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MATHS ASSIGNMENT

Question 1

1) 1

2) Unit vector

3) 2

4) $-5 \frac{\vec{v}}{|v|}$

QUESTION 2

(i)

$$|v| = |-i + j + k|$$
$$= \sqrt{(-1)^2 + (1)^2 + (1)^2}$$
$$= \sqrt{1+1+1}$$
$$= \sqrt{3}$$
$$\hat{v} = \frac{v}{|v|} = \frac{-i + j + k}{\sqrt{3}}$$

$$2\left[\frac{-i + j + k}{\sqrt{3}}\right]$$

$$= \frac{-2i}{\sqrt{3}} + \frac{2j}{\sqrt{3}} + \frac{2k}{\sqrt{3}} \text{ ans}$$

(ii) $a \cdot b = (i-k) \cdot (j+k) = 0$

$= (i + 0j - k) \cdot (0i + j + k)$

$= (1)(0) + 0(1) + (-1)(1)$

$a \cdot b = -1$

$|a| = |i-k| = \sqrt{(1)^2 + (-1)^2} = \sqrt{1+1} = \sqrt{2}$

$|b| = |j+k| = \sqrt{(1)^2 + (1)^2} = \sqrt{1+1} = \sqrt{2}$

(iii) $\overrightarrow{AB} = OB - OA$

$= [2, 0] - [1, -1]$

$= [2-1, 0-(-1)] = [1, 1]$

$CD = OD - OC$

$= [-2-(-1), 2-3]$

$= [-2+1, -1]$

$= [-1, -1]$

$AB + CD = [1, 1] + [-1, -1]$

$= [1+(-1), 1+(-1)]$

$= [1-1, 1-1]$

$= [0, 0]$