



MATHS

BOOKS - SELINA MATHS (ENGLISH)

LOCI (LOCUS AND ITS CONSTRUCTIONS)

Question

1. Two parallel lines l and s are 4 cm apart. Find the locus of a point which is always

equidistant from both the given lines.



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2. Show that the locus of a point equidistant from a fixed point is a circle with the fixed point as centre.



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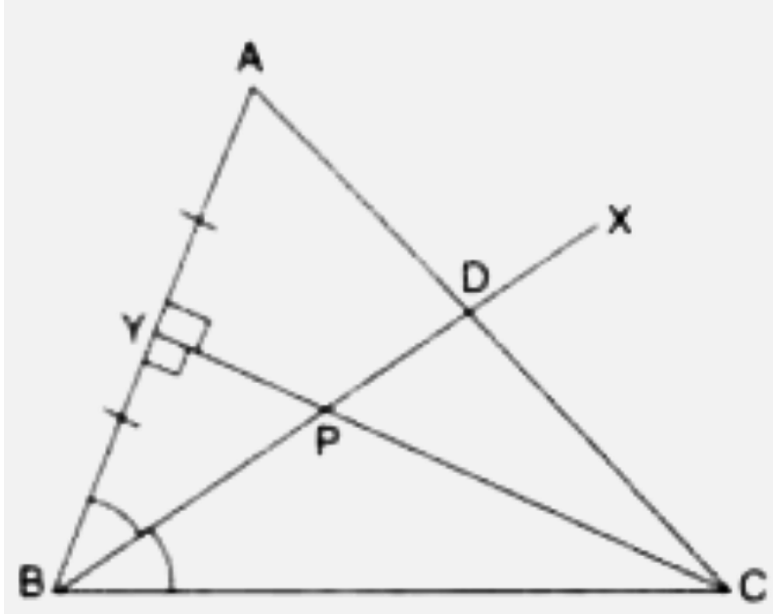
3. In the figure, BX bisects angle ABC and intersects AC at point D . Line segment CY is

perpendicular to AB and intersects BX at point P . If Y is mid-point of AB , prove that : point P is equidistant from A and B .



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4. In the figure, BX bisects angle ABC and intersects AC at point D . Line segment CY is perpendicular to AB and intersects BX at point P . If Y is mid-point of AB , prove that :



point D is equidistant from AB and BC.

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5. Find a point on the base of a scalene triangle equidistant from its sides.

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6. Construct a triangle ABC in which $AB = 6\text{ cm}$, $BC = 7\text{ cm}$ and $CA = 6.5\text{ cm}$. Find a point P equidistant from B and C, and also equidistant from AB and BC.



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7. Construct a quadrilateral ABCD, having given $AB = 2.6\text{ cm}$, $BC = 4.0\text{ cm}$, $CD = 3.2\text{ cm}$, and $AD = 2\text{ cm}$ and diagonal $BD = 3.6\text{ cm}$.

Mark a point P on diagonal AC, equidistant from B and C.



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8. A and B are two fixed points. Draw the locus of a point P such that angle $APB = 90^\circ$.



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9. AB is a chord of a circle. Draw the locus of a point in the circle so that it is equidistant

from A and B.



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10. Draw an angle $ABC = 120^\circ$. Find a point P such that P is at a distance of 3 cm from AB and 2 cm from BC.



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Exercise 16 A

1. Given : PQ is perpendicular bisector of side AB of the triangle ABC.



Prove : Q is equidistant from A and B.



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2. Given : CP is bisector of angle C of $\triangle ABC$.



Prove : P is equidistant from AC and BC.



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3. Given : AX bisects angle BAC and PQ is perpendicular bisector of AC which meets AX at point Y .



Prove : X is equidistant from AB and AC .



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4. Given : AX bisects angle BAC and PQ is perpendicular bisector of AC which meets AX at point Y .



Prove : Y is equidistant from A and C.



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5. Construct a triangle ABC, in which $AB = 4.2$ cm, $BC = 6.3$ cm and $AC = 5$ cm. Draw perpendicular bisector of BC which meets AC at point D. Prove that D is equidistant from B and C.



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6. In each of the given figures, $PA = PB$ and $QA = QB$.



