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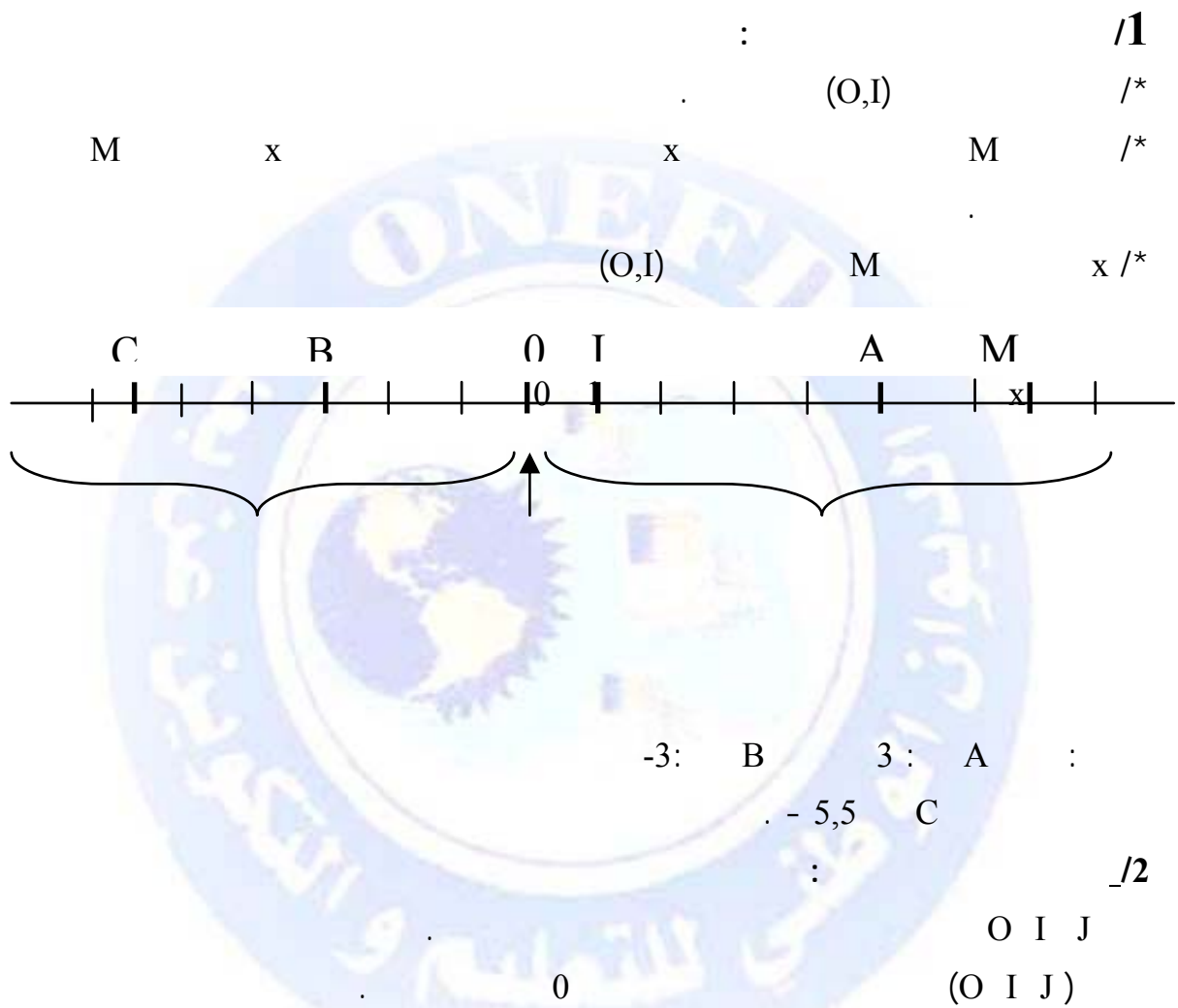
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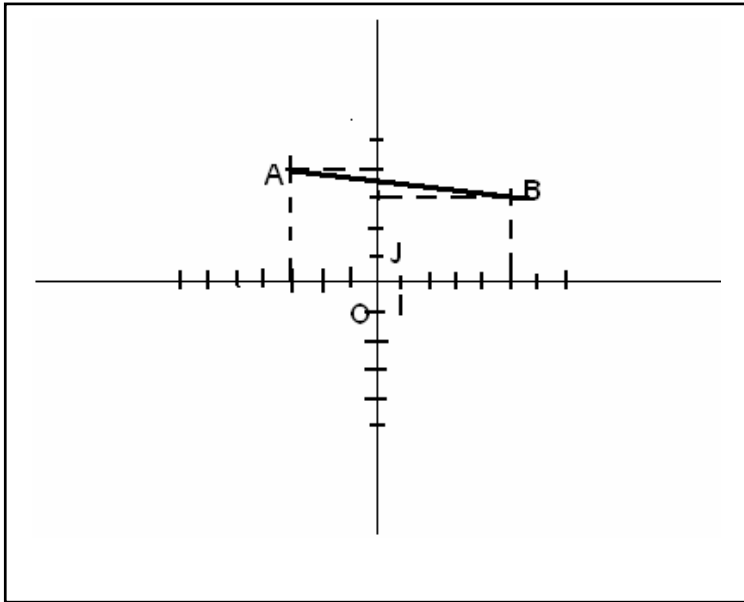


