

Fully-Worked Solutions

CHAPTER 8 Loci in Two Dimensions

UPSKILL 8.1

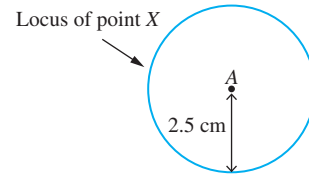
- 1 (a) Locus of point P is an arc of a circle.
- (b) Locus of point Q is a circle.
- (c) Locus of point K is a vertical straight line.
- (d) Locus of point A is an arc of a circle.
- (e) Locus of point R is a horizontal straight line.

2

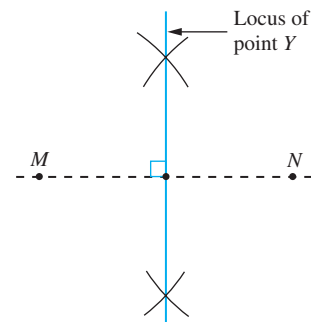
(a) Locus of a point on the moving boy is a straight line.	<p>Locus of a point on the boy sliding down</p>
(b) Locus of a point on the tip of the moving fan blade is a circle.	<p>Locus of a point on the tip of a moving fan blade</p>
(c) Locus of a point on the moving girl is an arc of a circle.	<p>Locus of a point on the girl who is swinging</p>
(d) Locus of a point on the tip of a moving minute hand in a clock is a circle.	<p>Locus of a point on the tip of a moving minute hand of a clock</p>
(e) Locus of a point on the moving lift is a vertical straight line.	<p>Locus of a point on the moving lift in a building</p>
(f) Locus of a point on the rotating circle $PQRS$ is the surface of a sphere.	<p>Locus of a point on the rotating circle $PQRS$</p>

UPSKILL 8.2A

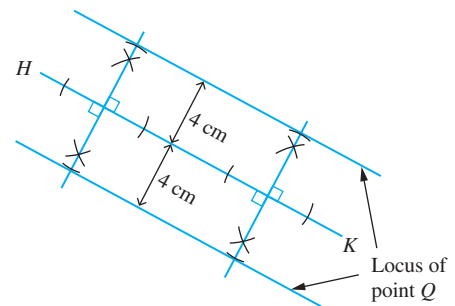
- 1 Locus of the point X is a circle with radius 2.5 cm and centre at A .



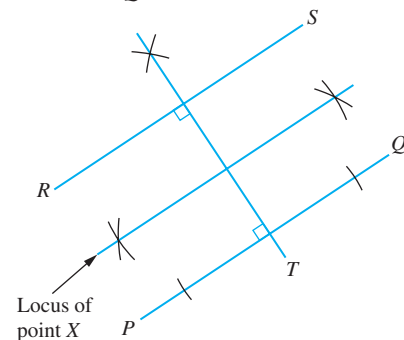
- 2 Locus of point Y is the perpendicular bisector of MN .



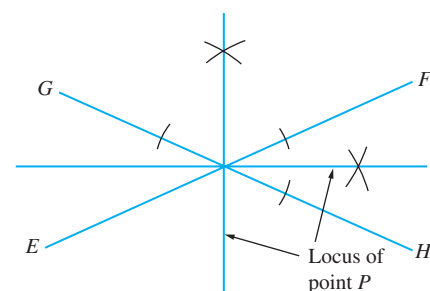
- 3 The locus of point Q is a pair of parallel lines to the line HK .



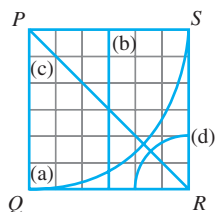
- 4 The locus of point X is the straight line that lies in the middle and parallel to lines PQ and RS .



- 5 The locus of point P is the angle bisector of the angle formed by the intersecting straight lines EF and GH .

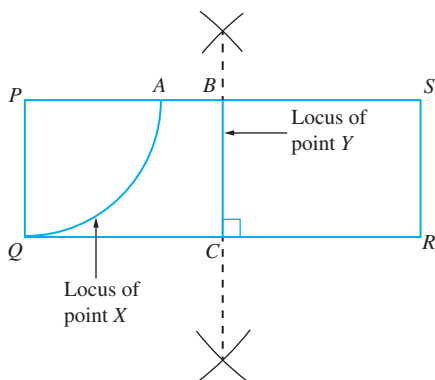


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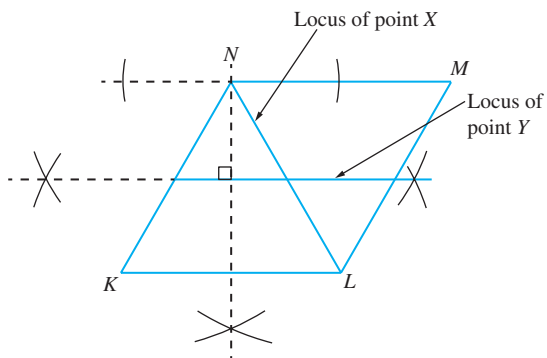


- (a) Locus of W is the arc QS of a circle with radius PQ and centre P .
- (b) Locus of X is the perpendicular bisector of QR .
- (c) Locus of Y is PR , the perpendicular bisector of QS .
- (d) Locus of Z is the arc of a circle with radius 2 units and centre at R .

