# Geometric Algorithms

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**Lines :**

1. [How to check if two given line segments intersect?](https://www.geeksforgeeks.org/check-if-two-given-line-segments-intersect/)
2. [Given n line segments, find if any two segments intersect](https://www.geeksforgeeks.org/given-a-set-of-line-segments-find-if-any-two-segments-intersect/)
3. [Klee’s Algorithm (Length Of Union Of Segments of a line)](https://www.geeksforgeeks.org/klees-algorithm-length-union-segments-line/)
4. [Count maximum points on same line](https://www.geeksforgeeks.org/count-maximum-points-on-same-line/)
5. [Find an Integer point on a line segment with given two ends](https://www.geeksforgeeks.org/find-integer-point-line-segment-given-two-ends/)
6. [Minimum lines to cover all points](https://www.geeksforgeeks.org/minimum-lines-cover-points/)
7. [Minimum block jumps to reach destination](https://www.geeksforgeeks.org/minimum-block-jumps-reach-destination/)
8. [Program for Point of Intersection of Two Lines](https://www.geeksforgeeks.org/program-for-point-of-intersection-of-two-lines/)
9. [Represent a given set of points by the best possible straight line](https://www.geeksforgeeks.org/represent-given-set-points-best-possible-straight-line/)
10. [Program to find line passing through 2 Points](https://www.geeksforgeeks.org/program-find-line-passing-2-points/)
11. [Reflection of a point about a line in C++](https://www.geeksforgeeks.org/reflection-point-line-c/)
12. [Find points at a given distance on a line of given slope](https://www.geeksforgeeks.org/find-points-at-a-given-distance-on-a-line-of-given-slope/)
13. [Number of ordered points pair satisfying line equation](https://www.geeksforgeeks.org/number-ordered-points-pair-satisfying-line-equation/)
14. [Check if a line passes through the origin](https://www.geeksforgeeks.org/check-line-passes-origin/)
15. [Count of different straight lines with total n points with m collinear](https://www.geeksforgeeks.org/count-different-straight-lines-total-n-points-m-collinear/)
16. [Number of horizontal or vertical line segments to connect 3 points](https://www.geeksforgeeks.org/find-no-segments-polyline/)
17. [Program to find the mid-point of a line](https://www.geeksforgeeks.org/program-find-mid-point-line/)
18. [Section formula (Point that divides a line in given ratio)](https://www.geeksforgeeks.org/section-formula-point-divides-line-given-ratio/)
19. [Sum of Manhattan distances between all pairs of points](https://www.geeksforgeeks.org/sum-manhattan-distances-pairs-points/)
20. [Minimum number of points to be removed to get remaining points on one side of axis](https://www.geeksforgeeks.org/minimum-number-points-removed-get-remaining-points-one-side-axis/)
21. [Program to find slope of a line](https://www.geeksforgeeks.org/program-find-slope-line/)
22. [Maximum integral co-ordinates with non-integer distances](https://www.geeksforgeeks.org/maximum-integral-co-ordinates-non-integer-distances/)
23. [Direction of a Point from a Line Segment](https://www.geeksforgeeks.org/direction-point-line-segment/)
24. [Find intersection point of lines inside a section](https://www.geeksforgeeks.org/find-intersection-point-lines-inside-section/)
25. [Program to check if three points are collinear](https://www.geeksforgeeks.org/program-check-three-points-collinear/)

