

Miscellaneous Exercises on Props. I. to XII.

1. Draw a figure for Prop. II. for the case when the given point A is

(α) below the line BC and to the right of it.

(β) below the line BC and to the left of it.

2. Divide a given angle into four equal parts.

3. The angles B, C , at the base of an isosceles triangle, are bisected by the straight lines BD, CD , meeting in D ; shew that BDC is an isosceles triangle.

4. D, E, F are points taken in the sides BC, CA, AB , of an equilateral triangle, so that $BD=CE=AF$. Shew that the triangle DEF is equilateral.

5. In a given straight line find a point equidistant from two given points; 1st, on the same side of it; 2d, on opposite sides of it.

6. ABC is a triangle having the angle ABC acute. In BA , or BA produced, find a point D such that $BD=CD$.

7. The equal sides AB, AC , of an isosceles triangle ABC are produced to points F and G , so that $AF=AG$. BG and CF are joined, and H is the point of their intersection. Prove that $BH=CH$, and also that the angle at A is bisected by AH .

8. BAC, BDC are isosceles triangles, standing on opposite sides of the same base BC . Prove that the straight line from A to D bisects BC at right angles.

9. In how many directions may the line AE be drawn in Prop. III.?

10. The two sides of a triangle being produced, if the angles on the other side of the base be equal, shew that the triangle is isosceles.

11. ABC, ABD are two triangles on the same base AB and on the same side of it, the vertex of each triangle being outside the other. If $AC=AD$, shew that BC cannot $=BD$.

12. From C any point in a straight line AB , CD is drawn at right angles to AB , meeting a circle described with centre A and distance AB in D ; and from A , AE is cut off $=AC$; shew that AEB is a right angle.