(x,y) ❖

(O I J)

X ❖

Y ❖



$(-3, 4)$ A/*

A 3

A 4

: (O J) (O I) /*

OI=OJ=1 (O J) (O I) /*

: /3

(O.I.J) (X_b, Y_b) (X_a, Y_a) : B A

[AB] G

: (O I J) G

$$Y_G = \frac{Y_A + Y_B}{2}, \quad X_G = \frac{X_A + X_B}{2}$$

: [AB] G B(5, 3) A(-3, 4)

$$Y_G = \frac{3+4}{2} = 3,5 \quad X_G = \frac{5+(-3)}{2} = 1$$

G (1,3,5) :

: /4

(O,I,J) (X_b, Y_b) (X_a, Y_a) B, A

\overrightarrow{AB}

$Y_a - Y_b$ $X_b - X_a$:

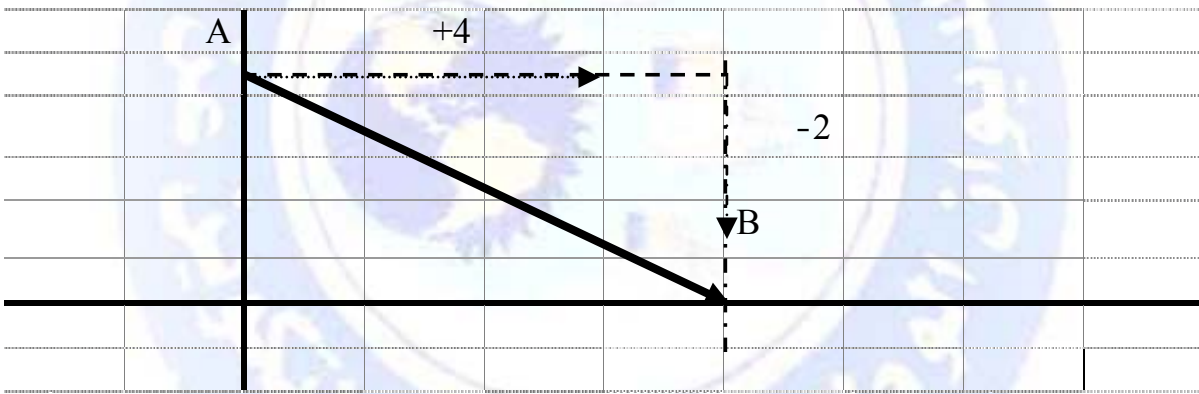
$$\vec{AB} \begin{pmatrix} X_b - X_a \\ Y_b - Y_a \end{pmatrix} :$$

$$B(5 \ 3) \ A(-3 \ 4) :$$

$$\vec{AB} \begin{pmatrix} 8 \\ -1 \end{pmatrix}, \vec{AB} \begin{pmatrix} 5 - (-3) \\ 3 - 4 \end{pmatrix}, \vec{AB} \begin{pmatrix} X_B - X_A \\ Y_B - Y_A \end{pmatrix}$$

