

Alıştırmalar ve Problemler-3.1

1. a. $\binom{6}{2} - 3 \cdot \binom{3}{2} + 3 = 9$

b. FE//BC, DE//BA, DF//CA olduğundan;
(9-6)+3=6 doğrultu belirtirler.

c. $2 \cdot \binom{6}{2} = 30$

G nokta ikişer ikişer $\binom{6}{2}$ tane doğru parçası,

$2 \cdot \binom{6}{2} = 30$ tane de yönlü doğru parçası belirtir.

d. $\overline{FE} = \overline{BD} = \overline{DC}$ ve $\overline{EF} = \overline{DB} = \overline{CD}$ gibi, \overline{DE} 'nin eşleri ile \overline{DF} 'nin eşleri çıkarılırsa,
 $30 - 3 \cdot (6 - 2) = 18$ vektör belirtirler.

2. a. $\binom{5}{2} = 10$ doğru

b. AB//DC ve AD//BC olduğundan, 8 doğrultu belirtir.

c. $2 \cdot \binom{5}{2} = 20$ yönlü doğru parçası

d. $\overline{AD} = \overline{BC}$, $\overline{DA} = \overline{CB}$, $\overline{AB} = \overline{DC}$ ve $\overline{BA} = \overline{CD}$ olduğundan $20 - 4 = 16$ vektör.

3. a. I. $\overline{AD} + \overline{FD} + \overline{FK} = \overline{CX}_1 = \overline{X}_2\overline{M}$

$$\Rightarrow 3\vec{u} - 2\vec{u} + 3\vec{u} = \overline{CX}_1 = \overline{X}_2\overline{M}$$

$$\Rightarrow 4\vec{u} = \overline{CX}_1 = \overline{X}_2\overline{M}$$

$\Rightarrow X_1$ ile G ve X_2 ile G çakışır.

II. $\overline{FC} + \overline{DH} - \overline{HE} = \overline{KX}_3 = \overline{X}_4\overline{F}$

$$\Rightarrow -3\vec{u} + 4\vec{u} - (-3\vec{u}) = \overline{KX}_3 = \overline{X}_4\overline{F}$$

$$\Rightarrow 4\vec{u} = \overline{KX}_3 = \overline{X}_4\overline{F}$$

$\Rightarrow X_3$ ile P ve X_4 ile B çakışır.

III. $\overline{DK} + 2\overline{KF} - 3\overline{FD} = \overline{DX}_5 = \overline{X}_6\overline{K}$

$$\Rightarrow 5\vec{u} + 2(-3\vec{u}) - 3(-2\vec{u}) = \overline{DX}_5 = \overline{X}_6\overline{K}$$

$$\Rightarrow 5\vec{u} = \overline{DX}_5 = \overline{X}_6\overline{K}$$

$\Rightarrow X_5$ ile K ve X_6 ile D çakışır.

IV. $4\overline{FH} - 3\overline{EH} - 2\overline{EC} = \overline{HX}_7 = \overline{X}_8\overline{E}$

$$\Rightarrow 4 \cdot 2\vec{u} - 3 \cdot 3\vec{u} - 2 \cdot (-2\vec{u}) = \overline{HX}_7 = \overline{X}_8\overline{E}$$

$$\Rightarrow 3 \cdot \vec{u} = \overline{HX}_7 = \overline{X}_8\overline{E}$$

$\Rightarrow X_7$ ile M ve X_8 ile B çakışır.

b. I. $\overline{AD} + \overline{BH} + \overline{MH} = m \cdot \overline{DG}$

$$\Rightarrow 3\vec{u} + 6\vec{u} + (-3\vec{u}) = m \cdot 3\vec{u}$$

$\Rightarrow m = 2$ olur.

II. $3\overline{EK} - 4\overline{GK} + 5\overline{MK} = m \cdot \overline{BD}$

$$3 \cdot 3\vec{u} - 4 \cdot 2\vec{u} + 5 \cdot (-2\vec{u}) = m \cdot 2\vec{u}$$

$$\Rightarrow m = -\frac{9}{2}$$

III. $m = \frac{1}{2}$

IV. $m = -3$

4. a. I. $\overline{CE} + \overline{FG} = \overline{CX}$

$$\Rightarrow (2\vec{u} + 3\vec{v}) + (\vec{u} - 4\vec{v}) = \overline{CX}$$

$$\Rightarrow 3\vec{u} - \vec{v} = \overline{CX} \Rightarrow \overline{CX} = \overline{CD}$$

X noktası D ile çakışır.

