# R¨wgwZK m‡vejx

## ¯^ivsK

1. $(x_1, y_1)$ I $(x_2, y_2)$ we›`y`� ga¨eZ©i‡Z¡i
$= \sqrt{(x_1-x_2)^2 + (y_1-y_2)^2}$

2. $(x_1, y_1)$ I $(x_2, y_2)$ we›`y`‡BU $(x, y)$ we›`‡Z $m:n$
Abycv‡Z A‰¯^ef¯ n‡j, $x = \dfrac{mx_2 + nx_1}{m+n}$ Ges
$y = \dfrac{my_2 + ny_1}{m+n}$ Avevi $k:1$ Abycv‡Z A‰¯^ef¯ n‡j,
$x = \dfrac{kx_2 + x_1}{k+1}$ Ges $y = \dfrac{ky_2 + y_1}{k+1}$ Avevi hw` $(x_1, y_1)$ I
$(x_2, y_2)$ we›`y`‡BUi msthvRK ‡iLvi ga¨we›`y $(x, y)$ nq Z‡e,
$x = \dfrac{x_1 + x_2}{2}$ Ges $y = \dfrac{y_1 + y_2}{2}$

3. $(x_1, y_1)$ I $(x_2, y_2)$ we›`y`‡BU $(x, y)$ we›`‡Z $m:n$
Abycv‡Z ewnwef¯ n‡j, $x = \dfrac{mx_2 - nx_1}{m-n}$ Ges $y = \dfrac{my_2 - ny_1}{m-n}$

4. ‡Kvb wÎfz‡Ri wZbwU kxl© $(x_1, y_1), (x_2, y_2)$ I $(x_3, y_3)$ n‡j
wÎfzRwUi fi‡K›`ª i ¯^ivsK $\left( \dfrac{x_1 + x_2 + x_3}{3}, \dfrac{y_1 + y_2 + y_3}{3} \right)$

5. $A(x_1, y_1), B(x_2, y_2)$ I $C(x_3, y_3)$ n‡j,
$\Delta ABC = \dfrac{1}{2} \begin{vmatrix} x_1 & y_1 & 1 \\ x_2 & y_2 & 1 \\ x_3 & y_3 & 1 \end{vmatrix}$

6. $A(x_1, y_1), B(x_2, y_2)$ I $C(x_3, y_3)$ we›`ywZbwU GKB
mij‡iLvq Aew¯’Z n‡j I †Kej hw` Zv‡`i Øvi MwVZ
wÎfz‡Ri ‡¶Îdj k~b¨ nq|

## mij‡iLv

7. $x$-A‡¶i mgv‡š^j mij‡iLvi mgxKiY $y = b$
8. $y$-A‡¶i mgv‡š^j mij‡iLvi mgxKiY $x = a$
9. $x$-A‡¶i mgxKiY $y = 0$
10. $y$-A‡¶i mgxKiY $x = 0$

11. $(x_1, y_1)$ I $(x_2, y_2)$ we›`Mwgx mij‡iLvi Xvj, $m = \dfrac{y_1 - y_2}{x_1 - x_2}$

12. mij‡iLvi Xvj mgxKiY, $y = mx + c$ ; $m = \tan\theta$
13. $m$ Xvjwewkó Ges $(x_1, y_1)$ we›`Mwgx mij‡iLvi mgxKiY,
$y - y_1 = m(x - x_1)$
14. $(x_1, y_1)$ I $(x_2, y_2)$ we›`Mwgx mij‡iLvi mgxKiY,
$\dfrac{x - x_1}{x_1 - x_2} = \dfrac{y - y_1}{y_1 - y_2}$

15. $x - A‡¶ †_‡K $a$ Ges $y - A‡¶ †_‡K $b$ ‰N©¨ Ask †Q`
K‡i Ggb mij ‡iLvi mgxKiY, $\dfrac{x}{a} + \dfrac{y}{b} = 1$ hvnv $x - A‡¶K
$(a, 0)$ Ges $y - A‡¶K $(0, b)$ we›`‡Z †Q` K‡i|

16. gj we›`y†_‡K †h †iLvi Dci AswKZ j‡¤^ ¨`N©©p Ges hvnv
$x - A‡¶i abvZ¥K w`‡Ki mvt_ $\alpha$ †KvY Drcbœ K‡i Ggb †iLvi
mgxKiY, $x\cos\alpha + y\sin\alpha = p$

17. $ax + by + c = 0$ Ges $a'x + b'y + c' = 0$ mgxKiY `y`‡BU
GKB mij‡iLv‡bt`‡R K‡i, hw` Ges †Kej hw` $\dfrac{a}{a'} = \dfrac{b}{b'} = \dfrac{c}{c'}$
nq| thLv‡b $a, b, c, a', b', c' \neq 0$