Prove, in each case, that PQ (produce, if required) is perpendicular bisector of AB .

Hence, state the locus of the points equidistant from two given fixed points.



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7. Construct a right angled triangle PQR , in which $\angle Q = 90^\circ$, hypotenuse $PR = 8$ cm and

$QR = 4.5$ cm. Draw bisector of angle PQR and let it meet PR at point T . Prove that T is equidistant from PQ and QR .



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8. Construct a triangle ABC which angle $ABC = 75^\circ$, $AB = 5$ cm and $BC = 6.4$ cm . Draw perpendicular bisector of side BC and also the bisector of angle ACB . If these bisector intersect each other at point P , prove

that P is equidistant from B and C , and also from AC and BC .



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9. In parallelogram $ABCD$, side AB is greater than side BC and P is a point in AC such that PB bisects angle B .

Prove that P is equidistant from AB and BC .



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10. In triangle LMN, bisector of interior angles at L and N intersect each other at point A. Prove that :
point A is equidistant from all the three sides of the triangle.



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11. In triangle LMN, bisector of interior angles at L and N intersect each other at point A.

Prove that :

AM bisects angle LMN.



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12. Use ruler and compasses only for this question

Construct $\triangle ABC$, where $AB = 3.5$ cm, $BC = 6$ cm and $\angle ABC = 60^\circ$.



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13. Use ruler and compasses only for the following question. All construction lines and arcs must be clearly shown.

Construct the locus of points equidistant from AC and BC.



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14. Use ruler and compasses only for this question

Construct the locus of points inside the triangle which are equidistant from B and C.



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15. Use ruler and compasses only for this question

Mark the point P which is equidistant from AB, BC and also equidistant from B and C. Measure and record the length of PB.



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16. The given figure shows a triangle ABC in which AD bisects angle BAC. EG is perpendicular bisector of side AB which intersects AD at point F.

Prove that : F is equidistant from AB and AC.



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17. The given figure shows a triangle ABC in which AD bisects angle BAC. EG is perpendicular bisector of side AB which intersects AD at point F.

Prove that : 

F is equidistant from AB and AC.



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18. The bisectors of $\angle B$ and $\angle C$ of a quadrilateral ABCD intersect each other at point P. Show that P is equidistant from the opposite sides AB and CD.



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19. Draw a line $AB = 6$ cm. Draw the locus of all the points which are equidistant from A and B.



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20. Draw an angle $ABC = 75^\circ$. Draw the locus of all the points equidistant from AB and BC.



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21. Draw an $\angle ABC = 60^\circ$, having $AB = 4.6$ cm and $BC = 5$ cm. Find a point P equidistant from AB and BC, and also equidistant from A and B.



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22. In the figure given below, find a point P on CD equidistant from points A and B.



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23. Construct a triangle ABC, with $AB = 7$ cm, $BC = 8$ cm and $\angle ABC = 60^\circ$. Locate by construction the point P such that :

P is equidistant from AB and BC.

Measure and record the length of PB.



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24. Construct a triangle ABC, with $AB = 7$ cm, $BC = 8$ cm and $\angle ABC = 60^\circ$. Locate by construction the point P such that :

P is equidistant from AB and BC.

Measure and record the length of PB.



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25. On a graph paper, draw the lines $x = 3$ and $y = -5$. Now, on the same graph paper, draw the locus of the point which is equidistant from the given lines.



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26. On a graph paper, draw the line $x = 6$.
Now, on the same graph paper, draw the locus of the point which moves in such a way that its distance from the given line is always equal to 3 units.



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Exercise 16 B

1. The locus of a point at a distance 3 cm from a fixed point.



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2. The locus of points at a distance 2 cm from a fixed line.



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3. The locus of the centre of a wheel of a bicycle going straight along a level road.



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4. The locus of the moving end of the minute hand of a clock.



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5. Write the locus of a stone dropped from the top of a tower.



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6. Write the locus of a runner running around a circular track and always keeping a distance of 1.5 m from the inner edge.



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7. The locus of the door- handle, as the door opens.



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8. The locus of points inside a circle and equidistant from two fixed points on the circumference of the circle.



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9. The locus of the centres of all circles passing through two fixed points.



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10. The locus of vertices of all isosceles triangles having a common base.



