1. $\dfrac{a+1}{-3} = \dfrac{-2}{1} \Leftrightarrow a = 5$

   Opção (B)

2.

   2.1 $\overrightarrow{AB} + \overrightarrow{BC} = \overrightarrow{AC} = C - A = (-1, 0) - (2, -3) = (-3, 3)$

   $\left\| \overrightarrow{AB} + \overrightarrow{BC} \right\| = \left\| \overrightarrow{AC} \right\| = \sqrt{(-3)^2 + 3^2} = 3\sqrt{2}$

   2.2. $M = \left(\dfrac{2+2}{2}, \dfrac{-3-1}{2} \right) = (2, -2)$

   $\overrightarrow{CM} = M - C = (2, -2) - (-1, 0) = (3, -2)$

   $4\overrightarrow{CM} - \vec{u} = 4(3, -2) - (4, -3) = (12, -8) - (4, -3) = (8, -5)$

   $\overrightarrow{BP} = P - B = (x, y) - (2, -1) = (x-2, y+1)$

   $\overrightarrow{BP} = 4\overrightarrow{CM} - \vec{u} \Leftrightarrow \begin{cases} x - 2 = 8 \\ y + 1 = -5 \end{cases} \Leftrightarrow \begin{cases} x = 10 \\ y = -6 \end{cases}$

   $P(10, -6)$

   2.3. $\vec{v} = k\vec{u} = k(4, -3) = (4k, -3k), \ k \in \mathbb{R}$

   $\|\vec{v}\| = 10 \Leftrightarrow \sqrt{(4k)^2 + (-3k)^2} = 10 \Leftrightarrow \sqrt{25k^2} = 10 \Leftrightarrow 25k^2 = 100 \Leftrightarrow k^2 = 4 \Leftrightarrow$

   $\Leftrightarrow k = 2 \lor k = -2$

   Como $\vec{v}$ tem sentido contrário ao de $\vec{u}$, $k < 0$, então $\vec{v}(-8, 6)$.

3.

   3.1. $-3x - 2y + 5 = 0 \Leftrightarrow y = -\dfrac{3}{2}x + \dfrac{5}{2}$

   $\vec{r}$ é colinear com $\vec{v}(2, -3)$.

   Então, $\vec{r}(6, -9)$.

   Opção (D)

   3.2. $m = -\dfrac{1}{2}$

   $y = -\dfrac{1}{2}x + b$, então $1 = -\dfrac{1}{2} \times 4 + b \Leftrightarrow b = 3$

   $s: y = -\dfrac{1}{2}x + 3$

3.3. $B(0, 3)$

$-\dfrac{1}{2}x + 3 = 0 \Leftrightarrow x = 6$, então $A(6,0)$.

$A = \dfrac{6 \times 3}{2} = 9$ u.a.

4. $\overrightarrow{AB} = B - A = (x, 0, 0) - (0, y, 0) = (x, -y, 0)$

Opção (D)

5.

5.1. $\overrightarrow{AB} = B - A = (6, 0, 4) - (3, 6, 2) = (3, -6, 2)$

$F = E + \overrightarrow{AB} = (1, 3, -4) + (3, -6, 2) = (4, -3, -2)$

5.2. $\overrightarrow{AE} = E - A = (1, 3, -4) - (3, 6, 2) = (-2, -3, -6)$

$(x, y, z) = (3, 6, 2) + k(-2, -3, -6), \ k \in \mathbb{R}$

$(x, y, 0) = (3, 6, 2) + k(-2, -3, -6), \ k \in \mathbb{R} \ \Leftrightarrow$

$\Leftrightarrow \begin{cases} x = 3 - 2k \\ y = 6 - 3k \\ 0 = 2 - 6k \end{cases} \Leftrightarrow \begin{cases} x = \dfrac{7}{3} \\ y = 5 \\ k = \dfrac{1}{3} \end{cases}$, então $P\left(\dfrac{7}{3}, 5, 0\right)$.

5.3. $\overline{AD} = \overline{AB} = \overline{AE} = \sqrt{3^2 + 6^2 + 2^2} = 7$

$(x - 3)^2 + (y - 6)^2 + (z - 2)^2 = 49$

5.4. $P(3, y, 2), \ y < 0$

$\overrightarrow{BP} = P - B = (3, y, 2) - (6, 0, 4) = (-3, y, -2)$

$\sqrt{3^2 + y^2 + 2^2} = 7 \Leftrightarrow y^2 = 36 \underset{y<0}{\Leftrightarrow} y = -6$