II. $\overline{AC} + 2\overline{BC} + \overline{DF} = \overline{YF}$

$$\Rightarrow (2\vec{u} + \vec{v}) + 2(\vec{u} - 2\vec{v}) + (\vec{u} + 2\vec{v}) = \overline{YF}$$

$$\Rightarrow 5\vec{u} - \vec{v} = \overline{YF} \Rightarrow \overline{YF} = -5\vec{u} + \vec{v}$$

$$\Rightarrow \overline{YF} = \overline{FB}$$

Y noktası B ile çakışır.

III. $\overline{BD} - 2\overline{EF} + \overline{CE} = 2\overline{DZ}$

$$\Rightarrow (4\vec{u} - 3\vec{v}) - 2(2\vec{u} - 2\vec{v}) + (2\vec{u} + 3\vec{v}) = 2 \cdot \overline{DZ}$$

$$\Rightarrow 2\vec{u} + 4\vec{v} = 2\overline{DZ} \Rightarrow \overline{DZ} = \vec{u} + 2\vec{v}$$

$$\Rightarrow \overline{DZ} = \overline{DF}$$

Z ile F çakışır.

$$\text{IV. } \overline{AE} - \overline{DE} + 2\overline{EB} = \overline{FT}$$

$$\Rightarrow 4\vec{u} + 4\vec{v} - (-\vec{u} + 4\vec{v}) + 2(-3\vec{u} - \vec{v}) = \overline{FT}$$

$$\Rightarrow -\vec{u} - 2\vec{v} = \overline{FT} \Rightarrow \overline{FT} = \overline{FD}$$

T ile D çakışmıştır.

$$\text{b. I. } \overline{AB} = x\overline{DC} + y\overline{EF}$$

$$\Rightarrow \vec{u} + 3\vec{v} = x(-3\vec{u} + \vec{v}) + y(2\vec{u} - 2\vec{v})$$

$$\Rightarrow \begin{cases} -3x + 2y = 1 \\ x - 2y = 3 \end{cases} \Rightarrow x = -2, y = -\frac{5}{2}$$

$$\text{II. } \overline{EG} = x\overline{AC} + y\overline{DF}$$

$$\Rightarrow 3\vec{u} - 6\vec{v} = x(2\vec{u} + \vec{v}) + y(\vec{u} + 2\vec{v})$$

$$\Rightarrow \begin{cases} 2x + y = 3 \\ x + 2y = -6 \end{cases} \Rightarrow x = 4, y = -5$$

$$\text{III. } \overline{DF} = x\overline{BE} + y\overline{GH}$$

$$\Rightarrow \vec{u} + 2\vec{v} = x(3\vec{u} + \vec{v}) + y(\vec{u} + 2\vec{v})$$

$$\Rightarrow \begin{cases} 3x + y = 1 \\ x + 2y = 2 \end{cases} \Rightarrow x = 0, y = 1$$

$$\text{IV. } \overline{AC} = x\overline{FD} + y\overline{HG}$$

$$\Rightarrow 2\vec{u} + \vec{v} = x(-\vec{u} - 2\vec{v}) + y(-\vec{u} - 2\vec{v})$$

$$\Rightarrow \begin{cases} -x - y = 2 \\ -2x - 2y = 1 \end{cases} \Rightarrow \zeta = \emptyset$$

\overline{AC} vektörü, \overline{FD} ve \overline{HG} türünden yazılamaz.

