Planner

Circles

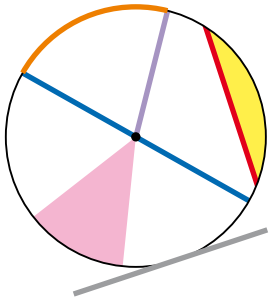
- Identifying different parts of a circle
- Finding the circumference of a circle
- Finding the area of a circle

Keywords

You should know

explanation 1a | explanation 1b | explanation 1c | explanation 1d

1 Each of the seven colours shows a different part of the circle.



a Describe what each colour shows. The yellow part has been done for you.

Yellow: A segment is the shape formed by cutting off part of a circle with a straight line.

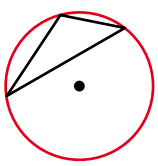
b What would the orange part become if it stretched all round the edge of the circle?

c What is half the blue line?

d Write down one fact about the grey line.

2 The diagrams show different circles. Describe each circle as 'circumscribed' or 'inscribed'.

a



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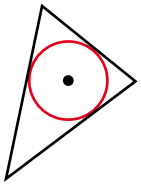

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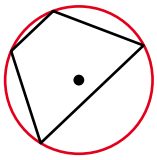

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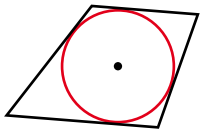
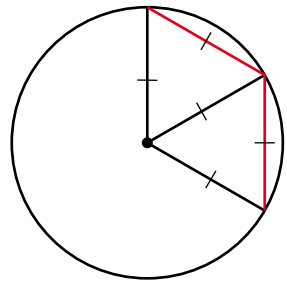


3 The diagram shows a circle with two chords, the same length as the radius, joined to the centre by radii.



a What type of triangles are created?

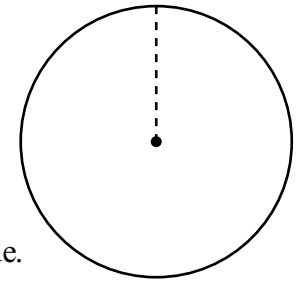
b What are the angles in each of the triangles?

c How many of these triangles will fit inside the circle?

d What polygon is formed?

4 Explain how to draw a hexagon where all the sides are 4 cm. Draw this polygon.

5 Jade wants to draw some regular polygons. She starts by drawing a circle of radius 5 cm and marking a radius with a dashed line.



a Describe how Jade can draw these shapes.

i regular pentagon **ii** regular heptagon

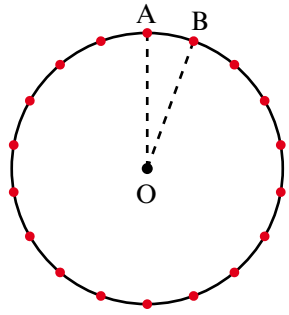
b Draw the pentagon and measure the length of each side.

c Draw the heptagon and measure the length of each side.

d Ask your teacher for the actual lengths. How accurate are your drawings?

explanation 2a | explanation 2b | explanation 2c | online

6 Jack wants to check that the formula $C = \pi d$ works out the circumference of a circle. He draws a circle with radius 6 cm and divides it into 18 equal parts. Jack measures the straight-line distance AB with a ruler. It is 2.1 cm.



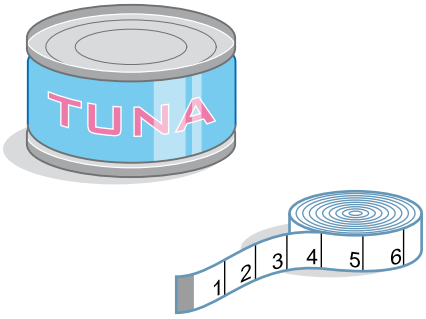
a Using Jack's measurement of AB, explain how to approximate the circumference of the circle.

b Work out an approximate value for the circumference.

c How could you improve the estimation of the circumference?

d Work out the circumference using $C = \pi d$, when $d = 12$ cm. Compare this with your approximate value.

7 A tin of tuna has a diameter of 8.5 cm.
Riaz measures the circumference using a tape measure. The measured length is 27 cm.



a Use a formula to calculate the circumference to 1 decimal place.

b Which gives the most accurate answer, measuring or calculating?

8 The table shows the measurements of five circles. Complete the table.
Use the formula $C = \pi d$ to calculate each circumference C to 1 decimal place.

Diameter (cm)	6	9			
Radius (cm)			5	20	26
***C* (cm)**	□8 • □	□□ • 3	3□ • □	1□□ • □	□6□ • □

9 Find the circumference of each coin correct to 1 decimal place.

diameter
20.3 mm

radius
9 mm

radius
12.5 mm

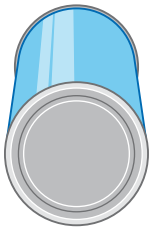
diameter
22.5 mm

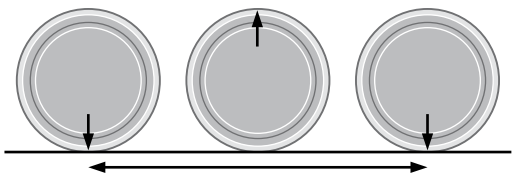
radius
14.2 mm

diameter
2.33 cm

10 Bella says that she uses $C = \pi d$ to find the circumference of a circle.
Bhavin says he uses $C = 2\pi r$.
Explain why these two formulae give the same answer for the circumference.

11 **a** Sahib rolls a baked bean tin on its side for one complete revolution.





The radius of the tin is 3.7 cm. How far has it moved along the table?

b Gina has a tin of golden syrup, with a diameter of 8.1 cm. How much further does Gina's tin roll along the table after one revolution than Sahib's?

