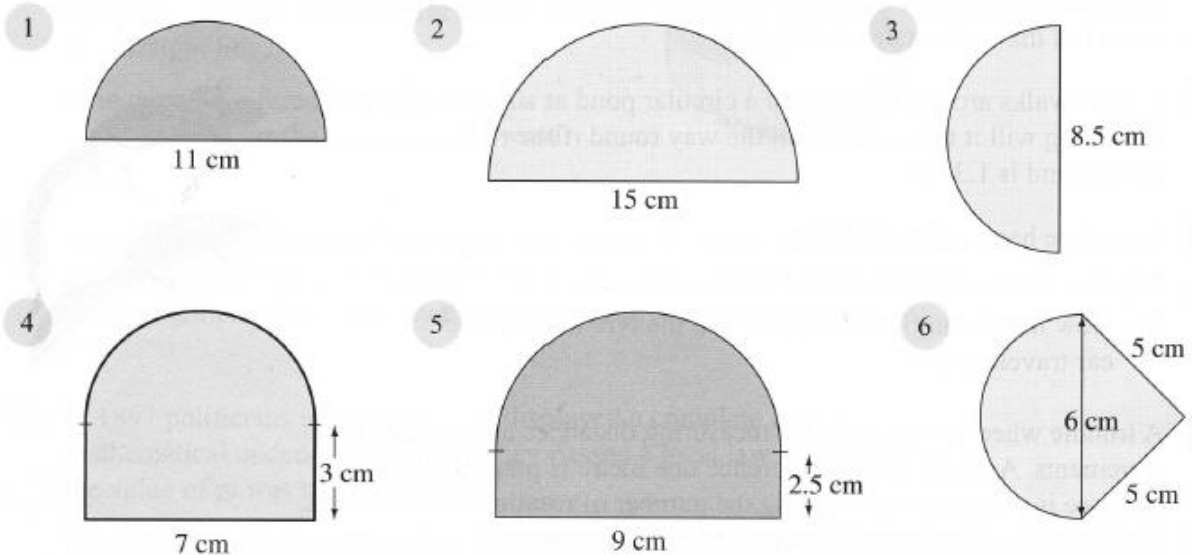# Circles

Exercise A
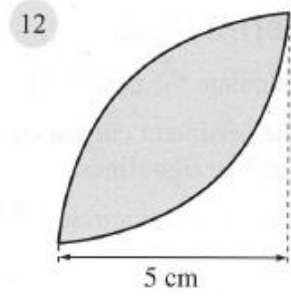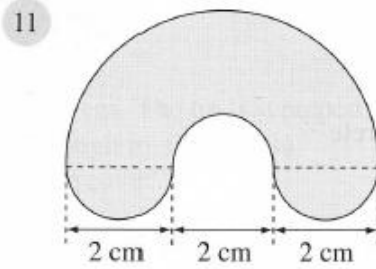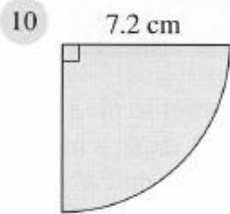
In questions 1 to 8 calculate the circumference of the circle. Use the 'π' button on a calculator or take π = 3.142. Give the answers correct to 1 decimal place unless told otherwise.
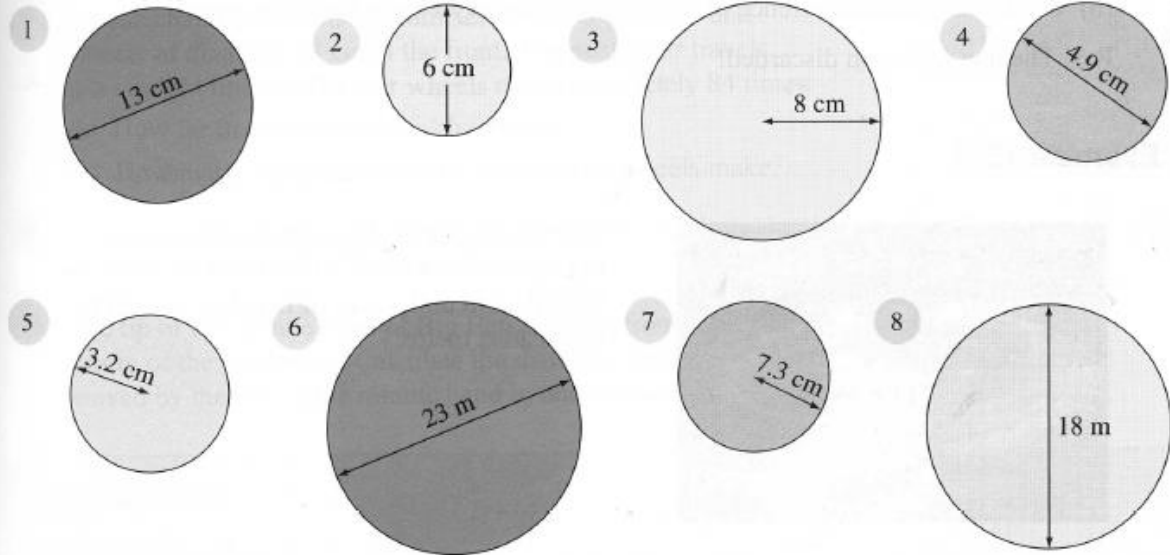
Exercise B