$$\text{V. } \overline{AC} + \overline{GE} = x\overline{AB} + y\overline{CD}$$

$$\Rightarrow (2\vec{u} + \vec{v}) + (-3\vec{u} + 6\vec{v}) = x(\vec{u} + 3\vec{v}) + y(3\vec{u} - \vec{v})$$

$$\Rightarrow \begin{cases} x + 3y = -1 \\ 3x - y = 7 \end{cases} \Rightarrow x = 2, y = -1$$

$$\text{VI. } 2\overline{BC} + \overline{BD} = x\overline{CF} + y\overline{FG}$$

$$\Rightarrow 2(\vec{u} - 2\vec{v}) + (4\vec{u} - 3\vec{v})$$

$$= x(4\vec{u} + \vec{v}) + y(\vec{u} - 4\vec{v})$$

$$\Rightarrow \begin{cases} 4x + y = 6 \\ x - 4y = -7 \end{cases} \Rightarrow x = 1, y = 2$$

$$\text{5. a. } x \cdot \overline{AB} + y \cdot \overline{BC} = 0$$

$$\Rightarrow x(3\vec{u} - 2\vec{v}) + y(-2\vec{u} - 2\vec{v}) = 0$$

$$\Rightarrow \begin{cases} 3x - 2y = 0 \\ -2x - 2y = 0 \end{cases} \Rightarrow x = 0, y = 0$$

\overline{AB} ile \overline{BC} doğrusal bağımsızdır. Biri, diğeri türünden yazılamaz.

$$\text{b. } x \cdot \overline{BG} + y \cdot \overline{HD} = 0$$

$$\Rightarrow x(2\vec{u} + \vec{v}) + y(2\vec{u} + \vec{v}) = 0$$

$$\Rightarrow \begin{cases} 2x + 2y = 0 \\ x + y = 0 \end{cases} \Rightarrow x = k, y = -k$$

\overline{BG} ile \overline{HD} doğrusal bağımlıdır.

$\overline{BG} = \overline{HD}$ dir.

$$\text{c. } x \cdot \overline{AA} + y \cdot \overline{DE} = 0$$

$$\Rightarrow x \cdot (0 \cdot \vec{u} + 0 \cdot \vec{v}) + y(\vec{u} + 2\vec{v}) = 0$$

$$\Rightarrow y = 0, x = k, (k \in \mathbb{R})$$

\overline{AA} ile \overline{DE} doğrusal bağımlıdır.

$\overline{AA} = 0 \cdot \overline{DE}$ dir.

\overline{DE} vektörü \overline{AA} türünden yazılamaz.

$$\text{d. } x \cdot \overline{DK} + y \cdot \overline{FK} + z \cdot \overline{DE} = 0$$

$$\Rightarrow x(-\vec{u} + 2\vec{v}) + y(2\vec{u} - 4\vec{v}) + z(\vec{u} + 2\vec{v}) = 0$$

$$\Rightarrow \begin{cases} -x + 2y + z = 0 \\ 2x - 4y + 2z = 0 \end{cases}$$

$$\Rightarrow z = 0, y = k, x = 2k; (k \in \mathbb{R})$$

\overline{DK} , \overline{FK} ve \overline{DE} doğrusal bağımlıdır.

$$2 \cdot \overline{DK} + \overline{FK} + 0 \cdot \overline{DE} = 0$$

$$\Rightarrow \overline{DK} = -\frac{1}{2}\overline{FK} + 0 \cdot \overline{DE} \text{ ve}$$

$$\overline{FK} = -2\overline{DK} + 0 \cdot \overline{DE} \text{ yazılır.}$$

\overline{DE} vektörü diğerleri türünden yazılamaz.

$$\begin{aligned} \text{e. } x \cdot \overline{BK} + y \cdot \overline{KG} + z \cdot \overline{DG} + t \cdot \overline{DE} &= 0 \\ \Rightarrow x(3\vec{u} - \vec{v}) + y(-\vec{u} + 2\vec{v}) + z(-2\vec{u} + 4\vec{v}) \\ &+ t(\vec{u} + 2\vec{v}) = 0 \end{aligned}$$

$$\Rightarrow \left. \begin{aligned} 2x - 3x - y - 2z + t &= 0 \\ -x + 2y + 4z + 2t &= 0 \end{aligned} \right\}$$

$$\Rightarrow 5x + 4t = 0; \quad x = 4k, \quad t = -5k$$

$$\Rightarrow y + 2z = 7k; \quad z = m, \quad y = 7k - 2m$$

$k = 1$ ve $m = 1$ alınırsa

$$x = 4, \quad y = 5, \quad z = 1, \quad t = -5 \text{ olur.}$$

$$4\overline{BK} + 5\overline{KG} + \overline{DG} - 5\overline{DE} = 0 \text{ yazılır.}$$