12 Sherman has a counter device on his bike.
It counts the number of revolutions his wheel has made. His wheels are 40 cm in diameter.

a Sherman rides to his grandmother's house.
The counter reads 1989.
How far away does his grandmother live?

b How many revolutions does his wheel have to make to travel 1 km?

13 Keefe's dad has a measuring wheel with a 5-digit counter. The radius of the wheel is 12 cm.

a Find the circumference of the measuring wheel in metres.

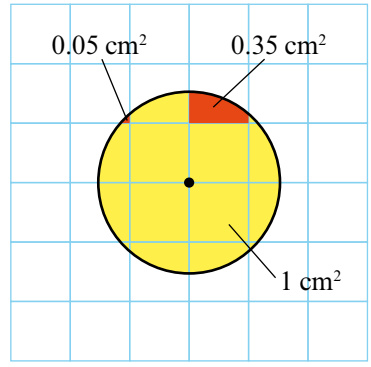
b Keefe and his dad use this to measure the length of the school football pitch.
The counter shows a reading of 106 revolutions.
How long is the pitch?

c One of the shortest pitches in the Football Premier League has a length of 100.6 m.

To make the school pitch the same length, what number would the counter have to read?

explanation 3a explanation 3b

14 Chika is counting squares to estimate the area of the circle. Each square is 1 cm^2.



Not to scale

a Estimate the area of the circle by counting full and part squares.

b What is the radius of this circle?

c Use the formula $A = \pi r^2$ to find the area of the circle.

d Which is the more accurate way of finding how many square centimetres fit inside a circle?

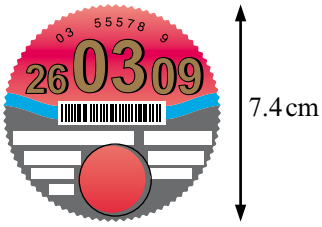
e Give two reasons why π is an important number.

15 Here are two letters and three expressions that people often get mixed up.

r, d, πd, $2\pi r$, πr^2

Describe the meaning of each expression.

16 What is the area of a car tax disc?



17 Find the area of circles with each of the following measurements.
Give your answers correct to 2 decimal places.

a radius = 8 cm

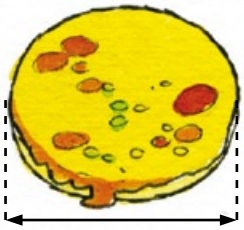
b diameter = 11 cm

c radius = 6.8 cm

d diameter = 3.6 cm

18 Find the area of the top of the cheesecake, cookie, pizza and birthday cake.
Give your answers correct to 2 decimal places.

a



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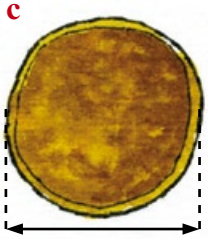
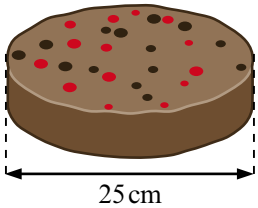


d

19 How much ribbon would be needed to fit round the edge of the birthday cake in question **18**?

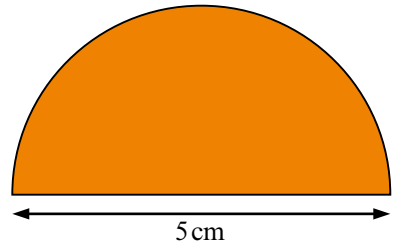
20 The diagram shows a fruit cake.



a How many square centimetres of marzipan are needed for the top of the fruit cake?

b A ribbon is fastened round the edge of the cake. How many centimetres of ribbon are needed if there is to be a 1 cm overlap of ribbon?

21 The diagram shows a semicircle.



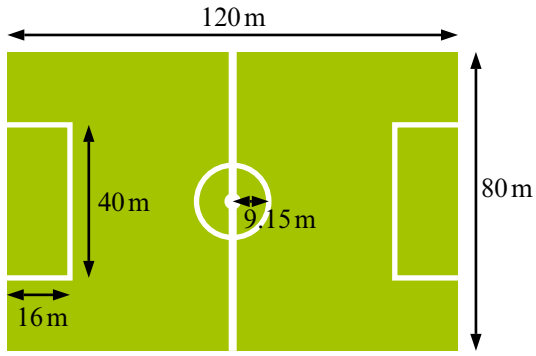
a Explain to your partner how to find the area of the semicircle correct to 2 decimal places.

b Ask your partner to explain how to find the perimeter of the semicircle correct to 2 decimal places.

22 The centre circle of a football pitch has a radius of 9.15 m.

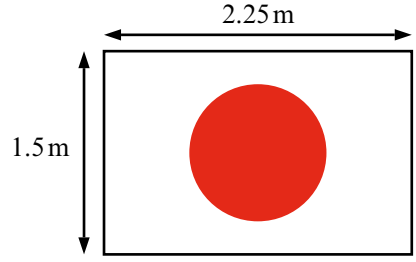
a Find the area of the centre circle to nearest square metre.

b Find the circumference of the centre circle to 1 decimal place.



23 The Japanese flag has a white background with a red circle to represent the sun.

The radius of the red circle is $\frac{3}{10}$ of the height of the flag.

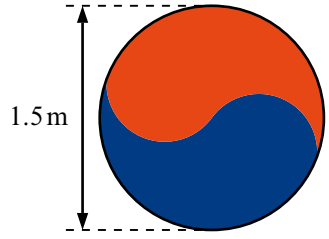


a Find the radius of the red circle.

b Find the area of the red circle.

c What is the area of the white part of the flag?

24 The diagram shows a pattern on a circle.



a Find the area of the whole circle.

b Find the area of the red region of the circle.