۶

$m = \frac{۰+۴}{-\frac{۱}{۲}-۰} = -۸ \Rightarrow y = -۸(x+\frac{۱}{۲}) \Rightarrow y = -۸x-۴ \Rightarrow -۸x-y-۴=۰$

$\frac{|۱-۷|}{\sqrt{۶۴+۱}} = \frac{۶}{\sqrt{۶۵}}$

فاصله از مبدا

۷

شیب $ay-x=a-۱ \rightarrow y=\frac{۱}{a}x+\frac{a-۱}{a} \Rightarrow m_۱=\frac{۱}{a}$

شیب $y-ax=۱ \rightarrow y=ax+۱ \rightarrow m_۲=a$

$\Rightarrow \frac{۱}{a}=a \Rightarrow a=\pm ۱$

چون موازی

$a=۱ \begin{cases} L_۱ = y-x=۰ \\ L_۲ = y-x=۱ \end{cases} \rightarrow \frac{|۱-۰|}{\sqrt{۱^۲+(-۱)^۲}} = \frac{۱}{\sqrt{۲}}$

قطر $= \sqrt{\text{طول}^۲ + \text{عرض}^۲} = ۵$

$\sqrt{\text{طول}^۲+(\frac{۱}{\sqrt{۲}})^۲} = ۵ \Rightarrow \text{طول}^۲ = \frac{۴۹}{۲} \Rightarrow \text{طول} = \frac{۷}{\sqrt{۲}}$

مساحت $= \frac{۷}{\sqrt{۲}} \times \frac{۱}{\sqrt{۲}} = \frac{۷}{۲}$

$a=-۱ \begin{cases} L_۱ = y+x=۲ \\ L_۲ = y+x=۱ \end{cases} \rightarrow \frac{|۲-۱|}{\sqrt{۱+۱}} = \frac{۱}{\sqrt{۲}}$ غ ق ق

نقطه راس باید روی یکی از این دو خط باشد

۸

$d = \frac{|۴-۱|}{\sqrt{۱۰}} = \frac{۳}{\sqrt{۱۰}} , x-۱=۰ \rightarrow x=۱$

$x = \sqrt{۹-\frac{۹}{۱۰}} = \frac{۹}{\sqrt{۱۰}} \Rightarrow S = \frac{\frac{۳}{\sqrt{۱۰}} \times \frac{۹}{\sqrt{۱۰}}}{۲} = \frac{۲۷}{۲۰}$

۹

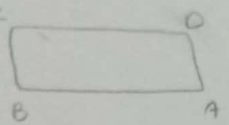
$\frac{b-a}{-\frac{۱}{۳}+\frac{۱}{۲}} = \sqrt{۳} \Rightarrow -\frac{\sqrt{۳}}{۶} = b-a$

$\sqrt{(-\frac{۱}{۳}+\frac{۱}{۲})^۲+(-\frac{\sqrt{۳}}{۶})^۲} = \sqrt{\frac{۱}{۳۶}+\frac{۳}{۳۶}}$ یا $= \sqrt{\frac{۴}{۳۶}} = \frac{۲}{۶} = \frac{۱}{۳}$

مساحت $= \frac{۱}{۳} \times \frac{۱}{۳} = \frac{۱}{۹} \Rightarrow \frac{۱}{۹} = \frac{\text{قطر} \times \text{قطر}}{۲} \Rightarrow \text{قطر}^۲ = \frac{۲}{۹} \Rightarrow \text{قطر} = \frac{\sqrt{۲}}{۳}$

$\frac{m-4}{4+2} = -\frac{1}{2} \Rightarrow m-4 = -3$

① طول قطر مربع: $\sqrt{(m-4)^2+(9)^2} = \sqrt{9+36} = \sqrt{45}$ (با $m-4=-3$) — مساحت $= \sqrt{45}\times\sqrt{45} = 45$



③ CA وسط $= \left(\frac{-1+x}{2}, \frac{4+y}{2}\right)$ ، DB وسط $= \left(\frac{x-2}{2}, \frac{y+4}{2}\right) \Rightarrow \frac{-1+x}{2} = \frac{x-2}{2} \Rightarrow x = \frac{3}{2}$ ، $y = -1$

$\Rightarrow C = \left(\frac{3}{2}, -1\right)$ ، $D = \left(-\frac{5}{2}, 2\right)$ $\rightarrow$ BA طول $= \sqrt{14+9} = \sqrt{25} = 5$

CB طول $= \sqrt{\frac{9}{4}+4} = \sqrt{\frac{25}{4}} = \frac{5}{2}$

مساحت $= 2\times\left(5+\frac{5}{2}\right) = 15$

④ $2mx+(m^2-1)y = 4 \Rightarrow (m^2-1)y = -2mx+4 \Rightarrow y = \frac{-2m}{m^2-1}x + \frac{4}{m^2-1} \Rightarrow a = \frac{-2m}{m^2-1}$

$\tan 120 = \sqrt{3} \Rightarrow \frac{-2m}{m^2-1} = \sqrt{3} \Rightarrow \sqrt{3}m^2 + 2m - \sqrt{3} = 0 \rightarrow m = \frac{-2 \pm \sqrt{4+4(3)}}{2\sqrt{3}} = \frac{-2\pm 4}{2\sqrt{3}} \Rightarrow m_1 = \frac{1}{\sqrt{3}}$

$m_2 = -\sqrt{3}$

$m_1 - m_2 = \frac{1}{\sqrt{3}} - (-\sqrt{3}) = \frac{1+3}{\sqrt{3}} = \frac{4}{\sqrt{3}} = \frac{4\sqrt{3}}{3}$

$\begin{vmatrix} 0 & 3 & 1 \\ 11 & 4 & 9 \\ 1 & 1 & 1 \end{vmatrix} = 21 + 27 + 11 - 3 - 33 - 36 = 81 - 48 = 33$

⑥ مساحت مثلث $= \frac{\text{قاعده}\times\text{ارتفاع}}{2} \Rightarrow \frac{\sqrt{80}\times \text{ارتفاع}}{2} = 20$ $\rightarrow$ $\frac{1}{2}\times 40 = 20$

CB طول $= \sqrt{(7-3)^2+(11-3)^2} = \sqrt{16+64} = \sqrt{80}$ ارتفاع $= \frac{40}{\sqrt{80}} = \frac{40}{4\sqrt{5}} = \frac{10\sqrt{5}}{5} = 2\sqrt{5}$

⑦ B ، $y+3x = 7$ ، $2y-7x = 19 \Rightarrow 2(7-3x)-7x = 19 \Rightarrow 14-11x = 19 \Rightarrow x = -\frac{5}{11}$ ، $y = \frac{87}{11}$

$B = \left(-\frac{5}{11}, \frac{87}{11}\right)$

C ، $4y-3x = 17$ ، $2y-7x = 19 \Rightarrow (4y-3x)-(4y-14x) = 17-38 \Rightarrow 11x = -21 \Rightarrow x = -\frac{21}{11}$ ، $y = \frac{71}{11}$

$C = \left(-\frac{21}{11}, \frac{71}{11}\right)$

⑧ A ، $\begin{matrix} y+2x = 7 \\ 4y-3x = 17 \end{matrix} \Rightarrow 4(7-2x)-3x = 17 \Rightarrow -11x = -11 \Rightarrow x = 1$ ، $y = 5$

$A = (1, 5)$

از B عمود بر CA $= \frac{|-3(-\frac{5}{11})+4(\frac{87}{11})-17|}{\sqrt{(-3)^2+4^2}} = \frac{15}{11} + \frac{348}{11} - 17 \Rightarrow BH = \frac{14}{5}$