**Triangle :**

1. [Check whether a given point lies inside a triangle or not](https://www.geeksforgeeks.org/check-whether-a-given-point-lies-inside-a-triangle-or-not/)
2. [C program to find area of a triangle](https://www.geeksforgeeks.org/c-program-find-area-triangle/)
3. [Count Integral points inside a Triangle](https://www.geeksforgeeks.org/count-integral-points-inside-a-triangle/)
4. [Classify a triangle](https://www.geeksforgeeks.org/classify-a-triangle/)
5. [Maximum height when coins are arranged in a triangle](https://www.geeksforgeeks.org/maximum-height-coins-arranged-triangle/)
6. [Find all sides of a right angled triangle from given hypotenuse and area | Set 1](https://www.geeksforgeeks.org/find-sides-right-angled-triangle-given-hypotenuse-area/)
7. [Maximum number of 2×2 squares that can be fit inside a right isosceles triangle](https://www.geeksforgeeks.org/maximum-number-2x2-squares-can-fit-inside-right-isosceles-triangle/)
8. [Check if right triangle possible from given area and hypotenuse](https://www.geeksforgeeks.org/check-right-angles-possible-given-area-hypotenuse/)
9. [Triangle with no point inside](https://www.geeksforgeeks.org/triangle-no-point-inside/)
10. [Find all angles of a given triangle](https://www.geeksforgeeks.org/find-angles-given-triangle/)
11. [Program to find Circumcenter of a Triangle](https://www.geeksforgeeks.org/program-find-circumcenter-triangle-2/)
12. [Number of Triangles that can be formed given a set of lines in Euclidean Plane](https://www.geeksforgeeks.org/number-triangles-can-formed-given-set-lines-euclidean-plane/)
13. [Triangular Matchstick Number](https://www.geeksforgeeks.org/triangular-matchstick-number/)
14. [Number of jump required of given length to reach a point of form (d, 0) from origin in 2D plane](https://www.geeksforgeeks.org/number-jump-required-given-length-reach-point-form-d-0-origin-2d-plane/)
15. [Program to calculate area of Circumcircle of an Equilateral Triangle](https://www.geeksforgeeks.org/program-calculate-area-circumcircle-equilateral-triangle/)
16. [Check whether triangle is valid or not if sides are given](https://www.geeksforgeeks.org/check-whether-triangle-valid-not-sides-given/)
17. [Program to find third side of triangle using law of cosines](https://www.geeksforgeeks.org/program-find-third-side-triangle-using-law-cosines/)
18. [Find the dimensions of Right angled triangle](https://www.geeksforgeeks.org/find-dimensions-right-angled-triangle/)
19. [Program to calculate area and perimeter of equilateral triangle](https://www.geeksforgeeks.org/program-calculate-area-perimeter-equilateral-triangle/)
20. [Count of acute, obtuse and right triangles with given sides](https://www.geeksforgeeks.org/count-of-acute-obtuse-and-right-triangles-with-given-sides/)
21. [Minimum height of a triangle with given base and area](https://www.geeksforgeeks.org/minimum-height-triangle-given-base-area/)
22. [Maximum number of squares that can fit in a right angle isosceles triangle](https://www.geeksforgeeks.org/maximum-number-of-squares-that-can-be-fit-in-a-right-angle-isosceles-triangle/)

