Introduction to Circle Geometry

Mana Maths

Te reo Māori terms

porowhita
circle
Open in Te Aka

pūtoro
radius
Open in Te Aka

pātapa
tangent
Open in Te Aka

porowhita haurua
semi-circle
Open in Te Aka

Introduction to Circle Geometry — Foundation

1. Name the line from the centre of a circle to its edge.

2. Name the line right across a circle through the centre.

3. Name the curved part of the circumference between two points.

4. State the angle in a semicircle.

5. State the angle between a tangent and a radius at the point of contact.

6. If two angles stand on the same arc, how are they related?

7. If the angle at the centre is 110°, what is the angle at the circumference on the same arc?

8. If the angle at the circumference is 42°, what is the angle at the centre on the same arc?

9. An angle in a semicircle is labelled x. Find x.

10. An angle between a tangent and a radius is labelled x. Find x.

11. Two angles in the same segment are labelled 58° and x. Find x.

12. The angle at the centre is twice the angle at the circumference. If the circumference angle is 37°, find the centre angle.

13. Complete the fact: the angle at the centre is _____ the angle at the circumference on the same arc.

14. Complete the fact: angles in the same segment are _____.

Introduction to Circle Geometry — Proficient

1. Two angles stand on the same arc. One is 70° and the other is $x + 12^\circ$. Find x.

2. The angle at the centre is $4y^\circ$ and the angle at the circumference on the same arc is 38°. Find y.

3. A tangent meets a radius at an angle of $a + 18^\circ$. Find a.

4. An angle in a semicircle is $3b^\circ$. Find b.

5. Two angles in the same segment are 84° and $2x + 6^\circ$. Find x.

6. The angle at the centre is $5m^\circ$ and the angle at the circumference on the same arc is 55°. Find m.

7. A tangent meets a radius at an angle of $2p - 6^\circ$. Find p.

8. A circle has a chord as a diameter. Explain why any angle on the circumference standing on that diameter is a right angle.

9. Two angles stand on the same chord AB and are marked 46° and q. Find q and state the rule used.

10. The angle at the centre subtending arc AB is 124°. What is the angle at the circumference subtending the same arc?

11. The angle at the circumference subtending arc CD is 33°. What is the angle at the centre subtending the same arc?

12. A tangent touches a circle at T. The radius OT is drawn. A student says the angle between the tangent and OT could be 88°. Explain why this is impossible.

Introduction to Circle Geometry — Excellence

1. Two angles in the same segment are $3x + 9°$ and $2x + 21°$. Find x.

2. The angle at the centre is $6y + 8°$ and the angle at the circumference on the same arc is $2y + 14°$. Find y.

3. A tangent meets a radius at an angle of $4a - 22°$. Find a.

4. An angle in a semicircle is $5b - 10°$. Find b.

5. Angles in the same segment are equal. One is $x + 18°$ and the other is $2x - 27°$. Find x.

6. The angle at the centre is $(3m + 12)°$ and the angle at the circumference on the same arc is $(m + 18)°$. Find m.

7. A tangent meets radius OT at an angle of $(7k - 1)^\circ$. Find k.

8. A student says: "If the angle at the centre is twice the angle at the circumference, then the circumference angle must always be acute." Give one example that supports the claim and one example that disproves it.

9. An angle at the circumference is 41°. Another angle standing on the same chord is labelled $x + 5^\circ$. Find x.

10. An angle at the centre is 168°. Find the angle at the circumference on the same arc and explain why it is not 168°.

11. A triangle is drawn inside a circle with one side as the diameter. The other two angles are x° and $(x + 14)^\circ$. Find x.

12. A tangent touches a circle at P. The radius OP and another radius OQ form an angle of 128° at the centre. Find the angle between the tangent at P and the chord PQ.

13. Two equal angles stand on the same chord. One is written $3n^\circ$ and the other $2n + 19^\circ$. Find n.

14. The angle at the centre standing on arc AB is three times the angle at the circumference on the same arc, minus 20°. Find both angles.

15. Explain why a triangle formed by the endpoints of a diameter and any other point on the circle must be a right-angled triangle.

16. Write one circle-geometry question of your own using one of these rules: same segment, tangent-radius, centre/circumference, or semicircle. Then solve it.