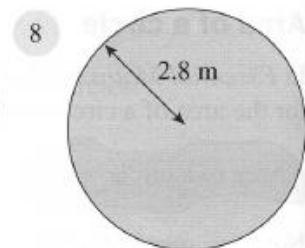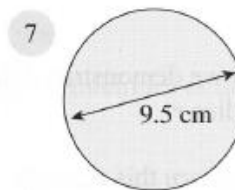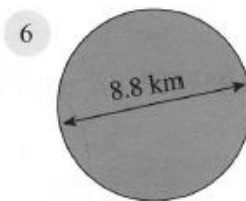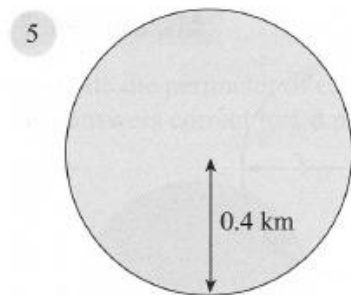Calculate the perimeter of each shape. All arcs are either semicircles or quarter circles. Give answers correct to 1 d.p.

10 7.2 cm

11 2 cm 2 cm 2 cm

12 5 cm

Exercise C

In questions **1** to **8** calculate the area of each circle correct to 1 d.p.

1 7 cm

2 10 cm

3 27 m

4 3.1 m

5 0.4 km

6 8.8 km

7 9.5 cm

8 2.8 m
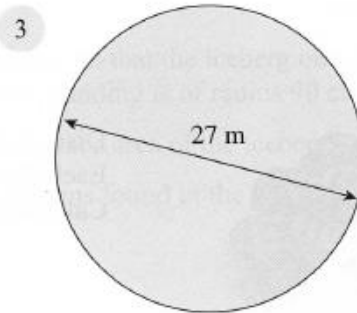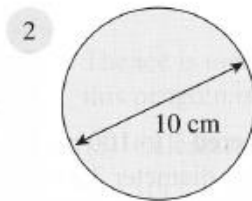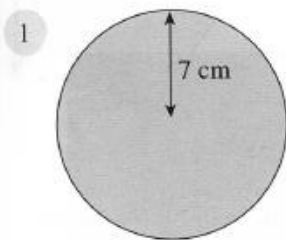
In questions **9** to **15** give your answers correct to 1 d.p., where necessary.

9 When hunting for food, an eagle flies over a circular region of radius 3.5km. What is the area of this region in km²?

10 A carton of 'Verdone' weedkiller contains enough weedkiller to treat an area of 100 m². A circular lawn at Hampton Court has a radius of 16.5 m. How many cartons of weedkiller are needed to treat this lawn?
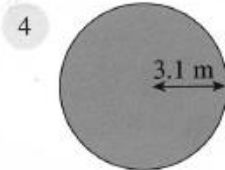
In questions **11** to **14** find the area of each shape. All arcs are either semicircles or quarter circles and the units are cm.

