Applications of Integration

AP Calculus BC · Vocabulary in context

Word	Example
average value /ˈævrɪdʒ ˈvæljuː/	The **average value** of f on [a, b] is the integral divided by b − a. f [a, b] b − a
integral /ˈɪntɪgrəl/	Use an **integral** to find the area under a curve.
rectangle /ˈrektæŋgl/	The average value is the height of a **rectangle** with the same area.
rate of change /reɪt ɒv tʃeɪndʒ/	The **rate of change** is 5 metres per second. 5 metres per second
derivative /dɪˈrɪvətɪv/	Use the **derivative** to find the curve's slope at this point.
integration /ˌɪntɪˈgreɪʃn/	**Integration** adds up tiny pieces to find a total.
differentiation /ˌdɪfəˌrenʃiˈeɪʃn/	**Differentiation** finds the derivative of a function.
displacement /dɪˈspleɪsmənt/	After walking 3 km east, your **displacement** is 3 km east. 3 km 3 km
net change /net tʃeɪndʒ/	The integral of a rate gives the **net change** in the amount.
total distance /ˈtəʊtl ˈdɪstəns/	**Total distance** is the integral of speed, not velocity.
speed /spiːd/	The bus moves at a **speed** of 15 m/s. 15 m/s
definite integral /ˈdefɪnət ˈɪntɪgrəl/	A **definite integral** has limits and gives a number, such as an area.
accumulated total	The integral of the rate gives the **accumulated total**.

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initial amount	Add the **initial amount** to the change to get the final amount.
intersection point /ˌɪntəˈsekʃn pɔɪnt/	Find the **intersection point** where the two curves meet.
limits of integration /ˈlɪmɪts ɒv ˌɪntɪˈgreɪʃn/	In $\int$ from 1 to 3, the **limits of integration** are 1 and 3. $1 \quad 3 \qquad \int \qquad 1 \quad 3$
parabola /pəˈræbələ/	A thrown ball follows a **parabola**.
cross section /krɒs ˈsekʃn/	Each **cross section** of the solid is a square.
perpendicular /ˌpɜːpənˈdɪkjʊlə/	The wall is **perpendicular** to the floor.
square /skweə/	The area of a **square** is its side squared.
volume /ˈvɒljuːm/	The **volume** of the box is $2\text{ m} \times 1\text{ m} \times 1\text{ m} = 2\text{ m}^3$. $2\text{ m} \times 1\text{ m} \times 1\text{ m} = 2\text{ m}^3$
equilateral triangle /ˌiːkwɪˈlætərəl ˈtraɪæŋgl/	An **equilateral triangle** has three equal sides.
semicircular	The cross sections are **semicircular**: each one is half a circle.
solid of revolution /ˈsɒlɪd ɒv ˌrevəˈluːʃn/	Turn a region around a line to make a **solid of revolution**.
disc method /dɪsk ˈmeθəd/	The **disc method** adds up thin circular slices.
radius /ˈreɪdɪəs/	The **radius** of a circle is the distance from the centre to the edge.

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axis of revolution	The **axis of revolution** is the line the region turns around.
ring	Each slice is a **ring** with a hole in the middle.
washer method /ˈwɒʃə ˈmeθəd/	The **washer method** uses rings: outer area minus inner area.
arc length /ɑːk leŋθ/	Measure the **arc length** along the curved edge.
hypotenuse /haɪˈpɒtənjuːs/	The **hypotenuse** is the longest side of a right triangle.
• **particle** /ˈpɑːtɪkl/	Modelling the ball as a **particle** means we ignore its size and any rotation.

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