18. $m_1$ I $m_2$ Xvj wewkó `y`‡BU †iLvi A‡fe©Z †KvY $\phi$ n‡j,
$\tan\phi = \pm \dfrac{m_1 - m_2}{1 + m_1 m_2}$ thLv‡b, $\tan\phi$ abvZ¥K n‡j $\phi$ m~²†KvY
Ges $\tan\phi$ FbvZ¥K n‡j $\phi$ ¯’~j†KvY n‡e|

19. `y`‡BU †iLv ci¯úi mgvš^vj n‡e hw` Zv‡`i Xvj Øq mgvb nq
Ges `y`‡BU †iLv ci¯úi j¤^n‡e hw` Zv‡`i Xvj Ø‡qi ¸Ydj -1
nq|

20. $ax \pm by \pm c = 0$ †iLvi mgvš^vj †iLvi mgxKiY,
$ax \pm by + k = 0$
21. $ax \pm by \pm c = 0$ †iLvi j¤^†iLvi mgxKiY,
$bx \mp ay + k = 0$
22. $a_1x + b_1y + c_1 = 0$ Ges $a_2x + b_2y + c_2 = 0$ †iLvi †Q`
we›`Mwgx †h †Kvb mij‡iLvi mgxKiY,
$a_1x + b_1y + c_1 + k(a_2x + b_2x + c_2) = 0$

23. $a_1x + b_1y + c_1 = 0$, $a_2x + b_2y + c_2 = 0$ I
$a_3x + b_3y + c_3 = 0$ mij ‡iLv wZbwU mgwe›`yn‡e hw`,
$\begin{vmatrix} a_1 & b_1 & c_1 \\ a_2 & b_2 & c_2 \\ a_3 & b_3 & c_3 \end{vmatrix} = 0$ nq|

24. $(x', y')$ we›`y†_‡K $ax + by + c = 0$ †iLvi j¤^^ ~iZ¡,
$\pm \dfrac{ax' + by' + c}{\sqrt{a^2 + b^2}}$ Ges ~iZ¡i gvb $= \dfrac{|ax' + by' + c|}{\sqrt{a^2 + b^2}}$

25. $ax + by + c_1 = 0$ Ges $ax + by + c_2 = 0$ mgvš^vj †iLv
`y`‡BUi ga¨eZ©j ¤^^ ~iZ¡, $\pm \dfrac{c_1 - c_2}{\sqrt{a^2 + b^2}}$ Ges Gi gvb
$= \left| \dfrac{c_1 - c_2}{\sqrt{a^2 + b^2}} \right|$

26. $a_1x + b_1y + c_1 = 0$ Ges $a_2x + b_2y + c_2 = 0$ †iLv `y`‡BUi
A‰¯^f¯ †Kv‡Yi mgwØLÊ‡Ki mgxKiY,
$\dfrac{a_1x + b_1y + c_1}{\sqrt{a_1^2 + b_1^2}} = \pm \dfrac{a_2x + b_2y + c_2}{\sqrt{a_2^2 + b_2^2}}$

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## eË

27. $(0,0)$ †K›`ªI $a$ e¨vmva©iwkó e‡Ëi mgxKiY,
$x^2 + y^2 = a^2$

28. $(h,k)$ †K›`ªI $a$ e¨vmva©iwkó e‡Ëi mgxKiY,
$(x-h)^2 + (y-k)^2 = a^2$

29. e‡Ëi mvaviY mgxKiY, $x^2 + y^2 + 2gx + 2fy + c = 0$
†hLv‡b, e‡ËUi †K›`ª $(-g,-f)$ Ges e‡Ëi e¨vmva©
$= \sqrt{g^2 + f^2 - c}$ ; e‡ËU Øviv $x - A¶ †_‡K KwZ© As‡ki
cwigvY $= 2\sqrt{g^2 - c}$ Ges $y - A¶ †_‡K KwZ© As‡ki cwigvY
$= 2\sqrt{f^2 - c}$ ; e‡ËU hw` $x - A¶‡K ¯úk©Ki‡i Z‡e, $g^2 = c$
Ges hw` $y - A¶‡K ¯úk©Ki‡i Z‡e, $f^2 = c$ Avi hw` Dfq
A¶‡K ¯úk©Ki‡i Z‡e, $g^2 = f^2 = c$

30. $x^2 + y^2 + 2gx + 2fy + c = 0$ eË Ges $ax + by + c = 0$
mij‡iLvi †Q` we›`Wgx e‡Ëi mgxKiY,
$x^2 + y^2 + 2gx + 2fy + c + k(ax + by + c) = 0$

31. $x^2 + y^2 = a^2$ e‡Ëi Dcwiw¯’Z $(x_1, y_1)$ we›`‡Z AswKZ
¯úk©Ki mgxKiY, $xx_1 + yy_1 = a^2$