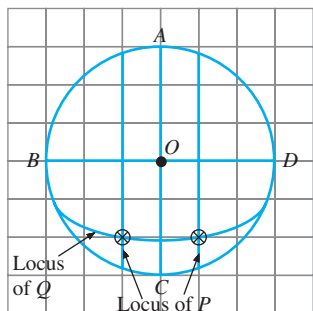
- 7 (a) Locus of point X is the arc QA of a circle with radius PQ and centre at P .
- (b) Locus of point Y is BC , the perpendicular bisector of QR .



- 8 (a) The locus of point X is NL , the angle bisector of the lines KN and NM .
- (b) The locus of point Y is the straight line that lies in the middle and parallel to lines KL and NM .

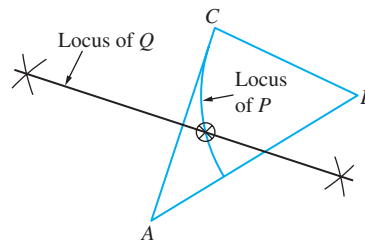


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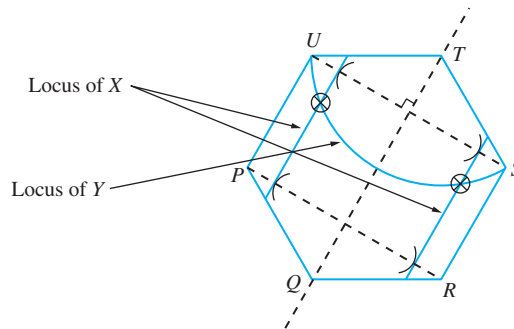
- (a) Locus of P is a pair of parallel lines to the line AC . Each of the parallel lines is 1 unit from AC .
- (b) Locus of Q is the arc of a circle with radius 5 units and centre at A .
- (c) The location of the intersection points of the two loci are marked using the symbol '⊗'.

10



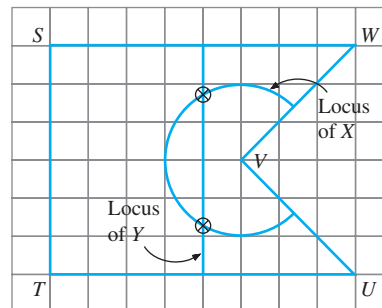
- (a) Locus of the point P is the arc of a circle with radius BC and centre at B .
- (b) Locus of point Q is the perpendicular bisector of AC .
- (c) The location of the intersection point of the two loci is marked using the symbol '⊗'.

11



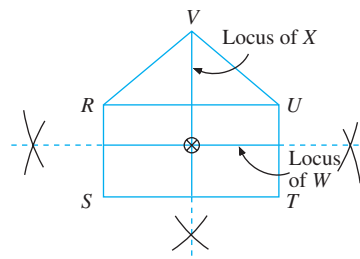
- (a) Locus of X is a pair of parallel lines to the line QT . Each of the parallel lines is 1 cm from QT .
- (b) Locus of Y is the arc of a circle with radius TU and centre at T .
- (c) The location of the intersection points of the two loci are marked using the symbol '⊗'.

12



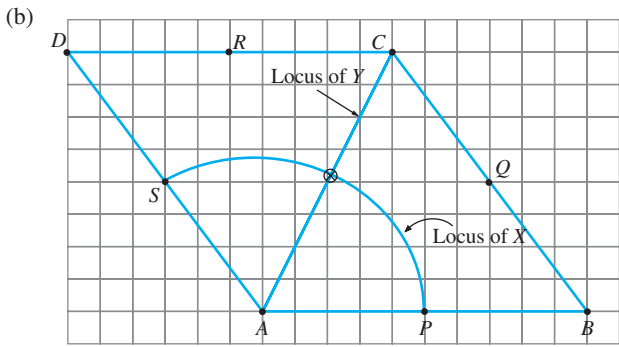
- (a) Locus of X is the arc of a circle with radius 2 cm and centre at V .
- (b) Locus of Y is the perpendicular bisector of TU .
- (c) The location of the intersection points of the two loci are marked using the symbol '⊗'.

13



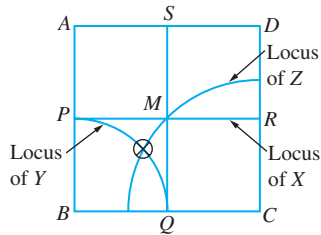
- (a) Locus of W is a straight line that lies in the middle and is parallel to RU and ST .
- (b) Locus of X is the angle bisector between the lines VR and VU .
- (c) The location of the intersection point of the two loci is marked using the symbol '⊗'.

