Geometry and trigonometry

International Baccalaureate · IB Diploma · Mathematics: Applications and Interpretation · HL · Vocabulary in context

Word	Example
• **midpoint** /ˈmɪdpɔɪnt/	The **midpoint** of (0, 0) and (4, 6) is (2, 3). (0, 0) (4, 6) (2, 3)
slant height /slænt haɪt/	The **slant height** of a cone runs from the tip to the edge of the base.
pyramid /ˈpɪrəmɪd/	A **pyramid** has a base and triangular sides meeting at a point.
cone /kəʊn/	An ice cream cone is a **cone**.
sphere /sfɪə/	A ball is a **sphere**.
hemisphere /ˈhemɪsfɪə/	A **hemisphere** is half of a sphere.
space diagonal /speɪs daɪˈægənl/	The **space diagonal** of a cuboid joins opposite corners through the middle.
hypotenuse /haɪˈpɒtənjuːs/	The **hypotenuse** is the longest side of a right triangle.
angle of elevation /ˈæŋgl ɒv ˌelɪˈveɪʃn/	The **angle of elevation** is measured up from the horizontal.
angle of depression /ˈæŋgl ɒv dɪˈpreʃn/	The **angle of depression** is measured down from the horizontal.
bearing /ˈbeərɪŋ/	The ship sails on a **bearing** of 090°, due east. 090°
sine rule /saɪn ruːl/	Use the **sine rule** to find the missing side.

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cosine rule /ˈkəʊsaɪn ruːl/	Use the **cosine rule** when you know two sides and the angle between them.
arc /ɑːk/	The **arc** is part of the edge of a circle.
sector /ˈsektə/	A **sector** is a slice of a circle, like a piece of pizza.
perpendicular bisector /ˌpɜːpənˈdɪkjʊlə baɪˈsektə/	Every point on the **perpendicular bisector** is the same distance from both ends.
Voronoi diagram	A **Voronoi diagram** splits a map into areas around each school.
site /saɪt/	In a Voronoi diagram, each **site** has its own cell.
cell /sel/	Each **cell** holds the points closest to its site.
edge /edʒ/	Each **edge** in a graph joins two nodes.
vertex /ˈvɜːteks/	The **vertex** of $y = (x - 2)^2 + 3$ is (2, 3). $y = (x - 2)^2 + 3$ (2, 3)
nearest neighbour interpolation	**Nearest neighbour interpolation** uses the value from the closest site.
radian /ˈreɪdɪən/	One full turn is an angle of 2π **radians**. 2π
unit circle /ˈjuːnɪt ˈsɜːkl/	A **unit circle** has a radius of one.
transformation matrix /trænsfɔːˈmeɪʃn ˈmeɪtrɪks/	A **transformation matrix** can rotate or reflect a shape.
reflection /rɪˈflekʃn/	**Reflection** in a mirror lets you see yourself.

Word	Example
rotation /rəʊ'teɪʃn/	A **rotation** turns a shape around a point.
enlargement /en'lɑ:dʒmənt/	An **enlargement** makes a shape bigger or smaller.
stretch /stretʃ/	A **stretch** by factor 2 parallel to the y-axis doubles every y-value. y 2 y
determinant /dɪ'tɜ:mɪnənt/	A nonzero **determinant** means a square matrix has an inverse.
vector /'vektə/	A **vector** describes both size and direction.
magnitude /'mægnɪtju:d/	The **magnitude** of the vector 3i + 4j is 5. 3i + 4j 5
unit vector /'ju:nɪt 'vektə/	A **unit vector** has a magnitude of 1, such as i or j. 1 i j
position vector /pə'zɪʃn 'vektə/	The **position vector** of point A tells you where A is from the origin. A A
• **scalar product** /'skeɪlə 'prɒdʌkt/	The **scalar product** of perpendicular vectors is zero.
× **vector product** /'vektə 'prɒdʌkt/	The **vector product** of two vectors is at right angles to both.
vector equation of a line	The **vector equation of a line** is $r = a + \lambda b$. $r = a + \lambda b$
velocity vector	The boat's **velocity vector** is (3, 4) km/h. (3, 4) km/h
graph /græf/	A **graph** has nodes joined by edges.
x^2 **degree** /dɪ'gri:/	The **degree** of a vertex is the number of edges that meet there.

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Word	Example
✱ **complete graph**	In a **complete graph**, every vertex is joined to every other one.
weighted graph /ˈweɪtɪd græf/	In a **weighted graph**, each edge has a number such as a distance.
→ **directed graph**	In a **directed graph**, the edges have arrows.
connected /kəˈnektɪd/	A graph is **connected** if you can reach every vertex from every other.
tree /tri:/	An undirected **tree** is connected and has no cycles.
Eulerian circuit	A graph has an **Eulerian circuit** if every vertex has an even degree.
Eulerian trail	An **Eulerian trail** uses every edge exactly once.
Hamiltonian cycle	A **Hamiltonian cycle** visits every vertex once and returns to the start.
adjacency matrix	An **adjacency matrix** is a table of 0s and 1s showing which nodes are joined. 0 1
transition matrix /trænˈsɪʃn ˈmeɪtrɪks/	A **transition matrix** shows the chances of moving between states.
spanning tree	A **spanning tree** joins all the vertices with no loops.
minimum spanning tree /ˈmɪnɪməm ˈspænɪŋ tri:/	A **minimum spanning tree** joins all vertices with the least total length.

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Kruskal's algorithm /ˈkrʌsklz ˈælgərɪθəm/	**Kruskal's algorithm** adds the shortest edges first, avoiding cycles.
Prim's algorithm /prɪmz ˈælgərɪθəm/	**Prim's algorithm** grows a tree one nearest vertex at a time.
Chinese postman problem	The **Chinese postman problem** finds the shortest route along every street.
travelling salesman problem	The **travelling salesman problem** finds the shortest tour of all the cities.
upper bound /ˈʌpə baʊnd/	The **upper bound** of the array is 10. 10
lower bound /ˈləʊə baʊnd/	The **lower bound** of the array is 1. 1

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