$$.(O,I,J) \quad M \quad \vec{OM} :$$

: /5



$$: \vec{AB}$$

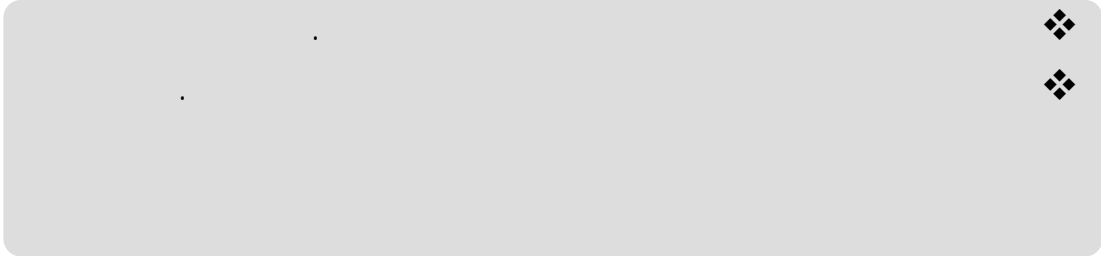
(4)

A /*

$$(4; -2) \vec{AB} \quad -2 \quad 4 \quad /*$$

: /6

: /



:

(O.I.J)

. C(1 ; -3) B(2; 4) A(1 ; 2)

C C'

\overrightarrow{AB}

$$\overrightarrow{CC'} = \overrightarrow{AB}$$

C

C'

$$\overrightarrow{AB} \begin{pmatrix} 1 \\ 2 \end{pmatrix}$$

$$\overrightarrow{CC'} \begin{pmatrix} x-1 \\ y+3 \end{pmatrix}$$

C'

Y X

$$\left\{ \begin{array}{l} X=2 \\ Y=-1 \end{array} \right\} \left\{ \begin{array}{l} X-1=1 \\ Y+3=2 \end{array} \right\} \cdot (2 \ -1) \ C'$$

: /

$$\overrightarrow{CD} \begin{pmatrix} x' \\ y' \end{pmatrix} \quad \overrightarrow{AB} \begin{pmatrix} x \\ y \end{pmatrix}$$

$$\begin{pmatrix} x+x' \\ y+y' \end{pmatrix} \quad \overrightarrow{AB} + \overrightarrow{CD}$$

: 17
 B A (X_B Y_B) (Y_A X_A)
 : AB

$$AB = \sqrt{\left(X_B - X_A \right)^2 + \left(Y_B - Y_A \right)^2}$$

B(-3 5) A(-1 2) :

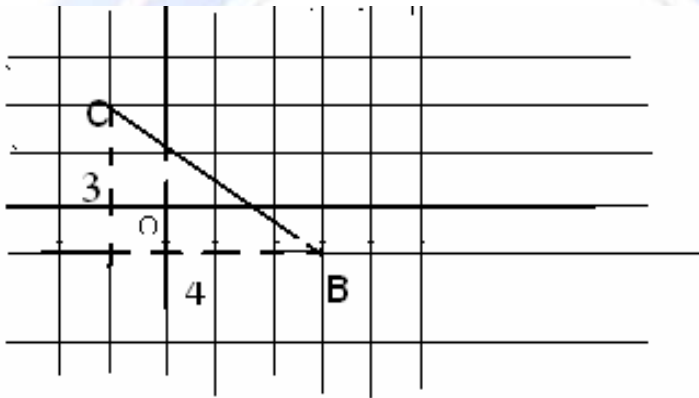
$$AB = \begin{pmatrix} -4 \\ 3 \end{pmatrix} - \overrightarrow{AB} \begin{pmatrix} -3-1 \\ 5-2 \end{pmatrix}$$

$$AB = \sqrt{\left(-4 \right)^2 + \left(3 \right)^2} \quad AB = \sqrt{16+9} \quad AB = \sqrt{25}$$