**Rectangle | Square | Circle :**

1. [Find if two rectangles overlap](https://www.geeksforgeeks.org/find-two-rectangles-overlap/)
2. [Check if four segments form a rectangle](https://www.geeksforgeeks.org/check-four-segments-form-rectangle/)
3. [Check whether a given point lies inside a rectangle or not](https://www.geeksforgeeks.org/check-whether-given-point-lies-inside-rectangle-not/)
4. [Minimum Perimeter of n blocks](https://www.geeksforgeeks.org/minimum-perimeter-n-blocks/)
5. [Number of rectangles in N\*M grid](https://www.geeksforgeeks.org/number-rectangles-nm-grid/)
6. [Find Corners of Rectangle using mid points](https://www.geeksforgeeks.org/find-corners-of-rectangle-using-mid-points/)
7. [Coordinates of rectangle with given points lie inside](https://www.geeksforgeeks.org/coordinates-rectangle-given-points-lie-inside/)
8. [Total area of two overlapping rectangles](https://www.geeksforgeeks.org/total-area-two-overlapping-rectangles/)
9. [Program for Area And Perimeter Of Rectangle](https://www.geeksforgeeks.org/program-area-perimeter-rectangle/)
10. [Program to find Perimeter / Circumference of Square and Rectangle](https://www.geeksforgeeks.org/python-program-find-perimeter-circumference-square-rectangle/)
11. [Program for Area Of Square](https://www.geeksforgeeks.org/program-area-square/)
12. [Number of unique rectangles formed using N unit squares](https://www.geeksforgeeks.org/number-unique-rectangles-formed-using-n-unit-squares/)
13. [How to check if given four points form a square](https://www.geeksforgeeks.org/check-given-four-points-form-square/)
14. [Paper Cut into Minimum Number of Squares](https://www.geeksforgeeks.org/paper-cut-minimum-number-squares/)
15. [Program to find area of a circle](https://www.geeksforgeeks.org/c-program-find-area-circle/)
16. [Non-crossing lines to connect points in a circle](https://www.geeksforgeeks.org/non-crossing-lines-connect-points-circle/)
17. [Circle and Lattice Points](https://www.geeksforgeeks.org/circle-lattice-points/)
18. [Queries on count of points lie inside a circle](https://www.geeksforgeeks.org/queries-count-point-lie-inside-circle/)
19. [Check whether a point exists in circle sector or not](https://www.geeksforgeeks.org/check-whether-point-exists-circle-sector-not/)
20. [Pizza cut problem (Or Circle Division by Lines)](https://www.geeksforgeeks.org/pizza-cut-problem-circle-division-lines/)
21. [Minimum revolutions to move center of a circle to a target](https://www.geeksforgeeks.org/minimum-revolutions-move-center-circle-target/)
22. [Angular Sweep (Maximum points that can be enclosed in a circle of given radius)](https://www.geeksforgeeks.org/angular-sweep-maximum-points-can-enclosed-circle-given-radius/)
23. [Check if a line touches or intersects a circle](https://www.geeksforgeeks.org/check-line-touches-intersects-circle/)
24. [Check if a given circle lies completely inside the ring formed by two concentric circles](https://www.geeksforgeeks.org/check-given-circle-lies-completely-inside-ring-formed-two-concentric-circles/)
25. [Area of a Circumscribed Circle of a Square](https://www.geeksforgeeks.org/area-circumscribed-circle-square/)
26. [Path in a Rectangle with Circles](https://www.geeksforgeeks.org/path-rectangle-containing-circles/)
27. [Area of square Circumscribed by Circle](https://www.geeksforgeeks.org/area-square-circumscribed-circle/)
28. [Count ways to divide circle using N non-intersecting chords](https://www.geeksforgeeks.org/count-ways-divide-circle-using-n-non-intersecting-chords/)
29. [Find the center of the circle using endpoints of diameter](https://www.geeksforgeeks.org/find-center-circle-using-endpoints-diameter/)
30. [Program to find area of a Circular Segment](https://www.geeksforgeeks.org/program-find-area-circular-segment/)
31. [Program to find smallest difference of angles of two parts of a given circle](https://www.geeksforgeeks.org/program-find-smallest-difference-angles-two-parts-given-circle/)
32. [Arc length from given Angle](https://www.geeksforgeeks.org/arc-length-angle/)
33. [Area of a Circular Sector](https://www.geeksforgeeks.org/area-of-a-sector/)
34. [Find minimum radius such that atleast k point lie inside the circle](https://www.geeksforgeeks.org/find-minimum-radius-atleast-k-point-lie-inside-circle/)
35. [Program to find Circumference of a Circle](https://www.geeksforgeeks.org/program-find-circumference-circle/)
36. [Check whether given circle resides in boundary maintained by two other circles](https://www.geeksforgeeks.org/check-whether-given-circle-reside-boundary-maintained-outer-circle-inner-circle/)
37. [Check if two given circles touch or intersect each other](https://www.geeksforgeeks.org/check-two-given-circles-touch-intersect/)
38. [Count of obtuse angles in a circle with ‘k’ equidistant points between 2 given points](https://www.geeksforgeeks.org/count-obtuse-angles-circle-k-equidistant-points-2-given-points/)

