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3-750+980
Cálculo III
7IL772
Parcial #1

5) $V = 7i - \sqrt{15}j$

$V = \langle 7, -\sqrt{15}, 0 \rangle$

$\|V\| = \sqrt{(7)^2 + (-\sqrt{15})^2 + (0)^2}$

$= \sqrt{49 + 15}$

$= \sqrt{64} = 8$

6) u en dirección V

$u = \frac{V}{\|V\|}$

$u = \frac{\langle 7, -\sqrt{15}, 0 \rangle}{8}$

$= \left\langle \frac{7}{8}, \frac{-\sqrt{15}}{8}, \frac{0}{8} \right\rangle$

$= \left\langle \frac{7}{8}, \frac{-\sqrt{15}}{8} \right\rangle$

7) $A = \langle 2, -3 \rangle$; $B = \langle -9, -12 \rangle$

$5A = 5\langle 2, -3 \rangle$

$= \langle 5(2), 5(-3) \rangle$

$= \langle 10, -15 \rangle$

8) $A = \langle 2, -3 \rangle$; $B = \langle -9, -12 \rangle$

$\frac{1}{3}B = \frac{1}{3}\langle -9, -12 \rangle$

$= \left\langle \frac{-9}{3}, \frac{-12}{3} \right\rangle$

$= \langle -3, -4 \rangle$

9) $\|5A - \frac{1}{3}B\|$

$= \langle 10, -15 \rangle - \langle -3, -4 \rangle$

$= \langle 10 - (-3), -15 - (-4) \rangle$

$= \langle 13, -11 \rangle$

$\|V\| = \sqrt{(13)^2 + (-11)^2}$

$= \sqrt{169 + 121}$

$= \sqrt{290} = 17.02$

10) $A = \langle 3, -4, 8 \rangle$; $B = \langle \frac{3}{4}, -1, 2 \rangle$

$A \cdot B$

$A \cdot B = 3\left(\frac{3}{4}\right) + (-4)(-1) + 8(2)$

$= \frac{9}{4} + 4 + 16$

$= \frac{9}{4} + 20 = \frac{89}{4}$

11) $A = \langle 3, -4, 8 \rangle$

$\|A\| = \sqrt{(3)^2 + (-4)^2 + (8)^2}$

$= \sqrt{9 + 16 + 64}$

$= \sqrt{89}$

12) $B = \left\langle \frac{3}{4}, -1, 2 \right\rangle$

$\|B\| = \sqrt{\left(\frac{3}{4}\right)^2 + (-1)^2 + (2)^2}$

$= \sqrt{\frac{9}{16} + 1 + 4}$

$= \sqrt{\frac{9}{16} + 5}$

$= \sqrt{\frac{89}{16}} = \frac{\sqrt{89}}{4}$

13) $A = \langle 3, -4, 8 \rangle$, $B = \langle 3/4, -1, 2 \rangle$

$\theta = \cos\theta = \frac{A \cdot B}{\|A\|\|B\|}$

$= \frac{\frac{89}{4}}{\left(\sqrt{89}\right)\left(\frac{\sqrt{89}}{4}\right)}$

$= \frac{\frac{89}{4}}{\frac{89}{4}}$

$= \frac{89}{4}\left(\frac{4}{89}\right) = \cos\theta = 1$

$= \theta = \cos^{-1}(1)$

$\theta = 0$

14) $A = \langle 3, -4, 8 \rangle$; $B = \langle \frac{3}{4}, -1, 2 \rangle$

Como el ángulo entre A y B es igual a 0 entonces A y B son paralelos.

15) $A = \langle -2, 3, 6 \rangle$; $B = \langle 3, -4, 0 \rangle$

$u = AB$

$u = (3-(-2))i + (-4-3)j + (0-6)k$

$= (3+2)i + (-7)j + (-6)k$

$= 5i - 7j - 6k$

16) $u = 5i - 7j - 6k$

$\|u\| = \sqrt{(5)^2 + (-7)^2 + (-6)^2}$

$= \sqrt{25 + 49 + 36}$

$= \sqrt{110} = 10.48$

17) $A = \langle -2, 3, 6 \rangle$ $P = \langle 1, 1, -1 \rangle$

AP

$AP = \langle 1-(-2), 1-3, -1-6 \rangle$

$= \langle 3, -2, -7 \rangle$

18) $AP = \langle 3, -2, -7 \rangle$

$u = \langle 5, -7, -6 \rangle$

$$AP \times u = \begin{vmatrix} i & j & k \\ 3 & -2 & -7 \\ 5 & -7 & -6 \end{vmatrix} = \begin{vmatrix} -2 & -7 \\ -7 & -6 \end{vmatrix} i + \begin{vmatrix} 3 & -7 \\ 5 & -6 \end{vmatrix} j + \begin{vmatrix} 3 & -2 \\ 5 & -7 \end{vmatrix} k$$

$= (12 - 49)i + (-18 + 35)j + (-21 + 10)k$

$= -37i - 17j - 11k$

19) $\|AP \times u\|$

$AP \times u = -37i - 17j - 11k$

$\|AP \times u\| = \sqrt{(-37)^2 + (-17)^2 + (-11)^2}$

$= \sqrt{1369 + 289 + 121}$

$= \sqrt{1779}$

$= 42.17$

20) $D = \frac{\|AP \times u\|}{\|u\|}$

$D = \frac{42.17}{10.48}$

$D = 4.02u$

21) $A(-1,-2,-3)$ $B(-2,1,0)$ $C(0,5,1)$

$AB = (-2-(-1),\ 1-(-2),\ 0-(-3))$

$= (-1, 3, 3)$

22) $BC = (0-(-2),\ 5-1,\ 1-0)$

$= (2, 4, 1)$

23) $AB \times BC = \begin{vmatrix} i & J & k \\ -1 & 3 & 3 \\ 2 & 4 & 1 \end{vmatrix} = \begin{vmatrix} 3 & 3 \\ 4 & 1 \end{vmatrix} i - \begin{vmatrix} -1 & 3 \\ 2 & 1 \end{vmatrix} J + \begin{vmatrix} -1 & 3 \\ 2 & 4 \end{vmatrix} k$

$= (3-12)i - (-1-6)J + (-4-6)k$

$= -9i + 7j - 10k$

24) $= \text{Area} = \|AB \times BC\|$

$= \sqrt{(-9)^2 + (7)^2 + (-10)^2}$

$= \sqrt{81 + 49 + 100}$

$= \sqrt{230}$

$= 15.16\ u^2$