

# Differentiation

Syllabus tracker [Open it online](#)

Name: \_\_\_\_\_

Date: \_\_\_\_\_

Tick one circle for each statement — on screen (click) or with a pen. Then try the quick checks: write your answer in the box, check it against the answers at the end, and tick “right” when you got it.

## Differentiating

The derivative of  $ax^n$  and simple sums.

|                                                          | Don't know            | Shaky                 | Got it                |
|----------------------------------------------------------|-----------------------|-----------------------|-----------------------|
| I can differentiate $ax^n$ .                             | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| I can differentiate a sum of terms, including constants. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

## Gradients and tangents

The gradient at a point, where the gradient is a value, and tangent equations.

|                                                  | Don't know            | Shaky                 | Got it                |
|--------------------------------------------------|-----------------------|-----------------------|-----------------------|
| I can find the gradient of a curve at a point.   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| I can find where the gradient has a given value. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| I can find the equation of a tangent.            | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

## Turning points

Finding stationary points and deciding maximum or minimum.

|                                                                 | Don't know            | Shaky                 | Got it                |
|-----------------------------------------------------------------|-----------------------|-----------------------|-----------------------|
| I can find the turning point of a curve.                        | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| I can decide whether a turning point is a maximum or a minimum. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| I can find both turning points of a cubic.                      | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

## Quick checks

One quick question per statement. Answer in the box, then check the answers at the end.

1. Differentiate  $y = 5x^3$ .

A  $15x^2$  B  $5x^2$  C  $15x^3$  D  $15x^4$

Answer: \_\_\_\_\_ ☐ I got it right

2. Differentiate  $y = x^4 - 3x^2 + 7x - 2$ .

A  $4x^3 - 6x + 7$  B  $4x^3 - 6x + 5$  C  $x^3 - 6x + 7$  D  $4x^3 - 3x + 7$

Answer: \_\_\_\_\_ ☐ I got it right

3. Find the gradient of  $y = x^2 + 3x$  at  $x = 2$ .

Answer: \_\_\_\_\_ ☐ I got it right

4.  $y = x^2 - 4x$ . At what value of  $x$  is the gradient 6?

Answer: \_\_\_\_\_ ☐ I got it right

5. Find the equation of the tangent to  $y = x^2$  at (3, 9).

**A**  $y = 6x - 9$    **B**  $y = 6x + 9$    **C**  $y = 3x$    **D**  $y = 9x - 18$

Answer: \_\_\_\_\_

☐ I got it right

6. Find the turning point of  $y = x^2 - 6x + 5$ .

Answer: \_\_\_\_\_

☐ I got it right

7.  $y = 12x - x^2$ . The turning point at  $x = 6$  is a...

**A** maximum   **B** minimum

Answer: \_\_\_\_\_

☐ I got it right

8. Find the x-coordinates of the turning points of  $y = x^3 - 12x$ .

Answer: \_\_\_\_\_

☐ I got it right

## Answers

Try every question first, then check.

1. A:  $15x^2$

2. A:  $4x^3 - 6x + 7$

3. 7

4. 5

5. A:  $y = 6x - 9$

6. 3, -4

7. A: maximum

8. -2, 2