

2.4.9 Circle Coordinates

Name: _____ Class: _____ Date: _____

KEY WORDS radius gradient

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

Objective

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

1 Key knowledge and worked examples

■ Origin-centred circles and tangent equations · Higher

For an origin-centred circle, $x^2 + y^2 = r^2$. A point is on the circle if its squared coordinates sum to r^2 . A tangent is perpendicular to the radius there. Use a negative reciprocal gradient when both gradients are finite; handle horizontal/vertical cases directly.

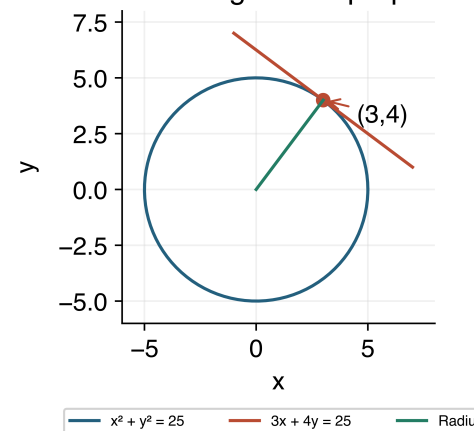
$$x^2 + y^2 = 25, \quad 3x + 4y = 25$$

At (3,4), $r^2 = 3^2 + 4^2 = 25$, so $x^2 + y^2 = 25$. The radius gradient is $4/3$, hence tangent gradient $-3/4$. Its equation $y - 4 = (-3/4)(x - 3)$ simplifies to $3x + 4y = 25$. At (5,0) the radius is horizontal and the tangent is the vertical line $x = 5$.

The radius and tangent share a point but different directions. Do not use the negative reciprocal of zero; a horizontal radius has a vertical tangent. Check the tangent passes through its contact point.

AQA A16 Higher concerns circles centred at the origin. Offset-centre circle formulae and circle calculus are not needed for this lesson.

Radius and tangent are perpendicular



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

2 Practice

2.1 (Higher) Find the radius of the circle through (3,4).

2.2 (Higher) Find the tangent gradient at (3,4).

2.3 (Higher) For tangent $3x + 4y = 25$, find x when $y = 0$.

3 Exam-style questions

3.1 Decide whether this claim is true. Justify with a concrete calculation or counterexample: The tangent at a circle point has the same gradient as the radius to that point.

Solutions

2.1 $\sqrt{3^2+4^2}=5$.

2.2 The negative reciprocal of $4/3$ is $-3/4$.

2.3 Set $y=0$, then divide 25 by 3.

3.1 False. On $x^2+y^2=25$ at $(3,4)$, the radius gradient is $4/3$ and the tangent gradient is $-3/4$. The radius and tangent are perpendicular.

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