Vektörlerin her biri diğerleri türünden ifade edilebilir.

$$\begin{aligned} \text{f. } x \cdot \overline{BC} + y \cdot \overline{HK} + z \cdot \overline{KD} &= 0 \\ \Rightarrow x(-2\vec{u} - 2\vec{v}) + y(\vec{u} + 3\vec{v}) + z(\vec{u} - 2\vec{v}) &= 0 \\ \Rightarrow \left. \begin{aligned} -2x + y + z &= 0 \\ -2x + 3y - 2z &= 0 \end{aligned} \right\} \end{aligned}$$

$$\Rightarrow -2y + 3z = 0; \quad y = 6k, \quad z = 4k, \quad x = 5k$$

$$k = 1 \text{ alınırsa; } x = 5, \quad y = 6, \quad z = 4$$

$$5\overline{BC} + 6\overline{HK} + 4\overline{KD} = 0 \text{ yazılır.}$$

Her vektör diğerleri türünden ifade edilebilir.

$$6. \quad \overline{EF} = \overline{EA} + \overline{AB} + \overline{BF} \quad (1)$$

$$\overline{EF} = \overline{ED} - \overline{CD} + \overline{CF} \quad (2)$$

(1) ve (2) taraf tarafa toplanırsa;

$$2\overline{EF} = \overline{AB} - \overline{CD} \Rightarrow \overline{EF} = \frac{1}{2}(\overline{AB} - \overline{CD}) \text{ bulunur.}$$

$$\begin{aligned} 7. \quad \overline{AB} = \overline{CD} &\Rightarrow \overline{AC} + \overline{CB} = \overline{CB} + \overline{BD} \\ &\Rightarrow \overline{AC} = \overline{BD} \end{aligned}$$

$$8. \text{ a. } \overline{GA} + \overline{GB} + \overline{GC} = 0 \text{ olduğunu biliyoruz.}$$

$$\overline{OA} = \overline{OG} + \overline{GA}$$

$$\overline{OB} = \overline{OG} + \overline{GB}$$

$$+ \overline{OC} = \overline{OG} + \overline{GC}$$

$$\overline{OA} + \overline{OB} + \overline{OC} = 3\overline{OG}$$

$$\text{b. } \overline{OD} = \overline{OB} + \frac{1}{2}\overline{BC}$$

$$\overline{OE} = \overline{OC} + \frac{1}{2}\overline{CA}$$

$$\overline{OF} = \overline{OA} + \frac{1}{2}\overline{AB}$$

$$+ \overline{OD} + \overline{OE} + \overline{OF} = \overline{OA} + \overline{OB} + \overline{OC}$$

$$9. \text{ a. } \overline{DF} = \overline{DA} + \overline{AF}$$

$$\Rightarrow \overline{DF} = \frac{2}{3}\overline{BA} + \frac{1}{2}(-\overline{BA} + \overline{BC})$$

$$\Rightarrow \overline{DF} = \frac{1}{6}\overline{BA} + \frac{1}{2}\overline{BC}$$

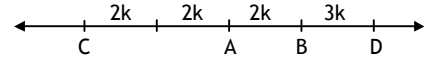
$$\text{b. } \overline{AC} = 2\overline{AF}$$

$$\Rightarrow \overline{AC} = 2 \cdot (\overline{AD} + \overline{DF})$$

$$\Rightarrow \overline{AC} = 2 \cdot (-2\overline{DE} + \overline{DF})$$

$$\Rightarrow \overline{AC} = 2\overline{DF} - 4\overline{DE}$$

10.