**3D Objects :**

1. [Find the perimeter of a cylinder](https://www.geeksforgeeks.org/find-perimeter-cylinder/)
2. [Find the Surface area of a 3D figure](https://www.geeksforgeeks.org/find-surface-area-3d-figure/)
3. [Program for distance between two points on earth](https://www.geeksforgeeks.org/program-distance-two-points-earth/)
4. [Calculate Volume of Dodecahedron](https://www.geeksforgeeks.org/calculate-volume-dodecahedron/)
5. [Program for Volume and Surface area of Frustum of Cone](https://www.geeksforgeeks.org/program-for-volume-and-surface-area-of-frustum-of-cone/)
6. [Program to calculate volume of Octahedron](https://www.geeksforgeeks.org/program-calculate-volume-octahedron/)
7. [Program for Surface Area of Octahedron](https://www.geeksforgeeks.org/program-for-surface-area-of-octahedron/)
8. [Program to calculate area and volume of a Tetrahedron](https://www.geeksforgeeks.org/calculate-area-tetrahedron/)
9. [Divide cuboid into cubes such that sum of volumes is maximum](https://www.geeksforgeeks.org/divide-cuboid-cubes-sum-volumes-maximum/)
10. [Program to calculate Volume and Surface area of Hemisphere](https://www.geeksforgeeks.org/program-calculate-volume-surface-area-hemisphere/)
11. [Maximize volume of cuboid with given sum of sides](https://www.geeksforgeeks.org/maximize-volume-cuboid-given-sum-sides/)
12. [Program to calculate volume of Ellipsoid](https://www.geeksforgeeks.org/program-calculate-volume-ellipsoid/)
13. [Program for volume of Pyramid](https://www.geeksforgeeks.org/program-for-volume-of-pyramid/)
14. [Calculate volume and surface area of a cone](https://www.geeksforgeeks.org/calculate-volume-surface-area-cone/)
15. [Calculate Volume and Surface area Of Sphere](https://www.geeksforgeeks.org/calculate-volume-surface-area-sphere/)
16. [Program for Volume and Surface Area of Cuboid](https://www.geeksforgeeks.org/program-for-volume-and-surface-area-of-cuboid/)
17. [Program for Volume and Surface Area of Cube](https://www.geeksforgeeks.org/program-volume-surface-area-cube/)
18. [Pythagorean Quadruple](https://www.geeksforgeeks.org/pythagorean-quadruple/)
19. [LS3/NS3 sphere generation algorithm and its implementation](https://www.geeksforgeeks.org/ls3ns3-sphere-generation-algorithm-implementation/)

**Quadrilaterals :**

1. [Number of parallelograms when n horizontal parallel lines intersect m vertical parallellines](https://www.geeksforgeeks.org/number-of-parallelograms-when-n-horizontal-parallel-lines-intersect-m-vertical-parallellines/)
2. [Program for Circumference of a Parallelogram](https://www.geeksforgeeks.org/program-circumference-parallelogram/)
3. [Program to calculate area and perimeter of Trapezium](https://www.geeksforgeeks.org/program-calculate-area-perimeter-trapezium/)
4. [Program to find area of a Trapezoid](https://www.geeksforgeeks.org/program-find-area-trapezoid/)
5. [Find all possible coordinates of parallelogram](https://www.geeksforgeeks.org/find-possible-coordinates-parallelogram/)
6. [Maximum area of quadrilateral](https://www.geeksforgeeks.org/maximum-area-quadrilateral/)
7. [Check whether four points make a parallelogram](https://www.geeksforgeeks.org/check-whether-four-points-make-parallelogram/)
8. [Find the Missing Point of Parallelogram](https://www.geeksforgeeks.org/find-missing-point-parallelogram/)

