Name	Date started	Target end date

WJEC Level 2 Additional Mathematics — Question Pack

Using the derivative as a gradient to find the equation of the tangent to a curve at a given point.

REVISE
.wales

Tangents to curves

Calculus · Level 2 Certificate (9550) · calculator allowed

Using the derivative as a gradient to find the equation of the tangent to a curve at a given point.

LEVEL 2 · 9550

Estimated time for entire question pack: ~1 hours 5 minutes

*At the Additional Maths pace of **~1.2 min/mark** (54 marks across 9 questions).*

*You are advised to **not** attempt to complete all of this in one sitting.*

ABOUT THIS QUESTION PACK

This is a **focused single-topic practice pack**, not a single mock paper. It gathers every question on this topic from the 2011–2024 papers.

Questions are ordered by year, newest first.

INSTRUCTIONS

Use black ink or black ball-point pen. Show all working — method marks are awarded for clear setup.

A calculator is allowed throughout this qualification.

Tangents to curves — what's examined

WJEC Level 2 Additional Mathematics (9550) · single written paper, calculator allowed.

Gradient at a point — Calculus

- Differentiate to get dy/dx.
- Substitute the x-value for the gradient.
- Find the y-value from the curve.

Equation of tangent — Coord. geom.

- Use $y - y_1 = m(x - x_1)$.
- m is the gradient just found.
- Simplify to the required form.

Method — Method

- Show the derivative.
- Show both the gradient and the point.
- Give the tangent's equation.

Crib sheet »

Tangents to curves in one page

Quick-reference notes — revisit before each question. Don’t use during the questions.

Three steps

1) differentiate; 2) put in the x-value for the gradient m; 3) get y on the curve.

Tangent line

$$y - y_1 = m(x - x_1)$$

Point on the curve

Find y_1 by substituting x_1 into the **curve**, not the derivative.

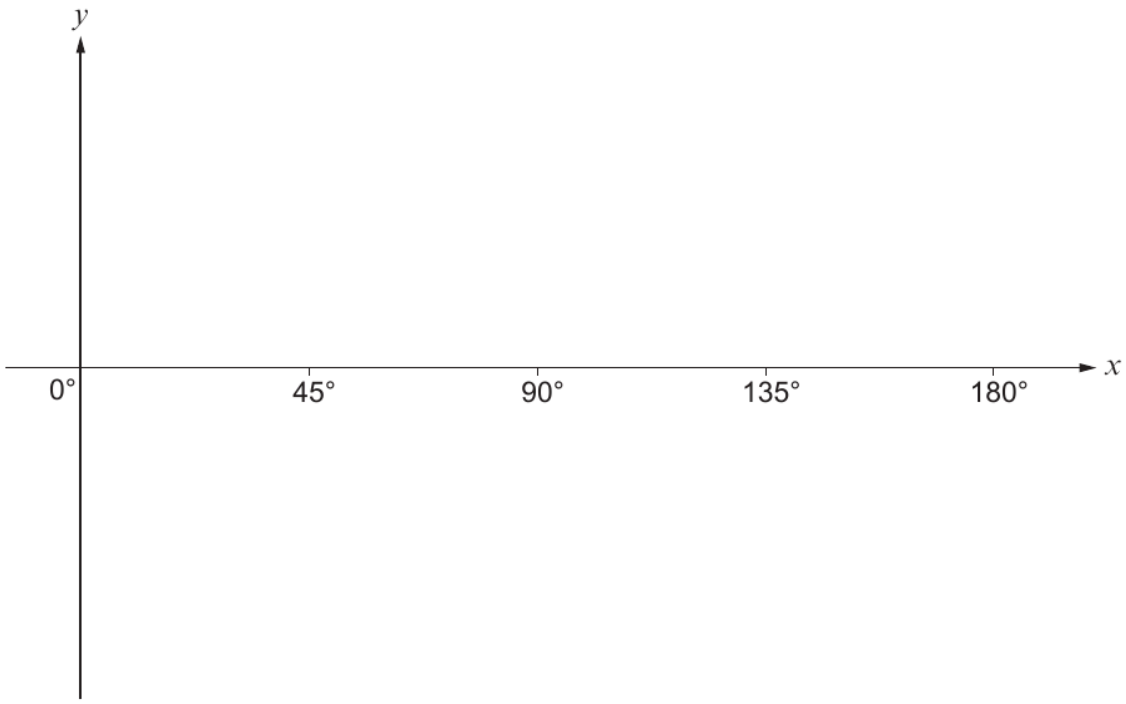
Normal (if asked)

The normal’s gradient is -1/m.