$AB = 5$

التمرين المحلول 1

$$\vec{U} = (-4 \ 3)$$



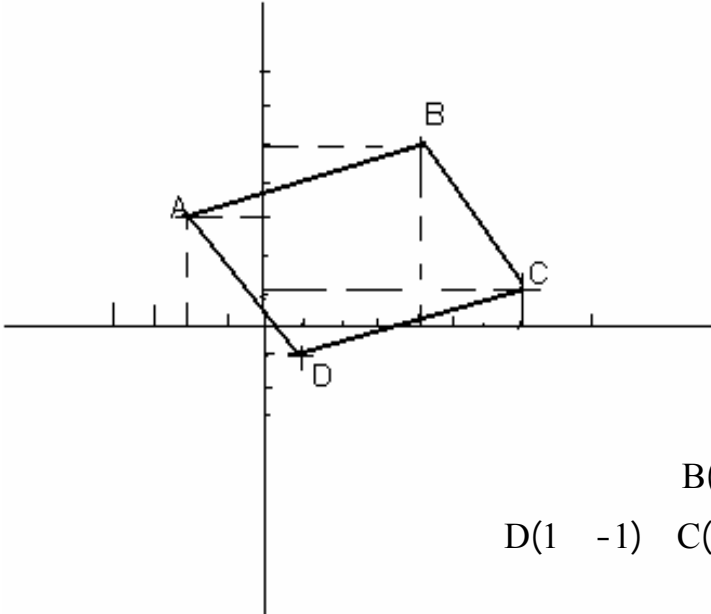
3

4

C

$$\vec{BC} = \vec{U}$$

التمرين المحلول 2



*
D C B A

()

D C B A /

ABCD /

:

B(4 5) A(-2 3) /

D(1 -1) C(7 1)

$\overrightarrow{DC}, \overrightarrow{AB}$ /

$$\overrightarrow{AB} \begin{pmatrix} 6 \\ 2 \end{pmatrix} \quad \overrightarrow{AB} \begin{pmatrix} 4+2 \\ 5-3 \end{pmatrix}$$

$$\overrightarrow{DC} \begin{pmatrix} 6 \\ 2 \end{pmatrix}, \quad \overrightarrow{DC} \begin{pmatrix} 7-1 \\ 1+1 \end{pmatrix}$$

$$\overrightarrow{DC} \quad \overrightarrow{AB}$$

$$ABCD \quad \overrightarrow{AB} = \overrightarrow{DC} :$$

التمرين المحلول 3

*

C(1 2) B(-1 -3) A(-2 1) (O,I,J) C,B,A,B

C A N [AB] M

. M /

N /

:

M (X_m, Y_m) /

$$X_M = -1,5, \quad X_M = \frac{-2 + (-1)}{2}, \quad X_M = \frac{X_A + X_B}{2}$$

$$y_M = -1, \quad y_M = \frac{1 + (-3)}{2}, \quad y_M = \frac{y_A + y_B}{2}$$

(-1,5 -1) M

N (X_n, Y_n) /

$$\vec{AC} = \vec{CN} : \quad C \quad A \quad N$$

$$2 - 1 = Y_n - 2 \quad 1 - (-2) = X_n - 1 :$$

$$Y_n = 3 \quad X_n = 4 :$$

N (4 3) :

C

$$\frac{X_c = X_a + X_1}{2} \quad \frac{Y_c = Y_a + Y_n}{2}$$

التمرين المحلول 4

*

$$B(5 \ -1) \ A(2 \ 1)$$

$$C(6 \ 7)$$

$$AC \quad /$$

$$A \quad ABC \quad /$$

:

