第7回の答え

1. (1) D, F

(2) B, E, F, G, H

(3) F

(4) E

(5) D, E, F, K

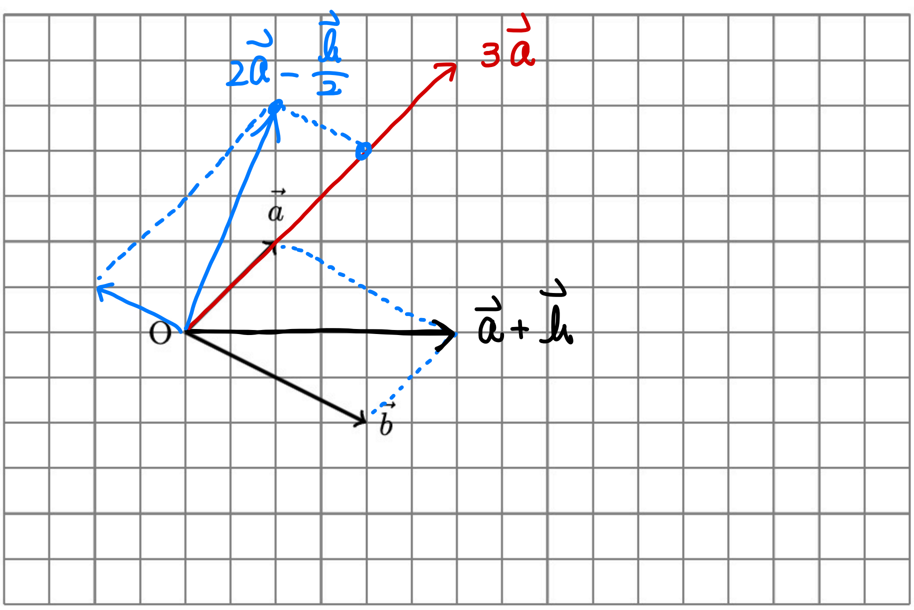
2. $\overrightarrow{PQ} - \overrightarrow{RS}$

$= \overrightarrow{PR} + \overrightarrow{RQ} + \overrightarrow{SR}$

$= \overrightarrow{PR} + \overrightarrow{RQ} + \overrightarrow{SQ} + \overrightarrow{QR}$

$= \overrightarrow{PR} + \overrightarrow{SQ}$ ■

3.



4. (1) $\vec{a}+2\vec{a}-5\vec{a}$

$= -2\vec{a}$ 〃

(2) $-3(2\vec{a}-3\vec{b})-4(-3\vec{a}-2\vec{b})$

$= -6\vec{a}+12\vec{a}+9\vec{b}+8\vec{b}$

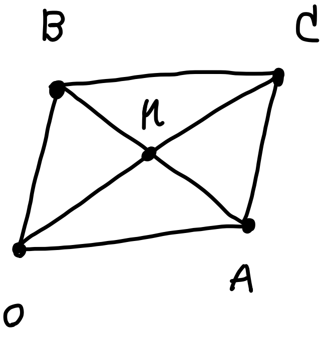
$= 6\vec{a}+17\vec{b}$ 〃

5. $2\vec{a}+\vec{x} = 2\vec{x}-3\vec{b}$

$\vec{x} = 2\vec{a}+3\vec{b}$ 〃

6. $\dfrac{\pm\vec{a}}{6}$

7. (1) $\overrightarrow{AB} = \vec{b}-\vec{a}$ 〃



(2) $\overrightarrow{AM} = \overrightarrow{OM}-\vec{a}$

$= -\dfrac{\vec{a}}{2}+\dfrac{\vec{b}}{2}$ 〃

(3) $\vec{a}+\vec{b}$ 〃

(4) $\overrightarrow{OM} = \dfrac{1}{2}(\vec{a}+\vec{b})$ 〃

8. (1) $\vec{a} + \vec{b}$

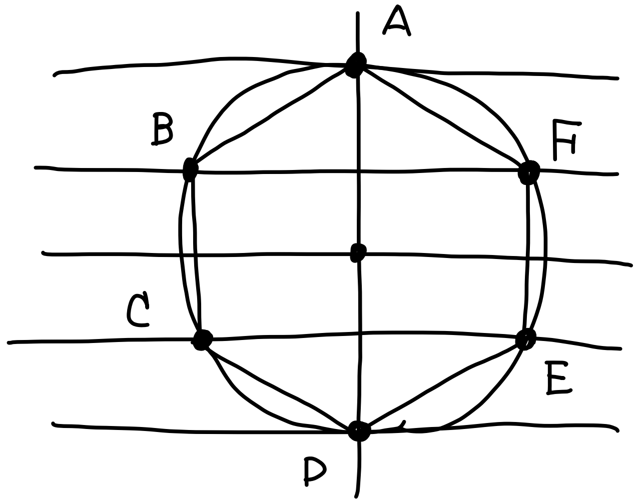
(2) $\overrightarrow{EC}$

$= \overrightarrow{AC} - \overrightarrow{AE}$

$= \vec{a} + (\vec{a} + \vec{b})$

$\quad - (\vec{b} + \vec{a} + \vec{b})$

$= \vec{a} - \vec{b}$ //



(3) $\overrightarrow{CA} = -2\vec{a} - \vec{b}$ //

(4) $\overrightarrow{EA} = -(\vec{b} + \vec{a} + \vec{b})$

$= -\vec{a} - 2\vec{b}$ //

9. $\vec{a} = \begin{pmatrix} -1 \\ 2 \end{pmatrix}$, $\vec{b} = \begin{pmatrix} 2 \\ 3 \end{pmatrix}$

