

4.2.5 Circle Measure

Name: _____ Class: _____ Date: _____

KEY WORDS circumference

<!-- Session 2 native-skill companion -->

Objective

Practise circle measure within the labelled native lessons. Public original tasks; locally authored answer guidance.

1 Key knowledge and worked examples

■ Circle lengths, areas and composite boundaries • Foundation

Circle circumference is $2\pi r = \pi d$ and area is πr^2 . A semicircle has half the circle area, but its complete perimeter includes the diameter as well as half the circumference. For composite shapes count every exposed boundary once, and separate straight edges from arcs.

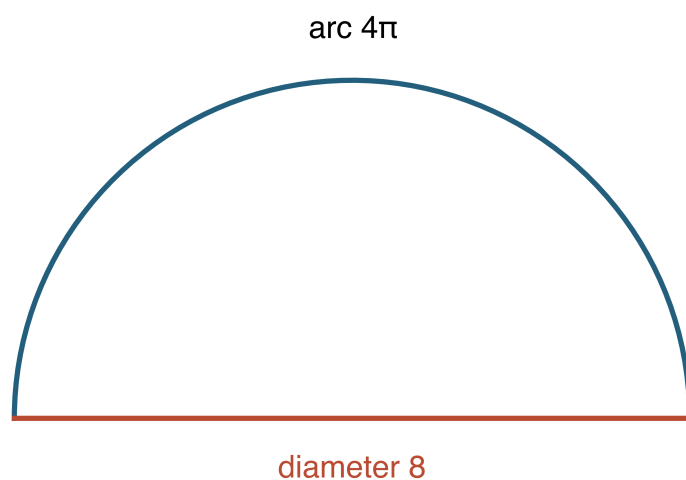
$$C = 2\pi r, \quad A = \pi r^2, \quad P_{\text{semi}} = \pi r + 2r$$

For radius 4 cm, circumference is 8π cm and area 16π cm². A semicircle of that radius has area 8π cm² and perimeter $4\pi + 8$ cm. A rectangular 8 by 3 cm window topped by this semicircle has area $24 + 8\pi$ cm². Its perimeter is the bottom 8, two vertical sides totalling 6 and the curved top 4π : $14 + 4\pi$ cm. The diameter across the join is internal and is not counted. An annulus with outer radius 5 and inner radius 3 has area $\pi(25 - 9) = 16\pi$ cm². Its two circular boundaries together have length $10\pi + 6\pi = 16\pi$ cm, despite this accidental equality of coefficients; length and area still have different units.

Radius must be halved from a given diameter before squaring. Half a circle's circumference is only its arc, not the complete semicircle perimeter. An internal join is not exposed boundary.

AQA G17 includes exact pi answers and composite circle perimeters/areas. Give both the exact expression and the required final rounded value, keeping the meaning and units clear.

Semicircle perimeter: curved arc + straight diameter



Original native-lesson illustration; labels belong to its worked example.

2 Practice

2.1 (Foundation) Find the coefficient of pi in area for radius 4.

2.2 (Foundation) Find the straight-edge contribution to the perimeter of an $r=4$ semi-circle.

2.3 (Foundation) Find the coefficient of pi in annulus area for outer radius 5, inner radius 3.

3 Exam-style questions

3.1 Decide whether this claim is true. Justify with a concrete calculation or counterexample: The complete perimeter of a semicircle is half a circle's circumference.

Solutions

2.1 $r^2=16$.

2.2 Its straight edge is diameter $2r=8$.

2.3 Subtract squared radii: $25-9=16$.

3.1 False. Radius 4 gives curved length 4π , but the straight diameter adds 8. The full perimeter is $4\pi+8$.

Local review guidance: show the chosen method; give the checked result; explain the condition or failed shortcut. This is authored classroom guidance.