Subject:
Year. Month. Date. ( )

۲۰ دنیا ریاضی

(۱)

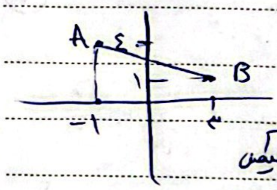
$y-k=-\frac{1}{2}(x+2) \Rightarrow y=-\frac{1}{2}x-1+k$

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

$k-1=2+m \qquad k-m=3 \qquad AB=\sqrt{(-2-4)^2+(\underbrace{k-m}_{3})^2}=\sqrt{45}$

$S=AB^2=45$

(۲)



$x_A+x_C=x_B+x_D$

$-1+x=+3-1-x \Rightarrow 2x=3 \rightarrow x=1.5$

مستطیل $ABCD \rightarrow BC \perp AB \Rightarrow m_{AB}=-\frac{3}{4} \quad m_{BC}=\frac{4}{3}$

$\frac{4}{3}=\frac{y-1}{\frac{3}{2}-3} \Rightarrow y-1=\frac{4}{3}x-\frac{3}{2} \rightarrow y=-1$

$A(-1,4) \quad B(3,1) \quad C(\frac{3}{2},-1),\ D(-\frac{5}{2},2) \qquad AB=\sqrt{4^2+3^2}=5 \qquad BC=\sqrt{2^2+(\frac{3}{2})^2}=\frac{5}{2}$

محیط $=2(\frac{5}{2}+5)=15$

(۳)

$\tan 60=\sqrt{3} \qquad 2mx+(m^2-1)y=3$

$(m^2-1)y=3-2mx \Rightarrow y=\frac{-2m}{m^2-1}x+\frac{3}{m^2-1}$

$\frac{-2m}{m^2-1}=\sqrt{3} \Rightarrow -2m=\sqrt{3}m^2-\sqrt{3} \Rightarrow \sqrt{3}m^2+2m-\sqrt{3}=0$

$\alpha-\beta=\frac{\sqrt{4+4\sqrt{3}\times\sqrt{3}}}{\sqrt{3}}=\frac{4}{\sqrt{3}}=\frac{4\sqrt{3}}{3}$

(۴)

$AH \rightarrow BD \leftarrow$ فاصله A تا BC

$m_{BC}=\frac{11-3}{7-3}=2 \quad y-3=2(x-3) \Rightarrow y=2x-3 \rightarrow BC=y-2x+3=0$

$\frac{|ax_A+by_A+c|}{\sqrt{a^2+b^2}}=\frac{|2-9-3|}{\sqrt{5}}=\frac{10}{\sqrt{5}}=2\sqrt{5}$

(۵)

راس مشترک B
$\begin{cases} AB=3y+4x=13 \\ BC=3y-7x=-19 \end{cases} \quad 11x=33 \rightarrow x=3$

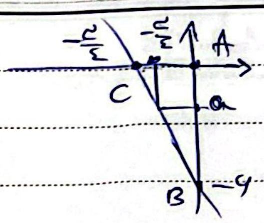
$3y=7\times3-19 \rightarrow y=1 \qquad BH=\frac{|4y-3x-17|}{\sqrt{4^2+3^2}}=\frac{|4-(3\times3)-17|}{5}=\frac{22}{5}$

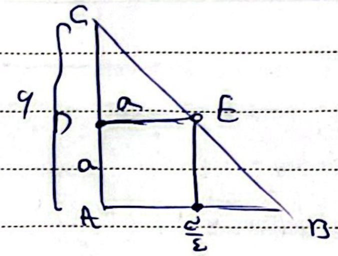
B نقطه، AC خط

PAPCO

Subject :
Year . Month . Date . ( )

(۶)





مربع ← ADEF , AB ∥ DE →

$\frac{AD}{AC} = \frac{DE}{AB}$

$\frac{9-a}{9} = \frac{\frac{a}{2}}{4} = \frac{4a}{9} \Rightarrow 18 - 2a = 24a$

$27a = 18 \rightarrow a = \frac{2}{3}$

قطر $= a\sqrt{2} \Rightarrow \frac{2\sqrt{2}}{3}$

---

(۷)