**Polygon & Convex Hull :**

1. [How to check if a given point lies inside or outside a polygon?](https://www.geeksforgeeks.org/how-to-check-if-a-given-point-lies-inside-a-polygon/)
2. [Minimum Cost Polygon Triangulation](https://www.geeksforgeeks.org/minimum-cost-polygon-triangulation/)
3. [Area of a polygon with given n ordered vertices](https://www.geeksforgeeks.org/area-of-a-polygon-with-given-n-ordered-vertices/)
4. [Tangents between two Convex Polygons](https://www.geeksforgeeks.org/tangents-two-convex-polygons/)
5. [Regular polygon using only 1s in a binary numbered circle](https://www.geeksforgeeks.org/regular-polygon-using-1s-binary-numbered-circle/)
6. [Find number of diagonals in n sided convex polygon](https://www.geeksforgeeks.org/find-number-diagonals-n-sided-convex-polygon/)
7. [Convex Hull | Set 1 (Jarvis’s Algorithm or Wrapping)](https://www.geeksforgeeks.org/convex-hull-set-1-jarviss-algorithm-or-wrapping/)
8. [Convex Hull | Set 2 (Graham Scan)](https://www.geeksforgeeks.org/convex-hull-set-2-graham-scan/)
9. [Quickhull Algorithm for Convex Hull](https://www.geeksforgeeks.org/quickhull-algorithm-convex-hull/)
10. [Convex Hull (Simple Divide and Conquer Algorithm)](https://www.geeksforgeeks.org/convex-hull-simple-divide-conquer-algorithm/)
11. [Dynamic Convex hull | Adding Points to an Existing Convex Hull](https://www.geeksforgeeks.org/dynamic-convex-hull-adding-points-existing-convex-hull/)
12. [Deleting points from Convex Hull](https://www.geeksforgeeks.org/deleting-points-convex-hull/)
13. [Number of Pentagons and Hexagons on a Football](https://www.geeksforgeeks.org/number-pentagons-hexagons-football/)
14. [Program to calculate are of Enneagon](https://www.geeksforgeeks.org/program-calculate-enneagon/)
15. [Program to calculate Area Of Octagon](https://www.geeksforgeeks.org/program-calculate-area-octagon/)
16. [Area of a Hexagon](https://www.geeksforgeeks.org/area-of-a-hexagon/)
17. [Minimum area of a Polygon with three points given](https://www.geeksforgeeks.org/minimum-area-polygon-three-points-given/)

**Misc :**

1. [Find Simple Closed Path for a given set of points](https://www.geeksforgeeks.org/find-simple-closed-path-for-a-given-set-of-points/)
2. [Orientation of 3 ordered points](https://www.geeksforgeeks.org/orientation-3-ordered-points/)
3. [Number of Integral Points between Two Points](https://www.geeksforgeeks.org/number-integral-points-two-points/)
4. [Divide and Conquer | Set 2 (Closest Pair of Points)](https://www.geeksforgeeks.org/closest-pair-of-points/)
5. [Closest Pair of Points | O(nlogn) Implementation](https://www.geeksforgeeks.org/closest-pair-of-points-onlogn-implementation/)
6. [Optimum location of point to minimize total distance](https://www.geeksforgeeks.org/optimum-location-point-minimize-total-distance/)
7. [n’th Pentagonal Number](https://www.geeksforgeeks.org/nth-pentagonal-number/)
8. [Find perimeter of shapes formed with 1s in binary matrix](https://www.geeksforgeeks.org/find-perimeter-shapes-formed-1s-binary-matrix/)
9. [Count of parallelograms in a plane](https://www.geeksforgeeks.org/count-parallelograms-plane/)
10. [Minimum distance to travel to cover all intervals](https://www.geeksforgeeks.org/minimum-distance-travel-cover-intervals/)
11. [Rotation of a point about another point in C++](https://www.geeksforgeeks.org/rotation-of-a-point-about-another-point-in-cpp/)
12. [Draw geometric shapes on images using OpenCV](https://www.geeksforgeeks.org/draw-geometric-shapes-images-using-opencv/)
13. [Finding the vertex, focus and directrix of a parabola](https://www.geeksforgeeks.org/finding-vertex-focus-directrix-parabola/)
14. [Program to check if water tank overflows when n solid balls are dipped in the water tank](https://www.geeksforgeeks.org/program-check-water-tank-overflows-n-solid-balls-dipped-water-tank/)
15. [Program to check if tank will overflow, underflow or filled in given time](https://www.geeksforgeeks.org/program-check-tank-will-overflow-underflow-filled-given-time/)
16. [Find if it’s possible to rotate the page by an angle or not](https://www.geeksforgeeks.org/find-possible-rotate-page-angle-not/)
17. [Equable Shapes](https://www.geeksforgeeks.org/equable-shapes/)
18. [Find mirror image of a point in 2-D plane](https://www.geeksforgeeks.org/find-mirror-image-point-2-d-plane/)