Verilenlere göre A, B, C, D noktaları doğrusaldır ve şekildeki gibi dizilirler.

$$\overline{AD} = \frac{5}{6}\overline{BC} \text{ olur.}$$

$$11. \text{ a. } \overline{AB} + \overline{BC} = \overline{AD} + \overline{DC}$$

$$\Rightarrow \overline{AB} + \overline{DC} = \overline{AD} - \overline{BC}$$

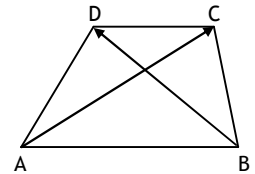
$$\text{b. } \overline{AC} = \overline{AB} + \overline{BC}$$

$$+ \overline{BD} = \overline{BA} + \overline{AD}$$

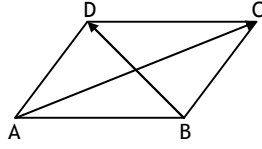
$$\overline{AC} + \overline{BD} = \overline{AD} + \overline{BC}$$

$$\text{c. } \overline{AC} - \overline{BD} = \overline{AB} + \overline{DC} - (\overline{BC} + \overline{CD})$$

$$\Rightarrow \overline{AC} - \overline{BD} = \overline{AB} - \overline{CD}$$



$$\begin{aligned} 12. \text{ a. } \overline{AC} &= \overline{AB} + \overline{BC} \\ + \overline{BD} &= \overline{BA} + \overline{BC} \\ \hline \overline{AC} + \overline{BD} &= 2 \cdot \overline{BC} \end{aligned}$$



$$\text{b. } \overline{AC} - \overline{BD} = 2 \cdot \overline{AB}$$

13. a. $\{\vec{0}, \vec{u}\}$ kümesi doğrusal bağımlıdır. Ancak ;
 \vec{u} vektörü $\vec{0}$ türünden ifade edilemez.

b. $\{\vec{0}, \vec{u}, \vec{v}\}$ kümesi doğrusal bağımlıdır.

Ancak, \vec{u} ile \vec{v} vektörleri diğerleri türünden ifade edilemez.

c. ve d. deki kümeler doğrusal bağımsızdır.

e. ve f. deki kümeler doğrusal bağımlıdır.

$$14. \text{ a. } \overline{AD}$$

$$\text{b. } \overline{NK}$$

$$15. \text{ a. } \vec{0}$$

$$\text{b. } \frac{3}{2} \overline{AD}$$

$$\text{c. } \overline{AF} = \overline{BC} - \overline{AB}$$

$$\overline{AE} = \overline{AF} + \overline{FE} = 2\overline{BC} - \overline{AB}$$

$$\overline{AD} = 2\overline{BC}$$

$$+ \overline{AC} = \overline{AB} + \overline{BC}$$

$$\overline{AF} + \overline{AE} + \overline{AD} + \overline{AC} = -\overline{AB} + 6\overline{BC}$$

$$16. \text{ a. } \vec{a} + 3\vec{b} + \vec{c}$$

$$\text{b. } 3\vec{b} + \vec{c}$$

$$\text{c. } \vec{v} = 4\vec{c}; \quad |\vec{v}| = 4$$

$$17. \text{ a. } (x, y) = (-1, 1)$$

$$\text{b. } (x, y) = (2, 2)$$

$$\text{c. } (x, y, z) = (1, 1, -1)$$

\vec{a} , \vec{b} , \vec{c} doğrusal bağımlıdır.

$$\text{d. } (x, y) = (0, 0);$$

\vec{a} ile \vec{b} doğrusal bağımsızdır.

e. III, IV, VI kümeleri doğrusal bağımlıdır.

$$18. \text{ a. } \frac{2}{3} \quad \text{b. } \overline{BD} = \frac{3}{5} \overline{BA} + \frac{2}{5} \overline{BC}$$

$$19. \overline{DE} = \frac{1}{2} \overline{BA} + x \overline{BC}$$

$$\Rightarrow \frac{2}{3} \overline{BA} + y \overline{AC} = \frac{1}{2} \overline{BA} + x (\overline{BA} + \overline{AC})$$

$$\Rightarrow x = y = \frac{1}{6} \text{ bulunur.}$$

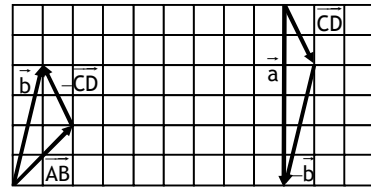
$$20. \text{ a. } (x, y) = \left(\frac{2}{3}, \frac{-1}{6}\right) \quad \text{b. } (x, y) = \left(-\frac{1}{6}, \frac{8}{9}\right)$$

$$21. \text{ a. } (x, y) = \left(\frac{5}{12}, 1\right) \quad \text{b. } \left(1, \frac{-1}{6}\right)$$

$$22. \text{ a. } \frac{2}{3} \quad \text{b. } \frac{5}{6} \quad \text{c. } \frac{1}{6}$$