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11. What is the locus of a point in space, which is always at a distance of 4 cm from a fixed point ?



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12. Describe the locus of a point P, so that :

$$AB^2 = AP^2 + BP^2,$$

where A and B are two fixed points.



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13. The locus of a point on rhombus ABCD, so that it is equidistant from

AB and BC



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14. The locus of a point on rhombus ABCD, so that it is equidistant from B and D



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15. The speed of sound is 332 metres per second. A gun is fired. Describe the locus of all the people on the earth's surface, who hear the sound exactly after one second ?



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16. Describe the locus of points at distances less than 3 cm from a given point.



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17. Describe the locus of points at distances greater than 4 cm from a given point.



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18. Describe the locus of point at distances less than or equal to 2.5 cm from a given point.



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19. Describe the locus of points at distances greater than or equal to 35 mm from a given point.



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20. Describe :

The locus of the centre of a given circle which rolls around the outside of a second circle and is always touching it.



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21. Describe :

The locus of the centres of all circles that are tangent to both the arms of a given angle.



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22. Describe :

The locus of the mid-points of all chords parallel to a given chord of a circle.



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23. Describe :

The locus of points within a circle that are equidistant from the end points of a given chord.



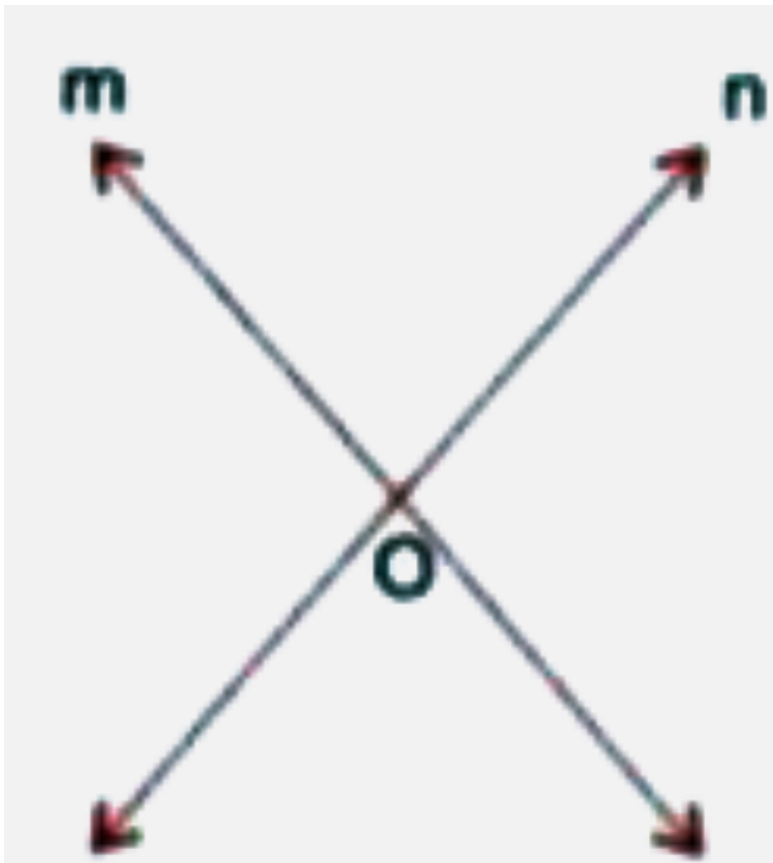
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24. Sketch and describe the locus of the vertices of all triangles with a given base and a given altitude.



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25. In the given figure , obtain all the points equidistant from lines m and n, and 2.5 cm from O.



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26. A straight line AB is 8 cm long. Draw and describe the locus of a point which is :
always 4 cm from the line AB.

Mark the two points X and Y, which are 4 cm from AB and equidistant from A and B.
Describe the figure AXBY.



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27. A straight line AB is 8 cm long. Draw and describe the locus of a point which is :
equidistant from A and B .

Mark the two points X and Y , which are 4 cm from AB and equidistant from A and B .

Describe the figure $AXBY$.



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28. Angle $ABC = 60^\circ$ and $BA = BC = 8$ cm. The mid-points of BA and BC are M and N

respectively. Draw and describe the locus of a point which is :

4 cm from N.

