

## Past-paper walk-through

Volume with Washer Method: Revolving Around Other Axes ■ 8.12

eXercise

## Questions in this set

- 2014 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

2014 ■ Q5

[Graph showing the shaded region  $R$  in the first quadrant (and dipping slightly below the  $x$ -axis) bounded by the curve  $y = xe^{x^2}$  (rising steeply and concave up from the origin  $O$  through  $x = 1$ ), the line  $y = -2x$  (a straight line from the origin through the fourth quadrant), and the vertical line  $x = 1$ ; axis labels  $O$  at the origin, 1 marked on the  $x$ -axis,  $x$  and  $y$  axis arrows shown; region  $R$  labeled inside the shaded area.]

Let  $R$  be the shaded region bounded by the graph of  $y = xe^{x^2}$ , the line  $y = -2x$ , and the vertical line  $x = 1$ , as shown in the figure above.

- (a) Find the area of  $R$ .
- (b) Write, but do not evaluate, an integral expression that gives the volume of the solid generated when  $R$  is rotated about the horizontal line  $y = -2$ .
- (c) Write, but do not evaluate, an expression involving one or more integrals that gives the perimeter of  $R$ .

## Question 5