$\begin{cases} ay - x = a-1 \\ y - ax = 1 \end{cases}$ $y = \frac{x}{a} + \frac{a-1}{a}$, $y = ax + 1$ $\longrightarrow \frac{1}{a} = a \Rightarrow a^2 = 1$

$\rightarrow a = 1 \rightarrow y = x \Rightarrow y = x + 1$ ✓ $(1, 2)$ } $a = 1$

$\rightarrow a = -1 \rightarrow y = -x + 2$ $(1, 2)$, $y = -x + 1$ } ✗

$y = \frac{|c - c'|}{\sqrt{a^2 + b^2}} = \frac{1}{\sqrt{2}} = \frac{\sqrt{2}}{2}$

$5 = \sqrt{x^2 + y^2} \Rightarrow 25 = x^2 + (\frac{\sqrt{2}}{2})^2$

$x^2 = \frac{49}{2} \rightarrow x = \frac{7}{\sqrt{2}} = \frac{7\sqrt{2}}{2}$

$S = xy = \frac{\sqrt{2}}{2} \times \frac{7\sqrt{2}}{2} = 3{,}5$

---

(۸)

$x - 3y = 1 \rightarrow 3y = x - 1 \Rightarrow y = \frac{1}{3}x - \frac{1}{3}$ $A(4, 0)$, $B(\frac{7}{2}, \frac{1}{2})$

$d = \frac{|4 - 1|}{\sqrt{10}} = \frac{3\sqrt{10}}{10}$ $m_{AC} = -3$ $y = -3(x - 4) = -3x + 12$

تقاطع: $\frac{1}{3}x - \frac{1}{3} = -3x + 12 \Rightarrow \frac{10}{3}x = \frac{37}{3} \Rightarrow x = 3{,}7$ ↳ $y = 0{,}9$

$\begin{vmatrix} 3{,}7 & 4 & 1 \\ 0{,}9 & 0 & 0 \\ 1 & 1 & 1 \end{vmatrix} = -2{,}7$ $S = \frac{1}{2} \times 2{,}7 = 1{,}35$

---

(۹)

$m = \frac{b-a}{-\frac{1}{2}} = \frac{b-a}{\frac{1}{4}} = \sqrt{3} \rightarrow b - a = \frac{\sqrt{3}}{4}$

$a = \sqrt{(-\frac{1}{2} - (-\frac{1}{4}))^2 + (\underbrace{b-a}_{\frac{\sqrt{3}}{4}})^2} \longrightarrow$ قطر مربع $= a\sqrt{2} = \frac{\sqrt{2}}{2}$

---

(۱۰)

شعاع = فاصله مرکز از مبدأ مختصات $A(-3, -4)$ $= \sqrt{3^2 + 4^2} = 5$

$\left.\begin{matrix} OA \perp L \\ L' \perp L \end{matrix}\right\} \rightarrow OA \parallel L' \Rightarrow m_{L'} = \frac{4}{3}$

$OA \Rightarrow y = \frac{4}{3}x$ $L' \rightarrow y = \frac{4}{3}x + C$

$m_{OA} = \frac{4}{3} \xrightarrow[OA \perp L]{} m_L = \frac{-3}{4}$

فاصله L' از OA $= 5 \Rightarrow \frac{C}{\sqrt{1 + (\frac{4}{3})^2}} = \frac{3C}{5} = 5 \rightarrow C = \frac{25}{3}$

$L' \Rightarrow y = \frac{4}{3}x + \frac{25}{3}$ $L \rightarrow y + 4 = \frac{-3}{4}(x + 3) \Rightarrow y = \frac{-3}{4}x - \frac{25}{4}$

$\Rightarrow (\frac{4}{3}x_B + \frac{25}{3} = -\frac{3}{4}x_B - \frac{25}{4}) \times 12 \Rightarrow 16x_B + 100 = -9x_B - 75 \Rightarrow 25x_B = -175$ $x_B = -7$

$y_B = -\frac{28}{3} + \frac{25}{3} = -1$ $x_B + y_B = -1 - 7 = -8$