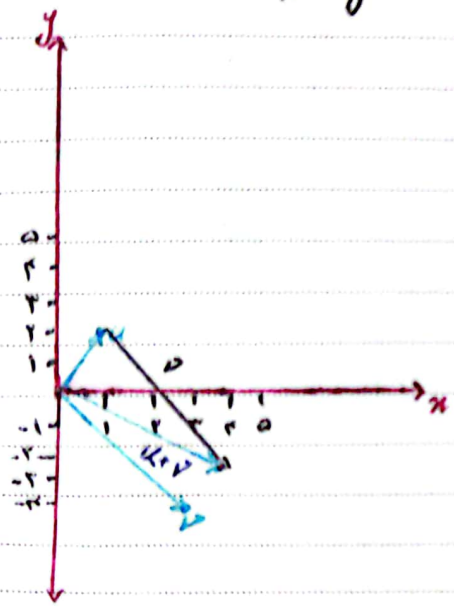
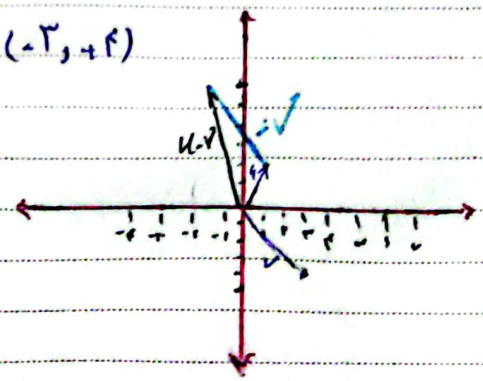
تکلیف 2

1. $u=(1,2)$ $v=(3,-4)$

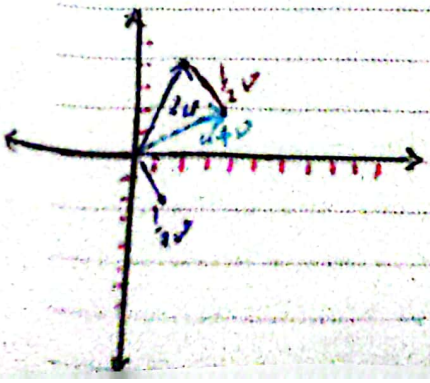
a) $u+v=(u_x,u_y)+(v_x,v_y)=(u_x+v_x,u_y+v_y)=(1+3,2-4)=(4,-2)$



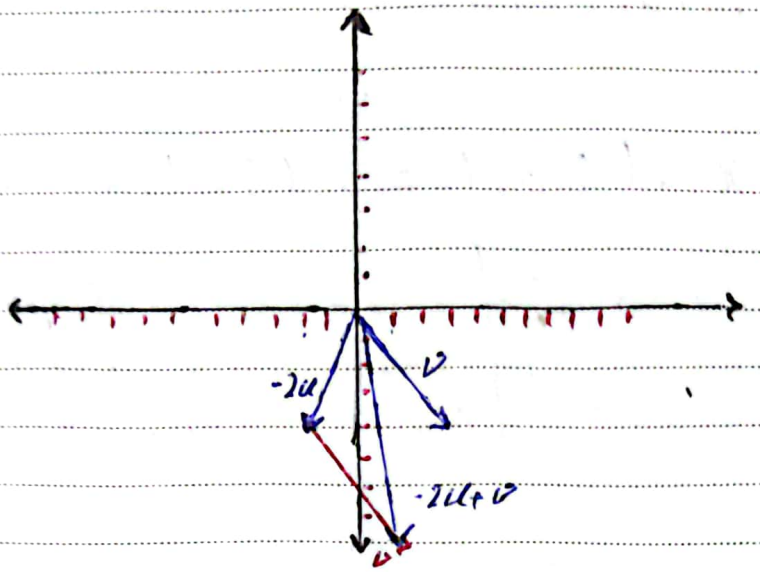
b) $u-v=(u_x-v_x,u_y-v_y)=(-2,4)$ $\quad -v=(-3,+4)$



c) $2u+\frac{1}{2}v=(2u_x,2u_y)+(\frac{1}{2}v_x,\frac{1}{2}v_y)=(2,4)+(\frac{3}{2},-2)=(\frac{7}{2},2)$



1) d) $-2u+v = (-2u_x, -2u_y) + (v_x, v_y) = (-2, -4) + (3, -4) = (1, -8)$



3.

a: $u+v = (u_x, u_y, u_z) + (v_x, v_y, v_z) = (u_x+v_x, u_y+v_y, u_z+v_z) =$

$= (v_x+u_x, v_y+u_y, v_z+u_z) = v+u$

b: $u+(v+w) = (u_x, u_y, u_z) + ((v_x+w_x), (v_y+w_y), (v_z+w_z)) = (u_x+(v_x+w_x), \ldots$

$\ldots, u_y+(v_y+w_y), u_z+(v_z+w_z)) = (u_x+v_x+w_x, u_y+v_y+w_y, u_z+y_z+w_z) =$

$= ((u_x+v_x)+w_x, (u_y+v_y)+w_y, (u_z+v_z)+w_z) = (u+v)+w$

C: $(ck)u = ((ck)u_x, (ck)u_y, (ck)u_z) = (c[ku_x], c[ku_y], c[ku_z])$

$= c[ku] = c(ku)$ ☆ تز، لعیج نیست

d: $k(u+v) = k(u_x+v_x, u_y+v_y, u_z+v_z) = (k(u_x+v_x), k(u_y+v_y), k(u_z+v_z))$

از، نبا ب هنی قبل

$= (ku_x+kv_x, ku_y+kv_y, ku_z+kv_z) = ku+kv$

3) e) $u(K+C) = ((K+C)u_x, (K+C)u_y, (K+C)u_z) = (Ku_x + u_x C, Ku_y + Cu_y, Ku_z + Cu_z)$

$= (Ku_x, Ku_y, Ku_z) + (Cu_x, Cu_y, Cu_z) = Ku + Cu$

4) $2((1,2,3) - x) - (-2,0,4) \xrightarrow{\text{ساده}} (2,4,6) + (-2x_x, -2x_y, -2x_z)$

$+ (2,0,4) = (-2,-4,-6) \Rightarrow$ (از دو این)

$2 - 2x_x + 2 = -2 \Rightarrow x_x = ۳$

$4 - 2x_y = -4 \Rightarrow x_y = ۴$

$6 - 2x_z - 4 = -6 \Rightarrow x_z = ۴$

$x = (۳, ۴, ۴)$

5) $u = (-1,3,2) \Rightarrow \sqrt{4+9+1} = \sqrt{۱۴} = \|u\|$

$u \cdot v = (3,-4,1) = \sqrt{9+14+1} = \sqrt{۲۶} = ۳\sqrt{۲} \sqrt{26}$

$u \cdot v = \sqrt{26} = u_x v_x + u_y v_y + u_z v_z = -v_x + 3v_y + 2v_z$

17) $u \times Ku = 0 \Leftrightarrow (Ku_y u_z - Ku_z u_y, Ku_z u_x - Ku_x u_z, Ku_x u_y - Ku_y u_x)$

$= (0,0,0) = 0$

$u \times Ku = (u_x, u_y, u_z) \times (Ku_x, Ku_y, Ku_z)$