

_____ - (1)

:03 •

$$\widehat{(\vec{i}, \vec{u})} = \alpha \quad \vec{u}(x, y)$$

$$\vec{u} = \|\vec{u}\| (\cos \alpha \vec{i} + \sin \alpha \vec{j}) \quad \begin{cases} x = \|\vec{u}\| \cos \alpha \\ y = \|\vec{u}\| \sin \alpha \end{cases}$$

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$$\overline{(\vec{u}, \vec{v})} \equiv \frac{\pi}{2} [2\pi] \quad \|\vec{v}\| = \|\vec{u}\| \quad V_2 \quad \vec{v} \\ \vec{u}(x, y) \quad \vec{v}(-y, x) : \\ : \sin(\overline{(\vec{u}, \vec{v})}) - \cos(\overline{(\vec{u}, \vec{v})}) \quad \text{---} \text{-(2)}$$

:04 •

$$V_2 \quad \vec{v}(x', y') \quad \vec{u}(x, y)$$

$$\cos(\overline{(\vec{u}, \vec{v})}) = \frac{\vec{u}\vec{v}}{\|\vec{u}\| \times \|\vec{v}\|} = \frac{xx' + yy'}{\sqrt{x^2 + y^2} \cdot \sqrt{x'^2 + y'^2}}$$

$$\sin(\overline{(\vec{u}, \vec{v})}) = \frac{\det(\vec{u}, \vec{v})}{\|\vec{u}\| \times \|\vec{v}\|} = \frac{\begin{vmatrix} x & x' \\ y & y' \end{vmatrix}}{\sqrt{x^2 + y^2} \cdot \sqrt{x'^2 + y'^2}}$$

$$\tan(\overline{(\vec{u}, \vec{v})}) = \frac{\det(\vec{u}, \vec{v})}{\vec{u}\vec{v}} = \frac{xy' - x'y}{xx' + yy'} \quad \vec{v} \quad \vec{u}$$

_____ - (3)

(P) _____ :05 •

$$S_{ABC} = \frac{1}{2} |\det(\overline{AB}, \overline{AC})| \quad : \quad ABC$$

$$|\det(\overline{AB}, \overline{AC})| : \quad \overline{AC} \quad \overline{AB}$$

_____ - I

$$(P) \quad B(\vec{i}, \vec{j}) \quad V_2$$

$$R(O, \vec{i}, \vec{j})$$

_____ - (1)

:01 •

$$\vec{u}\vec{v} = xx' + yy' \quad : \quad V_2 \quad \vec{v}(x', y') \quad \vec{u}(x, y)$$

$$\|\vec{u}\| = \sqrt{x^2 + y^2} \quad :$$

$$AB = \|\overline{AB}\| = \sqrt{(x_B - x_A)^2 + (y_B - y_A)^2} \quad : \quad (P) \quad B \quad A$$

_____ - (2)

:02 •

$$|\vec{u}\vec{v}| \leq \|\vec{u}\| \times \|\vec{v}\| \quad : \quad V_2 \quad \vec{v}(x', y') \quad \vec{u}(x, y)$$

$$|xx' + yy'| \leq \sqrt{x^2 + y^2} \times \sqrt{x'^2 + y'^2} \quad :$$

$$\vec{v} \quad \vec{u} \quad |\vec{u}\vec{v}| = \|\vec{u}\| \times \|\vec{v}\|$$

_____ •

$$\|\vec{u} - \vec{v}\| \leq \|\vec{u}\| + \|\vec{v}\| \quad \|\vec{u} + \vec{v}\| \leq \|\vec{u}\| + \|\vec{v}\| \quad : \quad V_2 \quad \vec{v} \quad \vec{u}$$

$$\vec{v} \quad \vec{u} \quad \|\vec{u} + \vec{v}\| = \|\vec{u}\| + \|\vec{v}\|$$

$$\vec{v} \quad \vec{u} \quad \|\vec{u} - \vec{v}\| = \|\vec{u}\| + \|\vec{v}\|$$

$$\|\vec{u}\| \pm \|\vec{v}\| \leq \|\vec{u} \pm \vec{v}\| \leq \|\vec{u}\| + \|\vec{v}\| \quad : \quad V_2 \quad \vec{v} \quad \vec{u}$$

_____ - II

$$B(\vec{i}, \vec{j})$$

$$V_2$$

$$R(O, \vec{i}, \vec{j})$$

$$(P)$$

_____ -IV

_____ -(1)

:10 •

: r Ω(a,b) (C)

$$(x-a)^2 + (y-b)^2 = r^2$$

_____ •

$$x^2 + y^2 - 2ax - 2by + c = 0 :$$

$$O \quad c \quad c = a^2 + b^2 - r^2$$

(C)

$$c > 0 \Leftrightarrow O \in \text{Ext}(C) \quad c < 0 \Leftrightarrow O \in \text{Int}(C) \quad c = 0 \Leftrightarrow O \in (C)$$