$$\rightarrow : AC \quad /$$

$$AC^2 = \sqrt{(6-2)^2 + (7-1)^2}$$

$$AC^2 = 52$$

$$AC = \sqrt{52} \quad :$$

$$AC = \sqrt{4 \times 13}$$

$$AC = 2\sqrt{13}$$

$$ABC \quad /$$

$$AB^2 = (5-2)^2 - (-1-1)^2 = 13$$

$$BC^2 = (6-5)^2 + (7-(-1))^2 = 65$$

$$AB^2 + AC^2 = 13 + 52 = 65$$

$$BC^2 = AB^2 + AC^2 \quad :$$

$$BC^2, AC^2, AB^2$$

$$BC, AC, AB$$

A ABC

تمارين

- / 1
- B,A (O,I, J)
- B (1 2) A (-2 3)
- : (AB) M /
- $(-\frac{1}{2} \frac{5}{2})$ C (4 □) B (-1; 5 □ A
- : AB /
- 3 C $\sqrt{\square}$ B □ A
- : \overrightarrow{AB} /
- $\begin{pmatrix} \square \\ \square \end{pmatrix}$ □ 3 $\begin{pmatrix} C \\ \square \end{pmatrix}$ □ 1 B, $\begin{pmatrix} -1 \\ \square \\ 5 \end{pmatrix}$ A
- (O I J) / 2
- D(6 -4) C(-2 -7) B(-2 3) A(1 2)
- [BA] [AB] M N P /
- $\rightarrow \rightarrow \rightarrow \overrightarrow{CB+DA} \rightarrow \overrightarrow{DA} \rightarrow \overrightarrow{CB}$:
- CB + DA AB :
- (O I J) / 3
- C(4 0) B(5 7) A(-3 1) /
- $\rightarrow \rightarrow \rightarrow \overrightarrow{CB} \overrightarrow{AC}$ *1/
- C ABC *2
- ABC (c) *3
- *
- (O I J) / 4
- C(4 0) B(-5 -1) A(-2 3) /
- $\overrightarrow{AC}, \overrightarrow{BC}, \overrightarrow{AB}$: *1/

\vec{AK}

ABCD D / *2
 ABCD K /
 ABCD $A'B'C'D'$ *1
 .C' B' *2
 (O I J) / 5
 : 5 O (ξ)
 D(0 -5) C(0 5) B(5 0) A(-5 0)
 (ξ) E(4 3) /
 CEF O E F/
 (O I J) / 6
 C(7 1) B(-2 -1) A(-1 3)
 ABC /
 ABC /
 A H AH) (BC) A /
 AH $\frac{1}{10}$.((BC)
 (O I J) / 7
 D(5 4) C(3 2) B(-1 2) A(-3 4)
 AD=4 AB=6 ABCD / 8
 B A E
 D A F
 E C F

الحلول

C:/ C:/ B:/ C/

P N M

$$X_m = \frac{x_A + x_B}{2} = \frac{1-2}{2} = \frac{-1}{2}$$

$$Y_M = \frac{Y_A + Y_B}{2} = \frac{2+3}{2} = \frac{5}{2}$$

$$M\left(\frac{-1}{2}; \frac{5}{2}\right) :$$

M N

$$N\left(\frac{-1}{2}; \frac{5}{2}\right) :$$

$$X_P = \frac{X_A + X_C}{2} = \frac{1-2}{2} = -\frac{1}{2}$$

$$Y_P = \frac{Y_A + Y_C}{2} = \frac{2-7}{2} = \frac{-7}{2}$$

$$P\left(\frac{-1}{2}; \frac{-7}{2}\right) :$$

$$\overrightarrow{CB} + \overrightarrow{DA}, \overrightarrow{DA} ; \overrightarrow{CB} ; \overrightarrow{AB} : \quad /3$$

$$\overrightarrow{AB}\begin{pmatrix} -3 \\ 1 \end{pmatrix} : \quad Y_B - Y_A = 1 \quad X_B - X_A = -3 \quad /^*$$

$$\overrightarrow{DA}\begin{pmatrix} -5 \\ 6 \end{pmatrix}, \overrightarrow{CB}\begin{pmatrix} 0 \\ 10 \end{pmatrix} : \quad /^*$$

$$\vec{CB} + \vec{DA} \begin{pmatrix} 0 + (-5) \\ 10 + 6 \end{pmatrix}$$

$$\vec{CB} + \vec{DA} \begin{pmatrix} -5 \\ 16 \end{pmatrix}$$

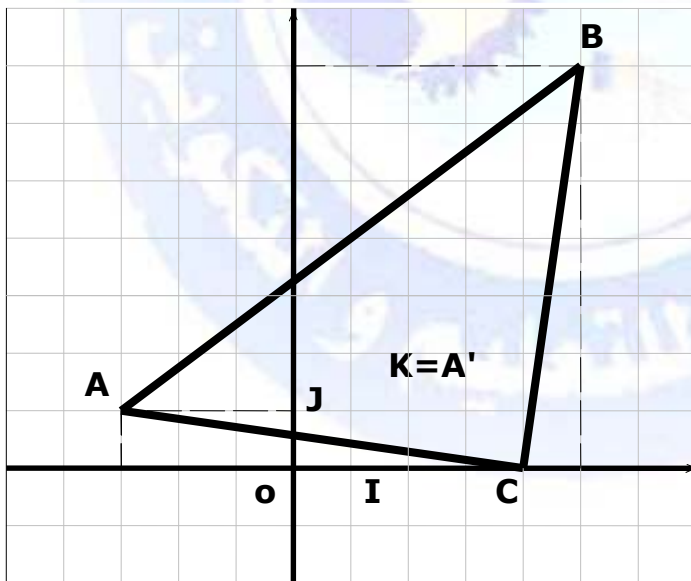
:

