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GEOMETRY

1. Two triangles are said to be similar if their corresponding sides are proportional.
2. The triangles are equiangular if the corresponding angles are equal.
3. A perpendicular line drawn from the vertex of a right angled triangle divides the triangle into two triangles similar to each other and also to original triangle.
4. If two triangles are similar, then the ratio of the corresponding sides are equal to the ratio of their corresponding altitudes.
5. If two triangles are similar, then the ratio of the corresponding sides are equal to the ratio of their corresponding perimeters
6. The ratio of the area of two similar triangles are equal to the ration of the squares of their corresponding sides
7. If two triangles have common vertex and their bases are on the straight line, the ration between their areas is equal to the ratio between the length of their bases.
8. Any congruent triangles are similar but the converse is not true
9. AA Criterion of Similarity

   AA similarity criterion is same as the AAA similarity criterion
10. SAS Criterion of Similarity

    If one angle of a triangle ios equal to one angle of another triangle and if the sides including these angles are in the same ratio then the triangles are similar.
11. SSS Criterion of Similarity

    If three sides of a triangle are proportional to the three corresponding sides of another triangle, then the two triangles are similar
12. Basic Proportionality Theorem (BPT) (or) Thales Theorem

    A straight line drawn parallel to a side of a triangle intersecting the other two sides divides the sides in the same ratio.
13. Converse of BPT

    If a straight line divides any two sides of a triangle in the same ratio, then the

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line is parallel to the third side.

14. Angle Bisector Theorem (ABT)

The internal bisector of an angle of a triangle divides the opposite side internally in the ratio of the corresponding sides containing the angle.

15. Converse of ABT

If a straight line through one vertex of a triangle divides the opposite side internally in the ratio of the other two sides, then the line bisects the angle internally at the vertex.

16. Pythagoras Theorem (or) Baudhyana Theorem

In a right angle triangle, the square on the hypotenuse is equal to the sum on the other two sides.

17. Converse of Pythagoras Theorem

If the square of the longest side of a triangle is equal to sums of squares of other two sides, then the triangle is a right angle triangle.

18. If a line touches a given circle at only one point, then it is called tangent to the circle.

19. A tangent at any point on a circle and the radius through the point are perpendicular to each other.

20. No tangent can be drawn from an interior point of the circle.

21. Only one tangent can be drawn at any point on a circle.

22. Two tangents can be drawnfrom any exterior point of a circle.

23. The lengths of the two tangents drawn from an exterior point to a circle are equal.

24. If two circles touch externally the distance between their centres is equal to the sum of their radii i.e. $r_1 + r_2$

25. If two circles touch internally the distance between their centres is equal to the different of their radii i.e. $r_1 - r_2$

26. The two direct common tangents drawn to the circles are equal in length.

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27. Alternate Segment Theorem

If a line touches a circle and from the point of contact a chord is drawn, the angles between the tangent and the chord are respectively equal to the angles in the corrospo9nding alternate segments

28. Ceva's Theorem

Let ABC be a triangle and let D, E, F be the points on the lines BC, CA, ABrespectively. then the cerians $AD, BE,\ CF$ are concurrent if and only if $\frac{BD}{DC} \times \frac{CE}{EA} \times \frac{AF}{FB} = 1$ where the lengths are directed. This also works for the reciprocal of each of the ratios as the re4ciprocal of 1 is 1

29. Menelaus Theorem

A necessary and sufficient condition for points P, Q, R on the respective sides BC, CA, AB (or their extension) of the triangle ABC to be collinear is that $\frac{BP}{PC} \times \frac{CQ}{QA} \times \frac{AR}{RB} = -1$ where all segments in the formula are directed segments.

30. Menelaus theorem proves that spheres are made up of spherical triangles.