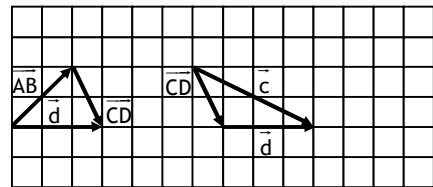
$$23. \text{ a. } \overline{AB} - \overline{CD} = \vec{b}$$

$$\overline{CD} - \vec{b} = \vec{a}$$



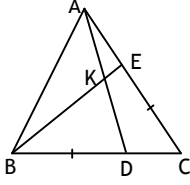
$$\text{b. } \overline{AB} + \overline{CD} = \vec{c}$$

$$\overline{CD} + \vec{b} =$$



$$\begin{aligned} \text{c. } \left. \begin{aligned} \vec{a} + 2\vec{b} &= 2\vec{u} + 2\vec{v} \\ \vec{a} + \vec{b} &= \vec{u} - 2\vec{v} \end{aligned} \right\} \Rightarrow \begin{cases} \vec{b} = \vec{u} + 4\vec{v} \\ \vec{a} = -4\vec{v} \end{cases} \\ \left. \begin{aligned} -\vec{c} + 2\vec{d} &= 2\vec{u} + 2\vec{v} \\ \vec{c} - \vec{d} &= \vec{u} - 2\vec{v} \end{aligned} \right\} \Rightarrow \begin{cases} \vec{c} = 4\vec{u} - 2\vec{v} \\ \vec{d} = 3\vec{u} \end{cases} \end{aligned}$$

24.



a. Eşitlikteki vektörleri \vec{BA} ve \vec{BC} türünden yazalım:

$$\begin{aligned} \vec{BK} + \vec{KD} &= \vec{BD} \\ \Rightarrow x\vec{BE} + y\vec{AD} &= \vec{BD} \\ \Rightarrow x\left[\vec{BA} + \frac{1}{3}(-\vec{BA} + \vec{BC})\right] + y\left[-\vec{BA} + \frac{2}{3}\vec{BC}\right] &= \frac{2}{3}\vec{BC} \\ \Rightarrow \left. \begin{aligned} \frac{2}{3}x - y &= 0 \\ \frac{1}{3}x + \frac{2}{3}y &= \frac{2}{3} \end{aligned} \right\} \Rightarrow x = \frac{6}{7}, y = \frac{4}{7} \end{aligned}$$

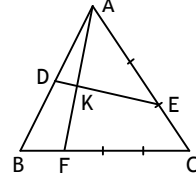
b. Eşitlikteki vektörleri \vec{AB} ve \vec{BC} türünden yazalım:

$$\begin{aligned} \vec{AK} + \vec{KB} &= \vec{AB} \\ \Rightarrow (1-y)\vec{AD} - x\vec{BE} &= \vec{AB} \\ \Rightarrow (1-y)\left(\vec{AB} + \frac{2}{3}\vec{BC}\right) - x\left[-\vec{AB} + \frac{1}{3}(\vec{AB} + \vec{BC})\right] &= \vec{AB} \\ \Rightarrow \left. \begin{aligned} 1-y + \frac{2}{3}x &= 1 \\ \frac{2}{3}(1-y) - \frac{1}{3}x &= 0 \end{aligned} \right\} \Rightarrow x = \frac{6}{7}, y = \frac{4}{7} \end{aligned}$$

c. Vektörleri \vec{AB} ve \vec{AC} türünden yazalım:

$$\begin{aligned} \vec{AK} + \vec{KE} &= \vec{AE} \\ \Rightarrow (1-y)\vec{AD} + (1-x)\vec{BE} &= \vec{AE} \\ \Rightarrow (1-y)\left[\vec{AB} + \frac{2}{3}(-\vec{AB} + \vec{AC})\right] + (1-x)\left(-\vec{AB} + \frac{1}{3}\vec{AC}\right) &= \frac{1}{3}\vec{AC} \\ \Rightarrow \left. \begin{aligned} \frac{1-y}{3} + x - 1 &= 0 \\ \frac{2-2y}{3} + \frac{1-x}{3} &= \frac{1}{3} \end{aligned} \right\} \Rightarrow x = \frac{6}{7}, y = \frac{4}{7} \end{aligned}$$

