

Exercise walk-through

3.4

Differentiation

Pearson Edexcel · International GCSE · Mathematics A

Exercises 2.1·2.3

2.1 (Higher) For $y=x^3-3x$, find dy/dx at $x=2$.

2.2 (Higher) Find the y-coordinate of the stationary point at $x=1$.

2.3 (Higher) For $y=4x^3$, find dy/dx at $x=2$.

3 Exam-style questions

Exercises 2.1·2.3

2.1 (Higher) For $y=x^3-3x$, find dy/dx at $x=2$.

2.1 $dy/dx=3x^2-3$. At $x=2$ it is $12-3=9$.

2.2 (Higher) Find the y-coordinate of the stationary point at $x=1$.

2.2 Substitute into the original curve: $y(1)=1-3=-2$.

2.3 (Higher) For $y=4x^3$, find dy/dx at $x=2$.

3 Exam-style questions

2.3 The derivative is $12x^2$; at 2 it is $12 \times 4 = 48$.

Exercise 3.1

3.1 Decide whether this claim is true. Justify with a concrete calculation or counterexample: Every point with zero derivative is a local maximum or minimum.

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3.1 False. For $f(x)=x^3$, $f'(0)=0$ but x^3 is increasing on both sides of zero. This stationary point is not a local extremum; inspect the gradient sign change.

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