18. Find the equation of the tangent to the curve $y = 2x^2 - 10x + 5$ at the point where $x = 1$.

Give your answer in the form $y = mx + c$. [6]

19. (a) On the axes below, sketch the graph of $y = \tan 2x$ for values of x from 0° to 180°. [2]



(b) Find all the solutions of the equation $\tan 2x = 10$ for values of x from 0° to 180°. [2]

17. Find the equation of the tangent to the curve $y = 5x^2 - 3x + 2$ at the point where $x = 2$.
Write your answer in the form $ax + by + c = 0$.

You must show all your working. [6]

END OF PAPER

17. Find the equation of the tangent to the curve $y = 4x^2 - 6x + 1$ at the point where $x = 1$.

Write your answer in the form $ax + by + c = 0$. [6]

13. Find the equation of the tangent to the curve $y = 5x^2 + 7$ at the point where $x = 2$.
Express your answer in the form $y = mx + c$. [6]

14. Find, using an algebraic method, the coordinates of the points of intersection of the curve $y = x^2 - 5x + 13$ and the line $y = 2x + 1$.

You must show all your working. [4]

15. Do the points (7, 10) and (2, –5) lie on the curve $3y^2 - 5x^2 = 55$?
You must support your answer by showing all your working. [2]

17. Find the equation of the tangent to the curve $y = 6x^2 - 18x + 13$ at the point where $x = 2$. Simplify your answer and write it in the form $ax + by + c = 0$. [6]

18. $(3x + 5)$ ice creams cost £44 altogether.
$(3x - 1)$ ice lollies cost £7 altogether.

Write an expression for the total cost, in pounds, of 2 ice creams and 3 ice lollies.
You must simplify your expression to give your answer as a single fraction in terms of x. [6]

END OF PAPER

13. Find the equation of the tangent to the curve $y = 5x^2 - 20x$ at the point where $x = 4$.
Give your answer in the form $ax + by + c = 0$. [6]

14. $(2x + 5)$ hats cost £36 altogether.
$(3x - 1)$ umbrellas cost £55 altogether.
Write an expression for the total cost, in pounds, of 1 hat and 1 umbrella.
You must simplify your expression to give your answer as a single fraction in terms of x. [5]

13. Find the equation of the tangent to the curve $y = 3x^2 + 6$ at the point where $x = 3$. [6]

14. Find, using an algebraic method, the coordinates of the points of intersection of the curve $y = x^2 - 6x + 14$ and the straight line $x + y = 10$.
You must show all your working. [4]

13. Find the equation of the tangent to the curve $y = 2x^2 - 8x$ at the point where $x = 3$.
Give your answer in the form $ax + by + c = 0$. [6]

14. Find the coordinates and the nature of each of the stationary points on the curve $y = 2x^3 - 24x + 13$.
You must show all your working. [7]

13. Find the equation of the tangent to the curve $y = 3x^2 + 4x$ at the point where $x = 2$.
Give your answer in the form $ax + by + c = 0$.

[6]

14. *(a)* Showing all your working, find the value of $(50^{\frac{1}{2}})^4$.

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[1]

(b) Showing all your working, simplify each of the following.

(i) $\dfrac{3x^{-\frac{5}{4}} \times 4x^{\frac{7}{4}}}{x^{\frac{3}{2}}}$

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[2]

(ii) $\dfrac{12x^{\frac{1}{6}} + 4x^{\frac{2}{6}}}{4x^{\frac{1}{6}}}$

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[2]