

## B CSOPORT:

$$\textcircled{1} \text{ a) } \underline{u} \cdot \underline{v} = u_1 \cdot v_1 + u_2 \cdot v_2 + u_3 \cdot v_3$$

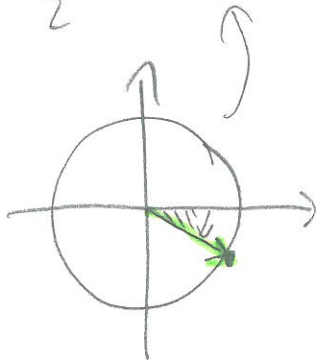
$\underline{u} \cdot \underline{v} = |\underline{u}| \cdot |\underline{v}| \cdot \cos(\varphi)$ , ANOL  $\varphi$  AZ AZ  
 $\underline{u}$  ÉS A  $\underline{v}$  VEKTOROK ÁLTAL BEZÁRT SZÖG.

b) LA'SD SZKEMNECT ÉEGYZET 12. OLDAL:

$$\left( \frac{\underline{a} \cdot \underline{b}}{\underline{b} \cdot \underline{b}} \right) \cdot \underline{b}$$

$$\textcircled{2} \text{ a) } |z| = \sqrt{\sqrt{3}^2 + (-1)^2} = \sqrt{4} = 2$$

$$\frac{z}{|z|} = \frac{\sqrt{3}}{2} - \frac{1}{2} \cdot i = \cos\left(-\frac{\pi}{6}\right) + i \cdot \sin\left(-\frac{\pi}{6}\right)$$



TENÁT  $z = 2 \cdot \left( \cos\left(-\frac{\pi}{6}\right) + i \cdot \sin\left(-\frac{\pi}{6}\right) \right)$

$$\begin{aligned} \text{b) } z^{13} &= 2^{13} \cdot \left( \cos\left(-13 \cdot \frac{\pi}{6}\right) + i \cdot \sin\left(-13 \cdot \frac{\pi}{6}\right) \right) = \\ &= 2^{13} \cdot \left( \cos\left(-\frac{\pi}{6}\right) + i \cdot \sin\left(-\frac{\pi}{6}\right) \right) = \textcircled{\star} \end{aligned}$$

(1. OLDAL)

$$c) \textcircled{\star} = 2^{13} \cdot \left( \frac{\sqrt{3}}{2} - \frac{1}{2} \cdot i \right) =$$

$$= 2^{12} \cdot (\sqrt{3} - i) = 4096 \cdot \sqrt{3} - 4096 \cdot i$$

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$$\textcircled{3} \quad \vec{PQ} = (1, 1, -2) \quad \vec{PR} = (-2, 0, -2)$$

$$\vec{PQ} \times \vec{PR} = \begin{vmatrix} \hat{i} & \hat{j} & \hat{k} \\ 1 & 1 & -2 \\ -2 & 0 & -2 \end{vmatrix} = (-2, 6, 2)$$

SÍK NORMÁLVEKTORA:  $(-2, 6, 2)$ , VAGY

$$\text{AKÁR } (-1, 3, 1) = \underline{n}$$

SÍK EGYENLETÉ:  $(x-1) \cdot (-1) + (y-0) \cdot 3 + (z-1) \cdot 1 = 0$

$$\text{AZAZ} \quad -x + 1 + 3y + z - 1 = 0$$

$$\text{AZAZ: } \boxed{-x + 3y + z = 0}$$

$$(4) \quad \lim_{n \rightarrow \infty} a_n = \lim_{n \rightarrow \infty} \frac{3n+2}{8-12n} = \frac{3}{-12} = -\frac{1}{4} = A$$

$$|a_n - A| = \left| \frac{3n+2}{8-12n} + \frac{1}{4} \right| = \left| \frac{3n+2}{8-12n} + \frac{2-3n}{8-12n} \right| =$$

$$= \left| \frac{4}{8-12n} \right| \stackrel{\text{KELL}}{\leq} \frac{1}{3000}, \quad A \neq A \neq$$

$$\frac{4}{12n-8} \leq \frac{1}{3000} \quad \Leftrightarrow \quad 12000 \leq 12n-8$$

$$\Leftrightarrow 1000 \leq n - \frac{8}{12} \quad \Leftrightarrow \quad 1000 - \frac{8}{12} \leq n$$

$$\text{TEHÁT} \quad N = \left\lceil 1000 - \frac{8}{12} \right\rceil = 1000$$

FELSŐ  
EGÉSZRÉS

$$N = 1000$$

3. OLDAL