$$(O I J) \quad \vec{AB} \begin{pmatrix} -3 \\ 1 \end{pmatrix}$$

$$AB = \sqrt{(-3)^2 + 1^2} = \sqrt{9+1} \quad :$$

$$\begin{aligned} CB + DA &= \sqrt{(0)^2 + (1)^2} + \sqrt{(-5)^2 + (6)^2} \\ &= \sqrt{10^2} + \sqrt{25+36} \end{aligned}$$

$$CB + AB = 10 + 61$$



$$C \quad AC \quad /$$

$$X_C - X_A = 4 - (-2) = 6$$

$$Y_C - Y_A = 0 - 1 = -1$$

$$\vec{AC} \begin{pmatrix} 6 \\ -1 \end{pmatrix}$$

$$\vec{CB} \begin{pmatrix} 1 \\ 7 \end{pmatrix}$$

$$C \quad ABC \quad /$$

$$\vec{AB} \begin{pmatrix} 8 \\ 6 \end{pmatrix} \quad :$$

:

$$AB = \sqrt{(8)^2 + (6)^2} = \sqrt{100}$$

$$AB = 10 \quad :$$

$$AC = \sqrt{(7)^2 + (-1)^2} = \sqrt{100} : \quad \overrightarrow{AC} \begin{pmatrix} 7 \\ -1 \end{pmatrix}$$

$$: \quad \overrightarrow{CB} \begin{pmatrix} 1 \\ 7 \end{pmatrix}$$

$$CB = \sqrt{(1)^2 + (7)^2} = \sqrt{50}$$

C : AC = CB: /*

$$AC^2 + CB^2 = (\sqrt{50})^2 + (\sqrt{50})^2 = 100, AB^2 = 100: /*$$

$$AB^2 = AC^2 + CB^2 :$$

ABC:

ABC :

C

ABC

(C)

(AB)

(C)

M

$$X_M = \frac{x_A + x_B}{2} = \frac{-3 + 5}{2} = \frac{2}{2} = 1$$

$$Y_M = \frac{y_A + y_B}{2} = \frac{1 + 7}{2} = \frac{8}{2} = 4$$

M(1 4) :

R= AB : *

$$R= 10=5$$

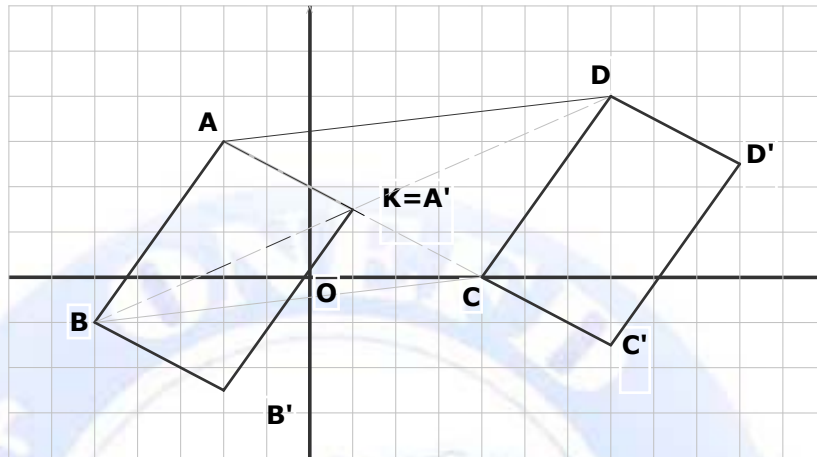
R= 5

M(1 4)

(c)

:

:



4

3

A

-

.

$$\overrightarrow{AB} \begin{pmatrix} -3 \\ -4 \end{pmatrix} :$$

.

