Educonclave

1. In the figure, AB and CD are two intersecting lines. OP and OQ are respectively bisectors of ∠BOD and ∠AOC. Prove that OP and OQ are opposite rays.

2. In the figure, three lines p, q are r are concurrent at O. If a = 50° and b = 90°, find c, d, e and f.

3. In the figure lines PQ and RS intersect each other at point O. If ∠POR : ∠ROQ = 5 : 7, find all angles.

4. If figure ∠PQR = ∠PRQ, then prove that ∠PQS = ∠PRT.

5. In figure if x + y = w + z, then prove that AOB is a line.

6. In figure, lines XY and MN intersect at O. If ∠POY = 90° and a : b = 2 : 3, find c.

7. In the given figure ∠XYZ = 64° and XY is produced to a point P. If ray YQ bisects ∠ZYP, find ∠XYQ and reflex ∠QYP.

8. In given figure POQ is a line. Ray OR is perpendicular to line PQ. OS is another ray lying between rays OP and OR. Prove that

$$\angle ROS = \frac{1}{2}\left(\angle QOS - \angle POS\right)$$
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9. In figure 'P' is a transversal to lines 'm' and 'n'. ∠2 = 120° and ∠5 = 60°. Prove that m || n.

∴   ∠1 = ∠5
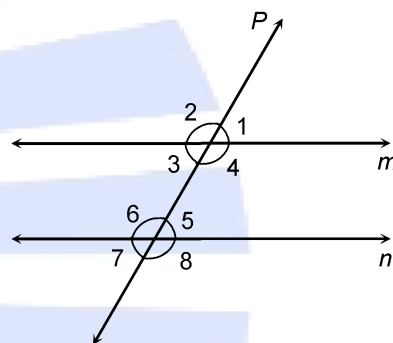
10. In the figure ∠ABC = 65°, ∠BCE = 30°, ∠DCE = 35° and ∠CEF = 145°. Prove that
    (i)   AB || CD and
    (ii)   EF || CD.

11. In the figure, 'm' and 'n' are two plane mirrors parallel to each other. Prove that incident ray CA is parallel to reflected ray BD.

12. Prove that bisector GM and HL of alternate angles AGH and DHG respectively are parallel to each other if AB || CD.
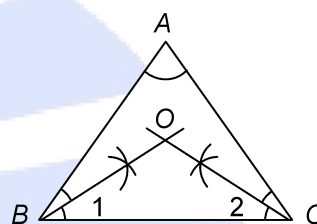
13. In the figure, AB || CD. Find the value of x.
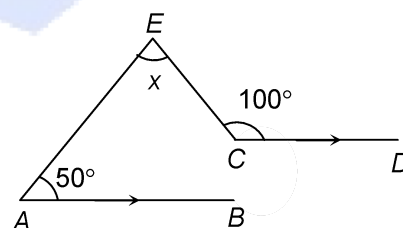
14. In the given figure, AB || CD. Find the value of x.
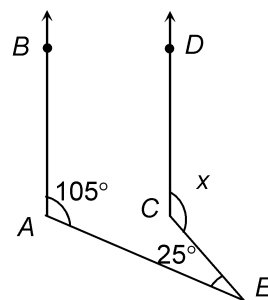
15. If the arms of one angle are respectively parallel to the arms of another angle, show that the two angles are either equal or supplementary.

16. In the figure, the bisectors of ∠ABC and ∠BCA intersect each other at O. Prove that : $\angle BOC = 90° + \frac{1}{2} \angle A$.

17. The sides AB and AC of a ΔABC are produced to P and Q respectively. The bisectors of ∠PBC and ∠QCB intersect at O. Prove that $\angle BOC = 90° - \frac{1}{2} \angle A.$

18. Sides QP and RQ of ΔPQR are produced to point S and T respectively. If ∠SPR = 35° and ∠PQT = 70° find ∠SQR and ∠PRQ.

19. Prove that the angle formed by the bisector of interior ∠A and the bisector of an ext. ∠B of a triangle ABC is half of ∠C.

20. In a ΔABC, ∠B > ∠C. If AM is the bisector of ∠BAC and AN ⊥BC, prove that $\angle MAN = \frac{1}{2} (\angle B - \angle C)$.

21. In the figure, side BC of ΔABC is produced to form ray BD and CE || BA. Show that ∠ACD = ∠A + ∠B. Deduce that ∠A + ∠B + ∠C = 180°.

22. In the given figure, ΔABC is an isosceles triangle in which AB = AC and AE bisects ∠CAD. Prove that AE || BC.

23. Two plane mirrors m and n are placed perpendicular to each other, as shown in the figure. An incident ray AB to the first mirror is first reflected in the direction of BC and then reflected by the second mirror in the direction of CD. Prove that AB || CD.