14 (a) SQ



- Locus of X is the arc PS of a circle with radius 5 units and centre at A .
- Locus of Y is the angle bisector AC between the lines BC and CD .
- The location of the intersection point of the two loci is marked using the symbol ' \otimes '

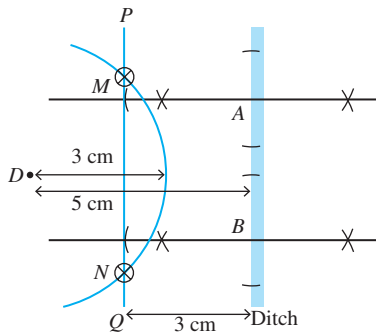
15



- Locus of X is the straight line PR that lies in the middle and is parallel to AD and BC .
- Locus of Y is the arc PQ of a circle with radius 4 cm and centre at B .
- Locus of Z is the arc of a circle with radius CM and centre at C .
- The location of the intersection point of the loci of Y and Z is marked using the symbol ' \otimes '.

UPSKILL 8.2B

1

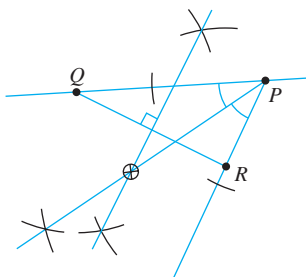


Scale = 1 cm : 5 m

$\therefore 15 \text{ m} \rightarrow 3 \text{ cm}$ and $25 \text{ m} \rightarrow 5 \text{ cm}$

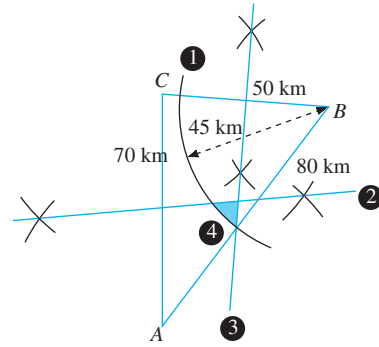
- Construct the line PQ which is parallel and 3 cm from the ditch.
- Construct an arc of a circle with radius 3 cm and centre at D .
- The possible locations of the mango trees are the intersection points of the two loci which are marked using the symbol ' \otimes '.

2



- Construct the angle bisector between the lines PQ and PR .
- Construct the perpendicular bisector of QR .
- The location of the treasure is the intersection point of the two loci which is marked using the symbol ' \otimes '.

3



Using a scale of 1 cm to represent 10 km,

- Construct an arc with centre B and radius 4.5 cm to cut the sides AB and BC .
- Construct the perpendicular bisector of the line AC .
- Construct the perpendicular bisector of the line BC .
- The possible region for the park is the shaded region enclosed by the arc in step 1, the perpendicular bisector in step 2 and the perpendicular bisector in step 3.

Summative Practice 8

Section A

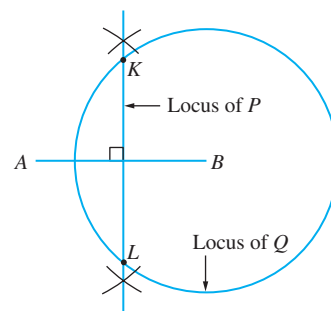
- | | | | | |
|-----|-----|-----|-----|-----|
| 1 D | 2 D | 3 B | 4 A | 5 C |
| 6 A | 7 C | 8 C | 9 D | |

Section B

- B C
 - E F
- GH
 - BF
 - JK
 - EF and BC
- True
 - True
 - False
 - True

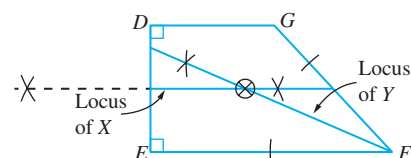
Section C

1 (a)



- Locus of P is the perpendicular bisector of AB .
- Locus of Q is a circle with radius 3 cm and centre at B .
- The intersection points of the two loci are marked using the letters K and L .

(b)

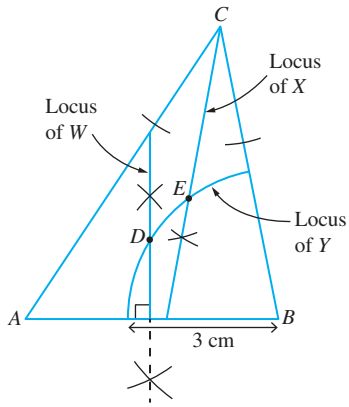


- Locus of X is the perpendicular bisector of DE .

- (ii) Locus of Y is the angle bisector between the lines EF and FG .
- (iii) The location of the intersection point of the two loci is marked using the symbol ' \otimes '.

- 2 (a) (i) X is a point such that it moves at equal distance from A and N .
- (ii) Y is a point such that it is equidistant from lines AB and AC .

(b)



- (i) Locus of W is the perpendicular bisector of AB .
- (ii) Locus of X is the angle bisector between the lines AC and BC .
- (iii) Locus of Y is the arc of a circle with radius 3 cm and centre at B .
- (iv) The intersection point of the loci W and Y is marked with the letter D .
- (v) The intersection point of the loci X and Y is marked with the letter E .