(1) $-2\vec{a} = \begin{pmatrix} 2 \\ -4 \end{pmatrix}$

(2) $2\vec{a} - 3\vec{b} = 2\begin{pmatrix} -1 \\ 2 \end{pmatrix} - 3\begin{pmatrix} 2 \\ 3 \end{pmatrix}$

$= \begin{pmatrix} -2-6 \\ 4-9 \end{pmatrix}$

$= \begin{pmatrix} -8 \\ -5 \end{pmatrix}$ //

10. $\vec{p} = s\begin{pmatrix}-1\\1\end{pmatrix} + t\begin{pmatrix}1\\-3\end{pmatrix}$

$$\begin{pmatrix}-5\\3\end{pmatrix} = \begin{pmatrix}-s+t\\s-3t\end{pmatrix}$$

$$\begin{cases}-5 = -s+t\\3 = s-3t\end{cases}$$

$$\begin{cases}-5 = -s+t\\-2 = -2t\end{cases}$$

$$\begin{cases}-5 = -s+1\\t = 1\end{cases}$$

$$\begin{cases}s = 6\\t = 1\end{cases}$$

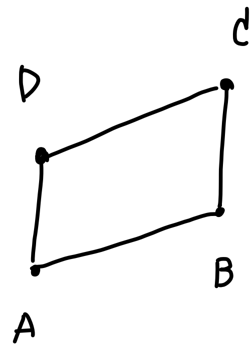
$\therefore \vec{p} = 6\vec{a} + \vec{b}$ //

11. $t = -8$

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

$|\overrightarrow{AB}| = \sqrt{5}$

13. $\overrightarrow{AD} = \overrightarrow{BC}$



$$\begin{pmatrix}y+2\\7-3\end{pmatrix} = \begin{pmatrix}8-2\\2-x\end{pmatrix}$$

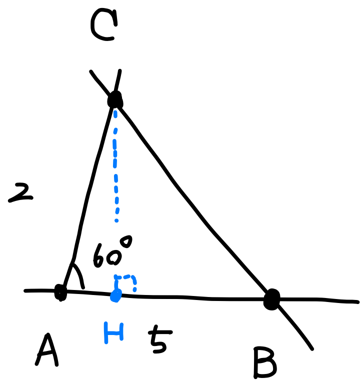
$$\begin{pmatrix}y+2\\4\end{pmatrix} = \begin{pmatrix}6\\2-x\end{pmatrix}$$

$\therefore x = -2,\ y = 4$ //

Ⅱ4. (1) $12 \times \frac{\sqrt{3}}{2} = 6\sqrt{3}$ 〃

(2) 0 〃

Ⅱ5. (1) $\overrightarrow{AC} \cdot \overrightarrow{CH}$



$= \overrightarrow{AC} \cdot (\overrightarrow{AH} - \overrightarrow{AC})$

$= 1 - 2^2$

$= -3$ 〃

(2) $\overrightarrow{BA} \cdot \overrightarrow{BC}$

$= -\overrightarrow{AB} \cdot (\overrightarrow{AC} - \overrightarrow{AB})$

$= -5 + 25$

$= 20$ 〃

Ⅱ6. (1) $\vec{a} \cdot \vec{b} = 6 - 36 = -30$ 〃 $\frac{-\cancel{30}^{\,1}}{\cancel{3} \cdot \cancel{\sqrt{5}} \cdot \cancel{2}\cancel{\sqrt{10}}_{\sqrt{2}}}$ $\therefore 135^\circ$ 〃

(2) $\vec{a} \cdot \vec{b} = 6 - 6 = 0$ 〃 $\therefore 90^\circ$ 〃

Ⅱ7. $\vec{a} \cdot \vec{b} = 6 - k^2$

$\therefore k = \pm\sqrt{6}$ 〃

Ⅱ8. $\vec{e} = \frac{1}{\sqrt{2}}\begin{pmatrix} 1 \\ 1 \end{pmatrix}, \frac{1}{\sqrt{2}}\begin{pmatrix} -1 \\ -1 \end{pmatrix}$ 〃

II 9.

$$(\vec{p}-\vec{a})\cdot(\vec{p}+2\vec{b})$$

$$= |\vec{p}|^2 - 2\vec{a}\cdot\vec{b} + (-\vec{a}+2\vec{b})\cdot\vec{p}$$

$$= |\vec{p}|^2 - (\vec{a}-2\vec{b})\cdot\vec{p} - 2\vec{a}\cdot\vec{b} \quad \blacksquare$$

20.

$$|2\vec{a}+3\vec{b}|^2$$

$$= 4\cdot 4 + 9\cdot 1 + 12\,\vec{a}\cdot\vec{b}$$

$$= 16 + 9 + 12\cdot 2\cdot 1\cdot \frac{1}{2}$$

$$= 37$$

$$\therefore\ |2\vec{a}+3\vec{b}| = \sqrt{37}\ 〃$$