:11 •

(P) M [AB] (C)

$$\overrightarrow{MA} \cdot \overrightarrow{MB} = 0 :$$

$$(x-x_A)(x-x_B) + (y-y_A)(y-y_B) = 0$$

_____ •

[AB] Ω [AB] (C)

$$r = \frac{AB}{2}$$

$$\left(x - \frac{x_A + x_B}{2}\right)^2 + \left(y - \frac{y_A + y_B}{2}\right)^2 = \frac{1}{4}((x_B - x_A)^2 + (y_B - y_A)^2)$$

:12 •

(C) C B A

$$(\Omega A = \Omega B = \Omega C) \quad ABC \quad \Omega : ABC$$

$$r = \Omega A$$

_____ -(2)

$$R(O, \vec{i}, \vec{j}) \quad (P)$$

_____ -III

$$R(O, \vec{i}, \vec{j}) \quad (P)$$

_____ -(1)

_____ •

$$\vec{u} \quad (D)$$

$$\vec{u} \quad \vec{n} \quad (D)$$

(D)

:06 •

$$\vec{n}(a,b) \quad ax + by + c = 0 \quad (D)$$

_____ -(2)

:07 •

$$\vec{n}(a,b) \quad A(x_A, y_A) \quad (D)$$

$$a(x-x_A) + b(y-y_A) = 0 :$$

:08 •

$$(D') : a'x + b'y + c' = 0 \quad (D) : ax + by + c = 0 :$$

$$(D) \perp (D') \Leftrightarrow \vec{n}(a,b) \perp \vec{n}'(a',b') \Leftrightarrow aa' + bb' = 0 :$$

$$(D') : y = m'x + p' \quad (D) : y = mx + p :$$

$$(D) \perp (D') \Leftrightarrow m \times m' = -1$$

_____ -(3)

:09 •

$$ax + by + c = 0 \quad (D) \quad A(x_A, y_A)$$

$$d(A, (D)) = \frac{|ax_A + by_A + c|}{\sqrt{a^2 + b^2}}$$

_____ - (5)

:16 •

r Ω (C) (D) (P)
 $d = d(\Omega, (D)) :$
 • (C) (D) $(D) \cap (C) = \emptyset : d > r$
 • (C) (D) $(D) \cap (C) = \{H\} : d = r$
 • H
 • (D) $(D) \cap (C) = \{A, B\} : d < r$
 • ($d = 0$) B A (C)

_____ - (6)

_____ •

• (C) A r Ω (C)
 $\overline{A\Omega}$ A A (C) (Δ)

• (Δ) = $\{M \in (P) / \overline{A\Omega AM} = 0\} :$

:17 •

$A(x_0, y_0) \quad x^2 + y^2 - 2ax - 2by + c = 0 \quad (C)$

$: A \quad (C) \quad (\Delta) \quad (C)$

$x_0x + y_0y - a(x_0 + x) - b(y_0 + y) + c = 0$

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r $\Omega(a, b)$ (C)

$\overline{\Omega M} = \Omega M (\cos \theta \vec{i} + \sin \theta \vec{j}) : (P) \quad M(x, y)$

$(\vec{i}, \overline{\Omega M}) \quad \theta$

$M(x, y) \in (C) \Leftrightarrow \overline{\Omega M} = r(\cos \theta \vec{i} + \sin \theta \vec{j}) :$

$\Leftrightarrow \begin{cases} x = a + r \cos \theta \\ y = b + r \sin \theta \end{cases}$

:13 •

$(2\pi) \quad \mathbb{R} \quad \theta \quad \begin{cases} x = a + r \cos \theta \\ y = b + r \sin \theta \end{cases}$

r $\Omega(a, b)$ (C)

$:(a, b, c) \in \mathbb{R}^3 \quad x^2 + y^2 - 2ax - 2by + c = 0$ - (3)

:14 •

$(C) \quad x^2 + y^2 - 2ax - 2by + c = 0$

$a^2 + b^2 - c \geq 0$

$r = \sqrt{a^2 + b^2 - c} \quad \Omega(a, b) \quad (C)$

_____ - (4)

$(P) \quad (r \text{ شعاعها } \Omega) \quad (C)$

$Int(C) = \{M \in (P) / \Omega M < r\} : (C) \quad (C)$

$Ext(C) = \{M \in (P) / \Omega M > r\} :$

:15 •

$x^2 + y^2 - 2ax - 2by + c = 0 \quad (C)$

$M(x, y) \in Int(C) \Leftrightarrow x^2 + y^2 - 2ax - 2by + c < 0$

$M(x, y) \in Ext(C) \Leftrightarrow x^2 + y^2 - 2ax - 2by + c > 0$