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Homework #2

2.

$\vec{AB} = v - \vec{BC}$

$\vec{AA'} = v - D'$

$\vec{BA'} = v - w$
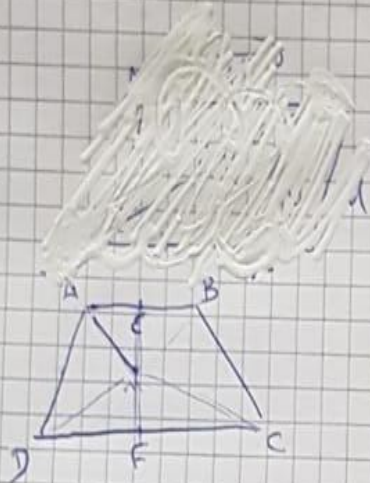
$\vec{AC'} = u - C'$
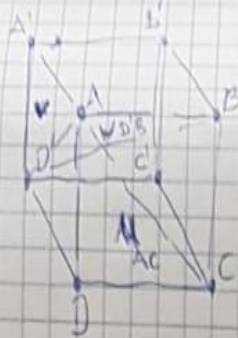
$\vec{DB} = D + C + B$

$\vec{DA} = (D + C) - u$

3.

$\vec{MA} = \frac{1}{2}(AB) + ME$

$\vec{MB} = \frac{1}{2}(BA) - ME$

$\vec{MA} + \vec{MB} = \vec{AB}$

$\vec{MA} - \vec{AB} - \vec{MB}$

$\vec{MB} = \vec{AB} - \vec{MA}$

$M = \frac{1}{2}(\vec{MA} - \vec{MB})$

$M = \frac{1}{2}\vec{BD}$

$M = \frac{1}{2}(AC)$

$E = \frac{1}{2}(AB$

$R = \frac{1}{2}DC$

8. $\vec{AB} = (7-2)i + (2+4)j + (7+3)j = 5i + 6j + 10_z = 5i + 16j$

$\vec{BC} = (4-7)i + (5-2)j + (9-7)j = -3i + 3j + 2j = -3i + 5j$

$\vec{CB} = (-1-6)i + (-1-5)j + (-1-9)j = -5i + 6j + (-10) = -5i - 16j$

$\vec{DA} = (2+1)i + (4+1)j + (3+1)j = 3i + (-3j) + (-2j) = 3i - 5j$

$\vec{AC} = (5-2)i + (5-4)j + (9-(-3))j = 2i + 9j + 12j = 2i + 21j$

$\vec{BD} = (-1-7)i + (-1-2)j + (-1-7)j = -8i + (-3j) + (-8j) = -8i - 11j$

It is not a parallelogram since no vector is the same.

9. $a = \sqrt{(-4-1)^2 + (5+5)^2 + (3-6)^2}$
    $= \sqrt{115} = 10,72$

    $a^2 + b^2 = c^2$

    $\sqrt{65} + \sqrt{74} = \sqrt{115}$ ✗

    $b = \sqrt{(3-1)^2 + (1+4)^2 + (0-6)^2}$
    $= \sqrt{65} = 8,06$

    a. points are not in vertige

    $c = \sqrt{(3+4)^2 + (1-5)^2 + (0-3)^2}$
    $c = \sqrt{75} = 8,6$

b. $\angle \alpha = 80,036°$
    $\angle \beta = 47,771°$
    $\angle y = 52,192°$

10 b.

$$\begin{pmatrix} 4 \\ 2 \\ 0 \end{pmatrix} \times \begin{pmatrix} 0 \\ 0 \\ 2 \end{pmatrix} = \begin{matrix} 2\cdot 2 - 3\cdot 0 \\ 3\cdot 0 - 4\cdot 2 \\ 4\cdot 0 - 2\cdot 0 \end{matrix} = \begin{pmatrix} 4 \\ -8 \\ 0 \end{pmatrix} \quad (4,-8,0)$$

12a.

$$a = \sqrt{(0-3)^2 + (0-5)^2 + (0-1)^2}$$

$$a = \sqrt{35} = 5,92$$

$$b = \sqrt{(1-3)^2 + (5-5)^2 + (2-1)^2}$$

$$= \sqrt{13} = 3,61$$

$$c = \sqrt{(1-0)^2 + (5-0)^2 + (2-0)^2}$$

$$= \sqrt{30} = 5,48$$

$$T = \sqrt{7,5(7,5-5,92)(7,5-3,61)(7,5-5,58)}$$

$$= \sqrt{93,5} = 9,67$$

16b.   1. $(4.2, 4.4, 0)$ 2. $(4.2, 0, 4.4)$ 3. $(0, 4.4, 4.2)$