

LOCUS

Form 5

Vol 5

Part 1 – Description of Locus (not equation)

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

5. I is false unless P is moving about a fixed point instead of a fixed line segment AB .

6. The locus of P is the perpendicular bisector of line segment AB .

7. Let h cm be the perpendicular distance from P to the line segment MN .

$$\frac{1}{2}(MN)(h) = 10$$

$$h = 4$$

Thus, the locus of P is a pair of lines parallel to MN and maintains a fixed perpendicular distance of 4 cm from MN .

8. 1st, A rotates 90° clockwise about D with a fixed distance AD .

2nd, A rotates 90° clockwise about the new position of C with a fixed distance AC .

3rd, A rotates 90° clockwise about the new position of B with a fixed distance AB .

Then, as 1st, A rotates 90° clockwise with a fixed distance AD about the new position of D and repeat 2nd, 3rd then 1st...

9. The locus of P is a pair of angle bisectors that bisects the angles formed by AB and CD .

Part 2 - Equation of Locus (後知後覺)

1. A 2. D 3. C 4. B 5. C
 6. D 7. C 8. D 9. A 10. D

Let $P(x, y)$ be the point.

$$1. \quad \sqrt{(x-3)^2 + (y-2)^2} = 3\sqrt{(x+1)^2 + (y-2)^2}$$

$$x^2 + y^2 - 6x - 4y + 13 = 9(x^2 + y^2 + 2x - 4y + 5)$$

$$8x^2 + 8y^2 + 24x - 32y + 32 = 0$$

$$x^2 + y^2 + 3x - 4y + 4 = 0$$

$$2. \quad \frac{y-5}{x-2} \times \frac{y+1}{x-3} = -1$$

$$(y-5)(y+1) = -(x-2)(x-3)$$

$$y^2 - 4y - 5 = -x^2 + 5x - 6$$

$$x^2 + y^2 - 5x - 4y + 1 = 0$$

$$3. \quad \frac{y+3}{x-2} \times \frac{y+5}{x-3} = -1, \text{ excluding } (2, -3) \text{ and } (3, -5)$$

$$y^2 + 8y + 15 = -(x^2 - 5x + 6)$$

$$x^2 + y^2 - 5x + 8y + 21 = 0$$

$$4. \quad \sqrt{(x-5)^2 + (y-7)^2} = \sqrt{(x+2)^2 + (y+3)^2}$$

$$-10x - 14y + 74 = 4x + 6y + 13$$

$$14x + 20y - 61 = 0$$

$$6. \quad \sqrt{(x-2)^2 + (y+3)^2} = \sqrt{(x+4)^2 + (y-1)^2}$$

$$-4x + 6y + 13 = 8x - 2y + 17$$

$$12x - 8y + 4 = 0$$

$$3x - 2y + 1 = 0$$

$$7. \sqrt{(x-7)^2 + (y-6)^2} = 3$$

$$x^2 + y^2 - 14x - 12y + 85 = 9$$

$$x^2 + y^2 - 14x - 12y + 76 = 0$$

$$8. (x+2)^2 + y^2 = (y-3)^2$$

$$x^2 + y^2 + 4x + 4 = y^2 - 6y + 9$$

$$y = -\frac{1}{6}x^2 - \frac{2}{3}x + \frac{5}{6}$$

$$9. (5-x)^2 = (x+1)^2 + (y+3)^2$$

$$-10x + 25 = 2x + 1 + y^2 + 6y + 9$$

$$x = -\frac{1}{12}y^2 - \frac{1}{2}y + \frac{5}{4}$$

$$10. (x+2)^2 + (y+3)^2 = (y+4)^2$$

$$x^2 + 4x + 4 + 6y + 9 = 8y + 16$$

$$y = \frac{1}{2}x^2 + 2x - \frac{3}{2}$$