

Past-paper walk-through

Volume with Washer Method: Revolving Around the x- or y-Axis ■ 8.11

eXercise

Questions in this set

- 2026 Q5

Reading the mark scheme

- **B1** a mark that stands on its own – the point is either made or not.
- **M1** a *method* mark: the right approach, even if the number is wrong.
- **A1** an *answer* mark, and it usually needs its M mark first.
- **C1** a working mark on the way to the answer.
- **//** separates answers the examiner accepts equally.
- **ecf** = error carried forward: a later part is marked on your own earlier answer.
- **owtte** = “or words to that effect” – the wording need not match.

Question 5

2026 ■ Q5

Let f be the function defined by $f(x) = \sqrt[3]{x-1}$, and let g be the function defined by $g(x) = e^{(-2x+4)}$. The graphs of f and g intersect at the point $(2, 1)$. Let R be the region bounded by the graph of f , the x -axis, and the vertical line $x = 2$, as shown in the figure.

[Graph in the xy -plane: y -axis marked at 1, x -axis marked at 1, 2, 3. The curve $y = f(x)$ starts near $x = 1$ (where it crosses the x -axis) and rises to the right, passing through $(2, 1)$; the curve $y = g(x)$ decreases from upper left, also passing through $(2, 1)$, and continues decreasing toward the right past $x = 3$. The shaded region R is bounded below by the x -axis, on the left by the curve $y = f(x)$, and on the right by the vertical line $x = 2$, lying between $x = 1$ and $x = 2$.]

(a) Evaluate $\int_1^2 f(x) \, dx$. Show the work that leads to your answer.

Question 5

- (b) Write, but do not evaluate, an expression involving one or more integrals that gives the volume of the solid generated when region R is rotated about the x -axis.
- (c) Write, but do not evaluate, an expression involving one or more integrals that gives the perimeter of region R .
- (d) Evaluate $\int_2^{\infty} g(x) dx$. Show the work that leads to your answer.

Question 5