11

8 cm

12

7

10

13

5

14

7

12

Exercise D

1. In this stained glass window the circle has diameter 3 m and the outer square is of side 4.5 m. Calculate the area which is outside the circle.
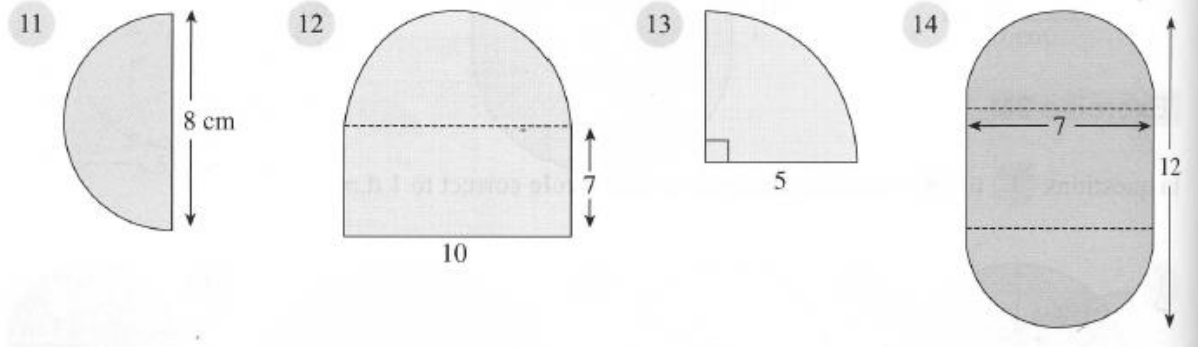
2. The diameters of 1p, 5p and 10p coins are 2 cm, 1.8 cm and 2.4 cm respectively. Calculate the total area of the top faces of the five coins used to make 18p.

In questions **3** to **8** find the shaded area. Lengths are in cm.

3

8

4

4

7

5

20

6

14

7

12

8

2
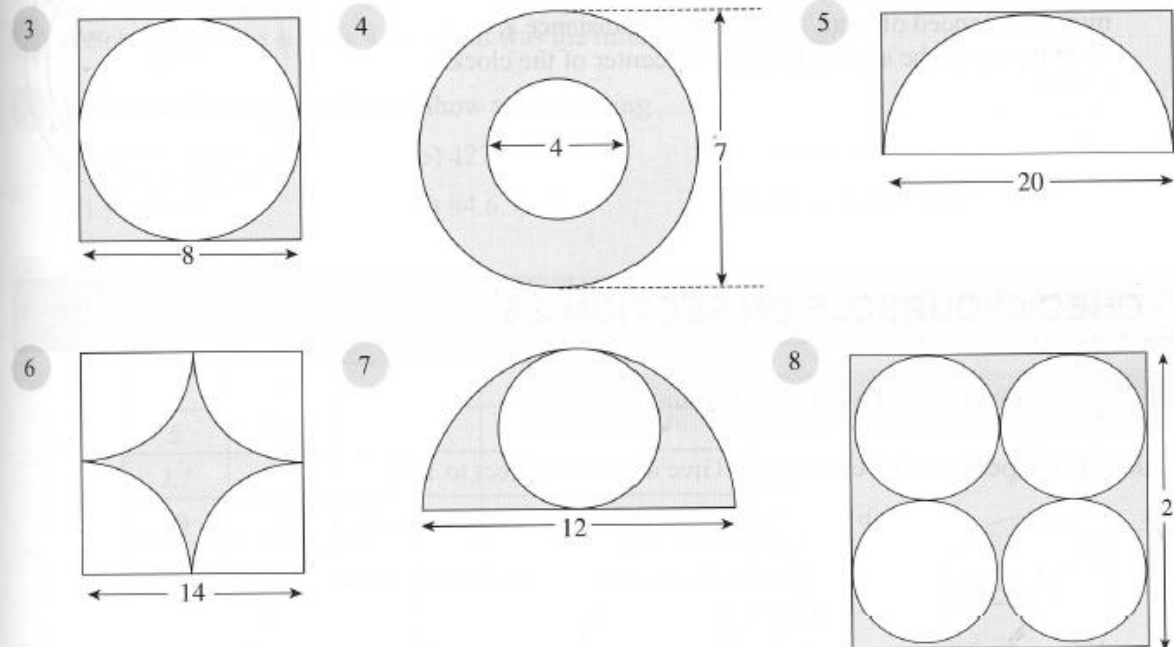
Exercise E

1. A circle has an area of $15 \, cm^2$. Find its radius.

2. An odometer is a wheel used by surveyors to measure distances along roads. The circumference of the wheel is one metre. Find the diameter of the wheel.

