78)

$S = \{A, B, C\}$: conjunto ortonormado

$D = A + 3B + 4C$

a) ? $\|A \times D\|$

$$A \times D = A \times (A + 3B + 4C) = \cancel{A \times A}^{=0} + 3\,A \times B + 4\,A \times C =$$

$$= 3\,A \times B + 4\,A \times C$$

$$\|A \times D\|^2 = \|A\|^2 \|D\|^2 - (A \cdot D)^2$$

$$\|D\|^2 = D \cdot D = (A + 3B + 4C) \cdot (A + 3B + 4C) =$$

$$= \|A\|^2 + 6\,\cancel{A \cdot B}^{=0} + 8\,\cancel{A \cdot C}^{=0} + 24\,\cancel{B \cdot C}^{=0} + 9\,\|B\|^2 + 16\,\|C\|^2 =$$

$$= 1 + 9 + 16 = 26$$

$$A \cdot D = A \cdot (A + 3B + 4C) = \|A\|^2 + 3\,\cancel{A \cdot B}^{=0} + 4\,\cancel{A \cdot C}^{=0} = 1$$

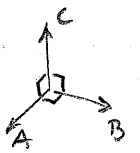
$$\|A \times D\|^2 = 26 - 1 = 25$$

$$\|A \times D\| = 5$$

b) $C \times (A \times D) = C \times (3\,A \times B + 4\,A \times C) = 3\,C \times (A \times B) + 4\,C \times (A \times C)$

CASO I) $A \times B = C$

$$C \times (A \times D) = 4\,C \times (-B) = 4\,B \times C = 4A$$



CASO II) $A \times B = -C$

$$C \times (A \times D) = 4\,C \times B = 4A$$

c) $$\operatorname{sen}\theta = \frac{\|C \times (A \times D)\|}{\|C\|\,\|A \times D\|} = \frac{\|4A\|}{5} = \frac{4}{5}$$

79) $C+D = (1,2,1)$

$C-D = (1,0,-1)$

$C = (1,1,0)$

$D = (0,1,1)$

$C \times D = (1,-1,1)$

$B \cdot A \times C = 5 \Leftrightarrow C \cdot B \times A = 5 \Leftrightarrow C \cdot A \times B = -5$

$B \cdot A \times D = 3 \Leftrightarrow D \cdot B \times A = 3 \Leftrightarrow D \cdot A \times B = -3$

$A \times B = (x,y,z)$

$$\begin{cases} x+y = -5 \\ y+z = -3 \end{cases} \quad \begin{cases} x = -5-y \\ z = -3-y \end{cases}$$

$A \times B = (-5-y, y, -3-y)$

$C \times D = (1,-1,1)$

$(A \times B) \times (C \times D) = (y-3-y, -3-y+5+y, 5+y-y) = (-3,2,5)$