1

9

C B

-

$$\overrightarrow{BC} \begin{pmatrix} 9 \\ 1 \end{pmatrix} :$$

$$AC \begin{pmatrix} 6 \\ -3 \end{pmatrix} :$$

:

-

$$X_B - X_A = (-5) - (-2) = -3$$

$$Y_B - Y_A = (-1) - (-3) = -4$$

$$\overrightarrow{AB} \begin{pmatrix} -3 \\ -4 \end{pmatrix} :$$

ABCD

D

-

$$\overrightarrow{AD} = \overrightarrow{BC} : \quad ABCD$$

$$\overrightarrow{AD} \begin{pmatrix} x+2 \\ y-3 \end{pmatrix}, \overrightarrow{BC} \begin{pmatrix} 9 \\ 1 \end{pmatrix} :$$

$$D(7;4) \quad \begin{cases} x = 9 - 2 \\ y = 1 + 3 \end{cases} \quad \begin{cases} x + 2 = 9 \\ y - 3 = 1 \end{cases} :$$

$$AK = BB' \quad AK \quad C \quad C' /$$

$$K \left(1; \frac{3}{2} \right) : \quad ((AC) \quad K)$$

$$B' \left(-2; \frac{-5}{2} \right) \quad \begin{cases} x + 5 = 1 + 2 \\ y + 1 = \frac{3}{2} - 3 \end{cases} :$$

$$C' \left(7; \frac{-3}{2} \right) :$$

(ζ) E

$$E(4,3) : \quad *$$

$$, OE = 5 \quad OE = \sqrt{25} \quad , \quad OE = \sqrt{(4)^2 + (3)^2} :$$

ECζ:

: ECF *

(EF) () F: () O () O E F:

F E ()

ECF :

ABC *

$$E(4 \ 3) :$$

$$OE = 5 : \quad OE = 25 \quad OE = (4)^2 + (3)^2 :$$

:

ECF *

() O () O E F:

.F E () C () (EF) () F:

ECF :

:

ABC

$$AB^2 = 17 : \quad AB = (-2 - (-1))^2 + (-1 - 3)^2 = 17$$

$$BC^2 = 85 \quad AC^2 = 68:$$

$$AB^2 + AC^2 = BC^2 : \quad 17 + 68 = 85 :$$

.A ABC :

$$ABC \quad S \quad /2$$

: A

$$AC = 68 = 4 \times 17 \quad AB = 17 \quad S = 1/2 AB \times AC$$

$$AC = 2 \sqrt{17} :$$

$$A = 17 : \quad A = 1/2 \sqrt{17} \times 2 \sqrt{17} :$$

$$AH \quad /3$$

$$A = 1/2 AH \times BC: \quad (BC)$$

$$AH = 2A :$$

$$AH = 2 \times 17 :$$

:

$$10^{-1} \quad AH = 3$$

:

() D C B A -

(AB) D C B A ()

(CD) (BC)

.I(1 6)

(O I J)

$$IA = IB = ID = IC :$$

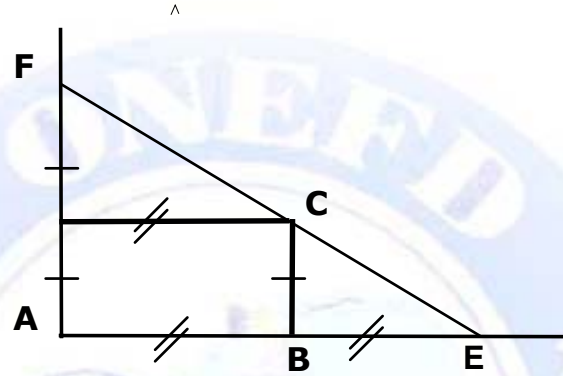
$$IA = \sqrt{(X_A - X_I)^2 + (Y_A - Y_I)^2} = \sqrt{20} = 2\sqrt{5}$$

$$ID = 2\sqrt{5} \quad IC = 2\sqrt{5} \quad IB = 2\sqrt{5} :$$

$$I(1 \ 6) \quad () \quad DCBA :$$

$$R = 2\sqrt{5} :$$

FCE



(EF) C

D(0 1) B(1 0) A(0 0) : (A B D)

. C(1 1)

E(2 0) : B A E

F(0 2) : D A F

$$\frac{Y_E + Y_F}{2} = 1 = Y_C \quad \frac{X_E + X_F}{2} = 1 = X_C :$$

(EF) C:

FCE :