3. Find the radius of a circle of area $22 \, km^2$.

4. Find the radius of a circle of circumference $58 \cdot 6 \, cm$.

5. The handle of a paint tin is a semicircle of wire which is 28 cm long. Calculate the diameter of the tin.

6. A circle has an area of $16 \, mm^2$. Find its circumference.

7. A circle has a circumference of 2500 km. Find its area.

8. A circle of radius 5 cm is inscribed inside a square as shown. Find the area shaded.

5cm
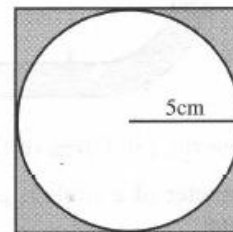
9. Discs of radius 4 cm are cut from a rectangular plastic sheet of length 84 cm and width 24 cm.
   How many complete discs can be cut out?
   Find:
   (a) the total area of the discs cut
   (b) the area of the sheet wasted.

4
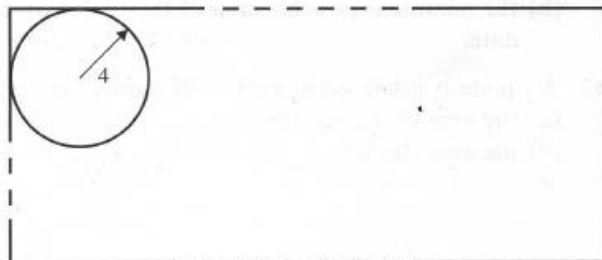
10. The tyre of a car wheel has an outer diameter of 30 cm. How many times will the wheel rotate on a journey of 5 km?

11. A golf ball of diameter $1 \cdot 68$ inches rolls a distance of 4 m in a straight line. How many times does the ball rotate completely?
    (1 inch $= 2 \cdot 54 \, cm$)

12. A circular pond of radius 6 m is surrounded by a path of width 1 m.
    (a) Find the area of the path.
    (b) The path is resurfaced with astroturf which is bought in packs each containing enough to cover an area of $7 \, m^2$.
   How many packs are required?
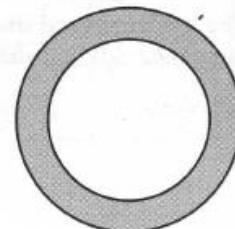
13. A rectangular metal plate has a length of 65 cm and a width of 35 cm. It is melted down and recast into circular discs of the same thickness. How many complete discs can be formed if:
    (a) the radius of each disc is 3 cm?
    (b) the radius of each disc is 10 cm?

14. Calculate the radius of a circle whose area is equal to the sum of the areas of three circles of radii 2 cm, 3 cm and 4 cm respectively.

15. The diagram below shows a lawn (unshaded) surrounded by a path of uniform width (shaded). The curved end of the lawn is a semicircle of diameter 10 m.
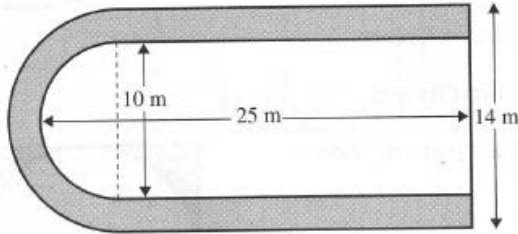

    Calculate the total area of the path.

16. The diameter of a circle is given as 10 cm, correct to the nearest cm. Calculate:
    (a) the maximum possible circumference
    (b) the minimum possible area of the circle consistent with this data.

17. A square is inscribed in a circle of radius 7 cm. Find:
    (a) the area of the square
    (b) the area shaded.
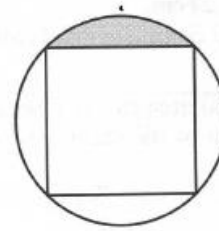
18. The governor of a prison has 100 m of wire fencing. What area can he enclose if he makes a circular compound?

19. In 'equable shapes' the numerical value of the area is equal to the numerical value of the perimeter.
    Find the dimensions of the following equable shapes:
    (a) square   (b) circle   (c) equilateral triangle.

†20. The semicircle and the isosceles triangle have the same base AB and the same area. Find the angle x.
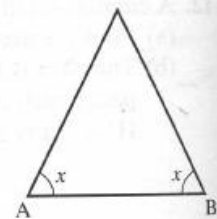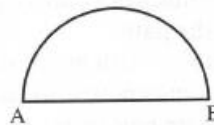
†21. Mr Gibson decided to measure the circumference of the earth using a very long tape measure. For reasons best known to himself he held the tape measure 1 m from the surface of the (perfectly spherical) earth all the way round. When he had finished Mrs Gibson told him that his measurement gave too large an answer. She suggested taking off 6 m. Was she correct? [Take the radius of the earth to be 6400 km (if you need it).]

22. The large circle has a radius of 10 cm. Find the radius of the largest circle which will fit in the middle.