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$$C(12; -3; 4)$$

$$\cos 90^\circ = 0$$

$$\bar{a} = ?$$

$$|\bar{c}| = |\bar{a}|$$

$$1) a(0, y, z) \text{ так } a \in \forall OZ$$

$$2) \bar{a} \perp \bar{c} \Rightarrow \bar{a} \cdot \bar{c} = 0$$

$$3) |\bar{c}| = \sqrt{144 + 9 + 16} = \sqrt{169} = 13$$

$$4) |\bar{a}| = \sqrt{y^2 + z^2} = 13$$

$$5) 4z - 3y = 0 \quad (x=0 \text{ по условию})$$

$$6) z = \frac{3y}{4}$$

$$7) |\bar{a}| = y^2 + \frac{9y^2}{16} = 169$$

$$8) |\bar{a}| = 5^2 y^2 = 13^2 \cdot 4^2$$

$$9) y^2 = \frac{13^2 \cdot 4^2}{5^2}$$

$$10) y = \sqrt{\frac{2704}{25}} = \pm \frac{52}{5} = \pm 10.4$$

$$11) z = \pm \frac{3 \cdot 52}{4 \cdot 5} = \pm 7.8$$

$$\bar{a} = (0; 10.4; 7.8); (0; -10.4; -7.8)$$

$$\text{Ответ: } a(0; 10.4; 7.8); (0; -10.4; -7.8)$$

множественные векторы  $\bar{a}, \bar{b}, \bar{c}$  если

$$\bar{a} \cdot \bar{b} \cdot \bar{c} = 0$$

$$\bar{a}(2; -4; 3)$$

$$\bar{b}(1; 4; 2)$$

$$\bar{c}(3; 1; -1)$$

$$\bar{a} \bar{b} \bar{c} = \begin{vmatrix} 2 & -4 & 3 \\ 1 & 4 & 2 \\ 3 & 1 & -1 \end{vmatrix} = 2 \cdot 4 \cdot (-1) + (-1) \cdot 2 \cdot 3 + 3 \cdot 1 \cdot 1 =$$

$$= -8 - 6 + 3 = -11$$

$$= -8 - 6 + 3 - 36 - 4 - 1 = \underline{\underline{-52}}$$

Ответ:  $\bar{a}, \bar{b}, \bar{c}$  не множественные так  $\bar{a} \bar{b} \bar{c} \neq 0$



A(4,6)  
B(-4,0)  
C(-1,-4)

1) AB:  $\frac{x-4}{4-4} = \frac{y-6}{0-6}$

$$\frac{x-4}{-8} = \frac{y-6}{-6}$$

$$-6x + 24 = -8y + 48$$

$$-6x + 8y = 24$$

$$AB: -6x + 8y - 24 = 0$$

2) AC:  $\frac{x-4}{-1-4} = \frac{y-6}{-4-6}$

$$\frac{x-4}{-5} = \frac{y-6}{-10}$$

$$-10x + 40 = -5y + 30$$

$$AC: -10x + 5y + 10 = 0$$

3) BC:  $\frac{x+4}{-1+4} = \frac{y-0}{-4}$

$$\frac{x+4}{3} = \frac{y}{-4}$$

$$-4x - 16 = 3y$$

$$BC: +4x + 3y + 16 = 0$$

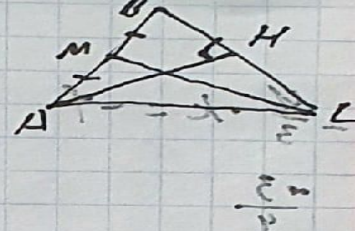
4) M:  $\left(\frac{4-4}{2}, \frac{6-0}{2}\right) \Rightarrow M(0; 3)$

$$CM: \frac{x+1}{0+4} = \frac{y+4}{3+4}$$

$$\frac{x+1}{4} = \frac{y+4}{7}$$

$$7x + 7 = 4y + 4$$

$$CM: 7x - 4y + 3 = 0$$



5)  $AM \perp BC \Rightarrow k_1 \cdot k_2 = -1$

$$BC: 4x + 3y + 16 = 0$$

$$y = -\frac{4x}{3} - \frac{16}{3}$$

$$k_1 = -\frac{4}{3} \Rightarrow k_2 = \frac{3}{4}$$

Запишем уравнение АМ через A(4,6)

$$y - 6 = \frac{3}{4}(x - 4) \quad y - 6 = \frac{3x}{4} - 3$$

$$AM: \frac{3x}{4} - y + 3 = 0$$

$$3x - 4y + 12 = 0$$



$$y_1 = 3x \quad y_2 = -2x + 5$$

$$k_1 = 3 \quad k_2 = -2$$

$$\operatorname{tg}(\angle_1, \angle_2) = \frac{k_1 - k_2}{1 + k_1 \cdot k_2} = \frac{3 + 2}{1 + (-6)} = \frac{5}{-5} = -1$$

$$\text{Ответ: } \operatorname{tg}(\angle_1, \angle_2) = -1 = 135^\circ \text{ или } 315^\circ$$

$$l: \frac{x-1}{5} = \frac{y-1}{4} = \frac{z-1}{7} \quad a: x - 3y + z + 1 = 0$$

$$1) \vec{l}(5, 4, 7) \quad \vec{n}(1; -3; 1) \text{ - нормаль}$$

$$\vec{l} \cdot \vec{n} = 5 \cdot 1 + 4 \cdot (-3) + 7 \cdot 1 = 5 - 12 + 7 = 0 \Rightarrow \vec{l} \perp \vec{n} \\ \Rightarrow \underline{l \parallel a} \quad (2)$$

Проверим лежит ли  $l$  в плоскости  $a$   
 найдем точку  $M(-1; -1; -1)$  в ур. п.  $a$  и проверим  
 $-1 - 3(-1) - 1 + 1 = 0 \quad -1 + 3 - 1 + 1 = 2 \neq 0$

$$\Rightarrow \underline{M \notin a} \text{ и } \underline{l \not\subset a} \quad (7)$$

2) пересечение. составим ур. и решим систему

$$\begin{cases} \frac{x-1}{5} = t \\ \frac{y-1}{4} = t \\ \frac{z-1}{7} = t \\ x - 3y + z + 1 = 0 \end{cases} \Rightarrow \begin{cases} x = 5t + 1 \\ y = 4t + 1 \\ z = 7t + 1 \\ 5t + 1 - 3(4t + 1) + 7t + 1 + 1 = 0 \end{cases} \Rightarrow \begin{cases} 5t + 1 - 12t + 3 + 7t + 1 + 1 = 0 \\ 0t - 0 = 0 \end{cases}$$

Нет решений.

$$\Rightarrow \underline{l \not\subset a} \quad (3)$$

Ответ: 1)  $l \not\subset a$  2)  $l \parallel a$  3)  $l \not\subset a$