25.



a. $\vec{AK} = x \cdot \vec{AF}$; $\vec{DK} = y \cdot \vec{DE}$; $\vec{AK} + \vec{KD} = \vec{AD}$

eşitliğindeki vektörleri \vec{AB} ve \vec{BC} türünden yazalım:

$$\begin{aligned} \vec{AK} + \vec{KD} &= \vec{AD} \\ \Rightarrow x\vec{AF} + y\vec{DE} &= \vec{AD} \\ \Rightarrow x\left(\vec{AB} + \frac{1}{4}\vec{BC}\right) + y\left[-\frac{1}{2}\vec{AB} + \frac{2}{3}(\vec{AB} + \vec{BC})\right] &= \frac{1}{2}\vec{AB} \end{aligned}$$

$$\Rightarrow \left. \begin{aligned} x + \frac{1}{6}y &= \frac{1}{2} \\ \frac{1}{4}x + \frac{2}{3}y &= 0 \end{aligned} \right\} \Rightarrow x = \frac{8}{15}, y = \frac{-1}{5}$$

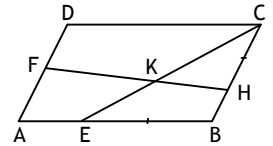
b. $\frac{|KA|}{|KF|} = \frac{8}{7}$ olur.

$\frac{|KD|}{|KE|} = \frac{1}{4}$ olur.

26. $\vec{CK} = x\vec{CE}$ ve $\vec{KH} = y\vec{FH}$ olsun.

$\vec{CK} + \vec{KH} = \vec{CH}$ eşitliğindeki vektörleri

\vec{AB} ve \vec{BC} türünden yazalım:



$$\begin{aligned}\overline{CK} + \overline{KH} &= \overline{CH} \\ \Rightarrow x\overline{CE} + y\overline{FH} &= \overline{CH} \\ \Rightarrow x\left(-\overline{BC} - \frac{2}{3}\overline{AB}\right) + y\left(-\frac{1}{2}\overline{BC} + \overline{AB} + \frac{1}{3}\overline{BC}\right) \\ &= -\frac{2}{3}\overline{BC}\end{aligned}$$

$$\Rightarrow \left. \begin{aligned} -x - \frac{1}{6}y &= -\frac{2}{3} \\ -\frac{2}{3}x + y &= 0 \end{aligned} \right\} \Rightarrow x = \frac{3}{5}, y = \frac{2}{5}$$

$$\text{a. } \frac{|\overline{CK}|}{|\overline{KE}|} = \frac{3}{2}$$

$$\text{b. } \frac{|\overline{FK}|}{|\overline{KH}|} = \frac{3}{2}$$

$$27. \overline{EK} = x\overline{EF},$$

$$\overline{GK} = y\overline{GH}$$

$$\overline{GK} + \overline{KE} = \overline{GA} + \overline{AE}$$

$$\Rightarrow y\overline{GH} - x\overline{EF} = \overline{GA} + \overline{AE}$$

$$\begin{aligned}\Rightarrow y\left(\frac{1}{2}\overline{AB} + \overline{BC} - \frac{1}{3}\overline{AB}\right) - x\left(-\frac{1}{2}\overline{BC} + \overline{AB} + \frac{1}{3}\overline{BC}\right) \\ = -\frac{1}{2}\overline{AB} + \frac{1}{3}\overline{BC}\end{aligned}$$

$$\Rightarrow \left. \begin{aligned} \frac{1}{6}y - x &= \frac{1}{2} \\ y + \frac{1}{6}x &= \frac{1}{3} \end{aligned} \right\} \Rightarrow x = \frac{-16}{37}, y = \frac{15}{37}$$

