

The circumference of a circle

Year 7 About 70 minutes Calculator allowed 47 marks



Hints online, answers free with an account:
mathswariz.uk/worksheets/ks3-year-7-the-circumference-of-a-circle/

Date _____

A Do Now

Quick questions to start.

A1 Needed today [1 mark] **A2** Needed today [1 mark]

Work out $21.7 \div 7$.

Answer

A circle has a radius of 4.5 cm.
Write down its diameter.

Answer

A3 Last lesson [1 mark] **A4** From chapter 11 [1 mark]

y is inversely proportional to x .
When $x = 4$, $y = 9$. Find y when
 $x = 6$.

Answer

A map has a scale of 1 : 50 000.
How many kilometres does 4 cm
on the map stand for?

Answer

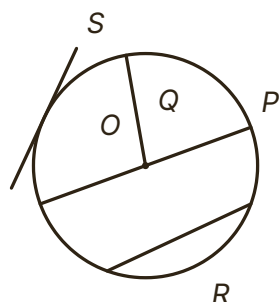
B Example, then your turn

Year 7

Your teacher works through each example with you. Then try the one beside it.

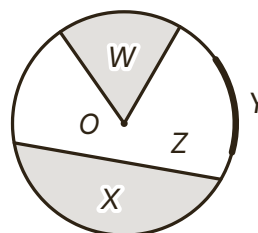
EXAMPLE 1

O is the centre of the circle. Write down the name of each line P , Q , R and S .



Hint Does the line go through O ? Does it end on the circle? Does it only touch the circle?

B1 O is the centre. Write down the name of each part W , X , Y and Z . W and X are the shaded regions, Y is the thick curve and Z is the line. [4 marks]



EXAMPLE 2

Sam measured three circles, in cm. Work out $C \div d$ for each one, to 1 decimal place. What do you notice?

d	C
4	12.5
7	21.9
10	31.3

Hint Divide each circumference by its diameter, then round.

- B2** The lengths are in cm. Work out $C \div d$ for each circle, to 1 decimal place. Then copy and complete: "The circumference is about ... times the diameter." [3 marks]

d	C
6	18.7
9	28.1
13	40.6

Answer ... , ... , ... ; about ... times

EXAMPLE 3

Use $C \approx 3.1 \times d$ to estimate the circumference of a circle with a radius of 6 cm.

Hint The rule uses the diameter. Double the radius first.

- B3** Use $C \approx 3.1 \times d$ to estimate the circumference of a circle with a radius of 8.5 cm. [2 marks]

Answer ... cm

EXAMPLE 4

A circular pond has a circumference of 62 m. Use $C \approx 3.1 \times d$ to estimate its diameter and its radius.

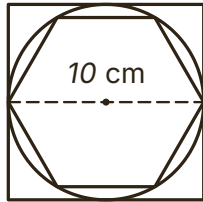
Hint Work backwards: divide the circumference by 3.1.

- B4** A hoop has a circumference of 155 cm. Use $C \approx 3.1 \times d$ to estimate its diameter and its radius. [3 marks]

Answer diameter ... cm, radius ... cm

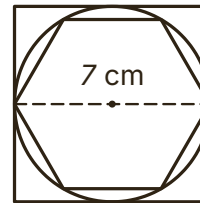
EXAMPLE 5

The circle has diameter 10 cm. The sides of the regular hexagon equal the radius. The sides of the square equal the diameter. Find each perimeter. What does this tell you about the circumference?



Hint The radius is half the diameter. The hexagon has 6 sides and the square has 4.

B5 The same shapes, but the diameter is 7 cm. Find each perimeter. The circumference is between which two lengths? [3 marks]

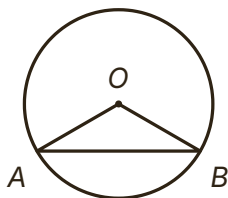


Answer between ... cm and ... cm

c Practice

Year 7

C1 O is the centre of the circle. A and B are on the circle. $OA = 5$ cm and the perimeter of triangle OAB is 16 cm. Work out the length of the chord AB . Give a reason. [2 marks]



Not drawn accurately

C2 Jo measured four circles, in cm. One circumference was measured wrongly. Which one? Give a reason. [2 marks]

d	C
3	9.3
5	15.6
8	21.0
12	37.5

C3 Write true or false for each one. [3 marks]
 A: A diameter is also a chord. B: A tangent touches a circle at two points. C: The radius is twice the diameter.

C4 A circle has a radius of 6.5 cm. What is the length of the longest chord you can draw in it? Give a reason. [2 marks]

Answer A ... B ... C ...

D1 The wheel of a bicycle has a diameter of 64 cm. Use circumference $\approx 3.1 \times$ diameter.

- (a) Estimate how far the bicycle moves when the wheel turns once. [2 marks]

Answer ... cm

- (b) The bicycle travels 50 m. Estimate the number of complete turns the wheel makes. You must show your working. [3 marks]

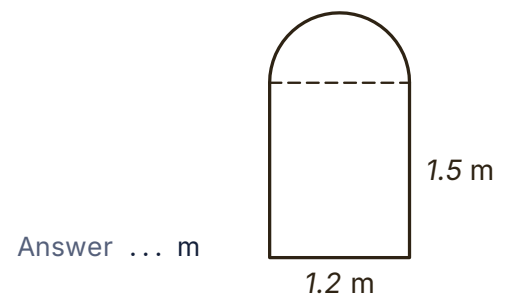
Answer

Total for D1: 5 marks

D2 Amira says, "The circumference of a circle is about 2 times its diameter, because the diameter goes across and back." [2 marks]

A circle has a diameter of 9 cm and a circumference of 28.3 cm. Use these to show that Amira is wrong.

D3 A window is a rectangle with a semicircle on top. The rectangle is 1.2 m wide and 1.5 m tall. Estimate the total length of the frame round the outside of the window. Use circumference $\approx 3.1 \times$ diameter. You must show your working. [4 marks]



Not drawn accurately

D4 A circular table has a circumference of 4.65 m. Use circumference $\approx 3.1 \times$ diameter.

- (a) Estimate the diameter of the table. [2 marks]

Answer ... m

- (b) A round cloth covers the table and hangs 0.25 m over the edge all the way round. Estimate the circumference of the cloth. [3 marks]

Answer ... m

Total for D4: 5 marks

E Extension

Stretch

No route is given. The hints are at the end of the sheet. Use one at a time.

- E1** A rope fits tightly round a tree trunk with a circular cross-section of diameter 0.8 m. Another rope fits tightly round a circular tower of diameter 20 m. Each rope is made longer so that it sits 1 m away from the surface all the way round. Use circumference $\approx 3.1 \times$ diameter. How much longer must each rope be? What do you notice? [3 marks]

Answer ... m and ... m

Extension hints

Cover these with paper. Uncover one at a time.

- E1** **Hint 1** Work out the new diameter for the tree. The rope is 1 m away on both sides.
- Hint 2** Tree: the diameter goes from 0.8 m to 2.8 m. Work out both circumferences.
- Hint 3** Tree: $3.1 \times 2.8 - 3.1 \times 0.8 = 8.68 - 2.48 = 6.2$ m.
Tower: $3.1 \times 22 - 3.1 \times 20 = 68.2 - 62 = 6.2$ m. Both are 6.2 m longer: the extra is always 3.1×2 .

How did it go?

Colour one circle on each line: not yet, nearly, yes.

I can name the parts of a circle:
radius, diameter, chord, tangent, arc, sector and segment.



I know that the circumference is always about 3.1 times the diameter.



I can estimate a circumference from a radius or diameter, and a diameter from a circumference.