32. $x^2 + y^2 + 2gx + 2fy + c = 0$ e‡Ëi Dcwiw¯’Z $(x_1, y_1)$
we›`‡Z AswKZ ¯úk©Ki mgxKiY,
$xx_1 + yy_1 + g(x + x_1) + f(y + y_1) + c = 0$

33. e‡Ëi ewnt¯’Kvb we›`y $(x_1, y_1)$ †_‡K $x^2 + y^2 = a^2$ e‡Ë
Aw¼Z ¯úk©Ki %N"© $= \sqrt{x_1^2 + y_1^2 - a^2}$

34. e‡Ëi ewnt¯’Kvb we›`y $(x_1, y_1)$ †_‡K
$x^2 + y^2 + 2gx + 2fy + c = 0$ e‡Ë Aw¼Z ¯úk©Ki %N"©
$= \sqrt{x_1^2 + y_1^2 + 2gx_1 + 2fy_1 + c}$

## KwbK

35. cive‡Ëi †¶Î

| | cive‡Ëi c¨gZ mgxKiY | $y^2 = 4ax$ | $x^2 = 4ay$ |
|---|---|---|---|
| i | kxl©we›`yi ¯bvsK | $(0, 0)$ | $(0, 0)$ |
| ii | Dc‡K›`ª¸i ¯bvsK | $(a, 0)$ | $(0, a)$ |
| iii | w`Kv‡¶i mgxKiY | $x + a = 0$ | $y + a = 0$ |
| iv | A¶‡iLvi mgxKiY | $y = 0$ | $x = 0$ |
| v | Dc‡Kw›`ªK j‡¤^ %N© | $|4a|$ | $|4a|$ |
| vi | Dc‡Kw›`ªK j‡¤^ mgxKiY | $x - a = 0$ | $y - a = 0$ |

## 36. Dce‡Ëi †¶Î t

Dce‡Ëi c¨gZ mgxKiY, $\dfrac{x^2}{a^2} + \dfrac{y^2}{b^2} = 1$

| | hLb | $a > b$ | $a < b$ |
|---|---|---|---|
| i | ‡K›`ª`i ¯bvsK | $(0, 0)$ | $(0, 0)$ |
| ii | Drt‡K›`ªZv, $e$ | $e^2 = \dfrac{a^2 - b^2}{a^2}$ | $e^2 = \dfrac{b^2 - a^2}{b^2}$ |
| iii | enr A‡¶i mgxKiY | $y = 0$ | $x = 0$ |
| iv | ¶ïª A‡¶i mgxKiY | $x = 0$ | $y = 0$ |
| v | enr A‡¶i %N"© | $2a$ | $2b$ |
| vi | ¶ïª A‡¶i %N"© | $2b$ | $2a$ |
| vii | Dc‡Kv›`ª`i ¯bvsK | $(\pm ae, 0)$ | $(0, \pm be)$ |
| viii | w`Kv‡¶i mgxKiY | $x = \pm \dfrac{a}{e}$ | $y = \pm \dfrac{b}{e}$ |
| ix | Dc‡Kw›`ªK j¤^ | $\dfrac{2b^2}{a}$ | $\dfrac{2a^2}{b}$ |
| x | Dc‡Kw›`ªK j‡¤^ mgxKiY | $x = \pm ae$ | $y = \pm be$ |

## 37. Aµae‡Ëi †¶Î t

| | c¨gZ mgxKiY | $\dfrac{x^2}{a^2} - \dfrac{y^2}{b^2} = 1$ | $\dfrac{y^2}{b^2} - \dfrac{x^2}{a^2} = 1$ |
|---|---|---|---|
| i | ‡K›`ª`i ¯bvsK | $(0, 0)$ | $(0, 0)$ |
| ii | Drt‡K›`ªZv, $e$ | $e^2 = \dfrac{a^2 + b^2}{a^2}$ | $e^2 = \dfrac{b^2 + a^2}{b^2}$ |
| iii | Avo A‡¶i mgxKiY | $y = 0$ | $x = 0$ |
| iv | AbyÜx A‡¶i mgxKiY | $x = 0$ | $y = 0$ |
| v | Avo A‡¶i %N"© | $2a$ | $2b$ |
| vi | AbyÜx A‡¶i %N"© | $2b$ | $2a$ |
| vii | Dc‡K›`ª`i ¯bvsK | $(\pm ae, 0)$ | $(0, \pm be)$ |
| | kxl¨ ¯bvsK | $(\pm a, 0)$ | $(0, \pm b)$ |
| viii | w`Kv‡¶i mgxKiY | $x = \pm \dfrac{a}{e}$ | $y = \pm \dfrac{b}{e}$ |
| ix | Dc‡Kw›`ªK j¤^ | $\dfrac{2b^2}{a}$ | $\dfrac{2a^2}{b}$ |
| x | Dc‡Kw›`ªK j‡¤^ mgxKiY | $x = \pm ae$ | $y = \pm be$ |

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