Mark the point P, which is 4 cm from both M and N, and equidistant from BA and BC. Join MP and NP, and describe the figure BMPN.



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29. Angle $ABC = 60^\circ$ and $BA = BC = 8$ cm. The mid-points of BA and BC are M and N respectively. Draw and describe the locus of a

point which is :

4 cm from N.

Mark the point P, which is 4 cm from both M and N, and equidistant from BA and BC. Join MP and NP, and describe the figure BMPN.



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30. Angle $ABC = 60^\circ$ and $BA = BC = 8$ cm. The mid-points of BA and BC are M and N respectively. Draw and describe the locus of a point which is :

4 cm from N.

Mark the point P, which is 4 cm from both M and N, and equidistant from BA and BC. Join MP and NP, and describe the figure BMPN.



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31. Construct a triangle ABC, having given $AB = 4.8$ cm, $AC = 4$ cm and $\angle A = 75^\circ$, Find a point P

- (i) inside the triangle ABC,
- (ii) outside the triangle ABC

equidistant from B and C, and at a distance of 1.2 cm from BC.



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32. Draw an angle $ABC = 120^\circ$. Find a point P such that P is at a distance of 3 cm from AB and 2 cm from BC.



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33. Construct a triangle ABC , with $AB = 5.6$ cm, $AC = BC = 9.2$ cm. Find the points equidistant from AB and AC , and also 2 cm from BC . Measure the distance between the two points obtained.



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34. Construct a triangle ABC , with $AB = 6$ cm, $AC = BC = 9$ cm. Find a point 4 cm from A and equidistant from B and C .





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35. Ruler and compasses may be used in this question. All construction lines and arcs must be clearly shown and be of sufficient length and clarity to permit assessment.

Construct a $\triangle ABC$, in which $BC = 6$ cm, $AB = 9$ cm and angle $ABC = 60^\circ$.



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36. Triangles on the same base and between the same parallels are equal in area.



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37. State the locus of a point in a rhombus ABCD, which is equidistant

(i) from AB and AD,

(ii) from the vertices A and C.



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38. Use graph paper for this question. Take 2 cm = 1 unit on both the axes.

Plot the points A(1, 1), B(5, 3) and C(2, 7).



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39. Use graph paper for this question. Take 2cm=1 unit on both the axes.

Construct the locus of points equidistance from A and B.



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40. Use graph paper for this question. Take $2\text{cm}=1$ unit on both the axes.

Construct the locus of points equidistance from A and B.



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41. Use graph paper for this question. Take $2\text{cm}=1$ unit on both the axes.

Locate the point P such that $PA=PB$ and P is equidistant from AB and AC.





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42. Use graph paper for this question. Take $2\text{cm}=1$ unit on both the axes.

Measure and record the length PA in cm.



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43. Construct an isosceles triangle ABC such that $AB = 6$ cm, $BC = AC = 4$ cm. Bisect $\angle C$ internally and mark a point P on this bisector such that $CP = 5$ cm. Find the points Q and R

which are 5 cm from P and also 5 cm from the line AB.



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44. Plot the points $A(2, 9)$, $B(-1, 3)$ and $C(6, 3)$ on a graph paper . On the same graph paper, draw the locus of point A so that the area of $\triangle ABC$ remains the same as A moves.



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45. Construct a triangle BCP given $BC = 5$ cm,
 $BP = 4$ cm and $\angle PBC = 45^\circ$.

Measure and record the length of PC.



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46. Construct a triangle BCP given $BC = 5$ cm,
 $BP = 4$ cm and $\angle PBC = 45^\circ$.

Measure and record the length of PC.



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47. Use ruler and compasses only for the following question. All construction lines and arcs must be clearly shown.

Construct a $\triangle ABC$ in which $BC = 6.5$ cm,
 $\angle ABC = 60^\circ$, $AB = 5$ cm.



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48. Use ruler and compasses only for the following question. All construction lines and arcs must be clearly shown.

Construct the locus of points equidistant from AC and BC.



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49. Use ruler and compasses only for the following question. All construction lines and arcs must be clearly shown.

Mark 2 points X and Y which are at a distance of 3.5 cm from A and also equidistant from AC and BC. Measure XY.



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