

**1** 10 puan

$\langle \vec{AC}, \vec{BH} + \vec{BA} \rangle = ?$ 
 $\vec{AC} \cdot (\vec{BH} + \vec{BA})$   
 $= \vec{AC} \cdot \vec{BH} + \vec{AC} \cdot \vec{BA}$   
 $= \vec{AC} \cdot \vec{AK} - \vec{AC} \cdot \vec{AB}$   
 $= 8\sqrt{5} \cdot 4 \cdot \cos \alpha - 8\sqrt{5} \cdot 4\sqrt{5} \cdot \cos 90^\circ$   
 $= 8\sqrt{5} \cdot 4 \cdot \frac{2}{\sqrt{5}} - 0$   
 $= 64$

$|\vec{u} \cdot \vec{v}| = |\vec{u}| \cdot |\vec{v}| \cdot \cos \alpha$

$|AH|^2 = 4 \cdot 16$  (Öklid teo.)  
 $\rightarrow |AH| = 8$   
 $\rightarrow |AB| = 4\sqrt{5}$   
 $\rightarrow |AC| = 8\sqrt{5}$   
 $\cos \alpha = \frac{16}{8\sqrt{5}} = \frac{2}{\sqrt{5}}$

**2** 5 + 5 puan

$A(3,4)$   
 $B(-2,1)$   
 $C(6,0)$

$\vec{BC} - \vec{CA} = ?$   
 $= [8, -1] - [-3, 4] = [11, -5]$

$\vec{BC} = [6 - (-2), 0 - 1] = [8, -1]$   
 $\vec{CA} = [3 - 6, 4 - 0] = [-3, 4]$

$x = ?$

$x^2 = (3\sqrt{3})^2 + 7^2$   
 $x^2 = 27 + 49$   
 $x^2 = 76$   
 $x = \sqrt{76}$   
 $x = 2\sqrt{19}$

**3** 10 puan

$\triangle ABC$  eşkenar  
 $\vec{BD} \cdot \vec{BC} = ?$   
 $= 4 \cdot 12 \cdot \cos 0^\circ = 48$

$\vec{BD} \cdot \vec{BA} = ?$   
 $= 4 \cdot 12 \cdot \cos 60^\circ = 4 \cdot 12 \cdot \frac{1}{2} = 24$

$\vec{BD} \cdot \vec{CA} = ?$   
 $= \vec{CD} \cdot \vec{CA}$   
 $= 4 \cdot 12 \cdot \cos 120^\circ = 4 \cdot 12 \cdot -\frac{1}{2} = -24$

**4** 10 puan

$\vec{u} = 4\vec{e}_1 + 2\vec{e}_2 = [4, 2]$   
 $\vec{v} = 3\vec{e}_1 - 4\vec{e}_2 = [3, -4]$

$x \cdot \vec{u} + y \cdot \vec{v} = 4\vec{e}_1 - 20\vec{e}_2 = [4, -20]$   
 $\rightarrow x = ? \quad y = ?$

$x[4, 2] + y[3, -4] = [4, -20]$   
 $[4x, 2x] + [3y, -4y] = [4, -20]$   
 $[4x + 3y, 2x - 4y] = [4, -20]$

$4x + 3y = 4$   
 $2x - 4y = -20$

$4x + 3y = 4$   
 $-4x + 8y = +40$   
 $11y = 44$   
 $y = 4$

$4x + 3y = 4$   
 $4x + 12 = 4$   
 $4x = -8$   
 $x = -2$

**5** 5 + 5 puan

$\vec{OE} + \vec{OF} + \vec{OD} = ?$   
 $= -\frac{2}{3}\vec{u} - \frac{2}{3}\vec{v} - \frac{2}{3}\vec{w}$   
 $= -\frac{2}{3}(\vec{u} + \vec{v} + \vec{w})$   
 $= \vec{0}$

$O$ : ağırlık merkezi  
 $\vec{u} + \vec{v} + \vec{w} = \vec{0}$

$|BC| = ?$   
 $4 + 4\sqrt{3}$

