

1.4 Answers

Further A-Level Pure Mathematics : Core 1 Volumes of Revolution

Answer 1

(i) 1220π

(ii) $\frac{47\pi}{10}$

(iii) 9π

[4, 4, 4 marks]

(iv) $\frac{405\pi}{14}$

(v) $\frac{377\pi}{6}$

(vi) $\frac{57\pi}{8}$

[4, 4, 4 marks]

Answer 2

(i) $\frac{512\pi}{15}$

(ii) $\frac{81\pi}{35}$

[4, 4 marks]

Answer 3

When finding area;

Integration is the sum of an infinite number of infinitely thin rectangles.

Their height is y and their width is dx

As the area of a rectangle is height $\times$ width, the rectangles to be summed each have an area of $y \times dx$.

Thus;

$$Area = \int y \, dx$$

with the slight complication that integration sees areas below the x -axis as negative.
So, more correctly;

$$Area = \int |y| \, dx$$

When finding volume;

Integration is the sum of an infinite number of infinitely thin cylinders.

Their radius is y and their height is dx

As the area of a cylinder is $\pi \times radius^2$, the cylinders to be summed each have a volume of $\pi \times y^2 \times dx$

Thus;

$$Volume = \pi \int y^2 \, dx$$

As y^2 is always positive, there is no need to worry about negative volumes.

[8 marks]