

Assegnati i seguenti vettori \mathbf{u} , $\mathbf{v} \in \mathbf{R}^3$, calcolare il modulo di \mathbf{u} , il versore di \mathbf{u} , il vettore $\mathbf{u}+3\mathbf{v}$, il prodotto scalare $\mathbf{u} \cdot \mathbf{v}$ e l'angolo $\widehat{\mathbf{u}\mathbf{v}}$:

$$\mathbf{u}=(8, -2, 2) \quad \mathbf{v}=\left(\frac{1}{2}, \frac{3}{2}, -\frac{1}{2}\right)$$

$$\text{Risposta: } |\mathbf{u}| = 6\sqrt{2}, \quad \frac{\mathbf{u}}{|\mathbf{u}|} = \left(\frac{2\sqrt{2}}{3}, -\frac{1}{3\sqrt{2}}, \frac{1}{3\sqrt{2}}\right), \quad \mathbf{u}+3\mathbf{v}=\left(\frac{19}{2}, \frac{5}{2}, \frac{1}{2}\right), \quad \mathbf{u} \cdot \mathbf{v}=0, \quad \widehat{\mathbf{u}\mathbf{v}}=\frac{\pi}{2}$$

$$\mathbf{u}=(1, 1, -\frac{1}{2}) \quad \mathbf{v}=(2, 8, 2)$$

$$\text{Risposta: } |\mathbf{u}| = \frac{3}{2}, \quad \frac{\mathbf{u}}{|\mathbf{u}|} = \left(\frac{2}{3}, \frac{2}{3}, -\frac{1}{3}\right), \quad \mathbf{u}+3\mathbf{v}=\left(7, 25, \frac{11}{2}\right), \quad \mathbf{u} \cdot \mathbf{v}=9, \quad \widehat{\mathbf{u}\mathbf{v}}=\frac{\pi}{4}$$

$$\mathbf{u}=(6, 6, -3) \quad \mathbf{v}=\left(\frac{1}{3}, \frac{4}{3}, \frac{1}{3}\right)$$

$$\text{Risposta: } |\mathbf{u}| = 9, \quad \frac{\mathbf{u}}{|\mathbf{u}|} = \left(\frac{2}{3}, \frac{2}{3}, -\frac{1}{3}\right), \quad \mathbf{u}+3\mathbf{v}=(7, 10, -2), \quad \mathbf{u} \cdot \mathbf{v}=9, \quad \widehat{\mathbf{u}\mathbf{v}}=\frac{\pi}{4}$$

$$\mathbf{u}=\left(5, 5, -\frac{5}{2}\right) \quad \mathbf{v}=\left(\frac{2}{5}, \frac{8}{5}, \frac{2}{5}\right)$$

$$\text{Risposta: } |\mathbf{u}| = \frac{15}{2}, \quad \frac{\mathbf{u}}{|\mathbf{u}|} = \left(\frac{2}{3}, \frac{2}{3}, -\frac{1}{3}\right), \quad \mathbf{u}+3\mathbf{v}=\left(\frac{31}{5}, \frac{49}{5}, -\frac{13}{10}\right), \quad \mathbf{u} \cdot \mathbf{v}=9, \quad \widehat{\mathbf{u}\mathbf{v}}=\frac{\pi}{4}$$

$$\mathbf{u}=(-4, -4, 2) \quad \mathbf{v}=(1, 4, 1)$$

$$\text{Risposta: } |\mathbf{u}| = 6, \quad \frac{\mathbf{u}}{|\mathbf{u}|} = \left(-\frac{2}{3}, -\frac{2}{3}, \frac{1}{3}\right), \quad \mathbf{u}+3\mathbf{v}=(-1, 8, 5), \quad \mathbf{u} \cdot \mathbf{v}=-18, \quad \widehat{\mathbf{u}\mathbf{v}}=\frac{3\pi}{4}$$

$$\mathbf{u}=(2, 0, 2) \quad \mathbf{v}=\left(1, 1, \frac{1}{2}\right)$$

$$\text{Risposta: } |\mathbf{u}| = 2\sqrt{2}, \quad \frac{\mathbf{u}}{|\mathbf{u}|} = \left(\frac{1}{\sqrt{2}}, 0, \frac{1}{\sqrt{2}}\right), \quad \mathbf{u}+3\mathbf{v}=\left(5, 3, \frac{7}{2}\right), \quad \mathbf{u} \cdot \mathbf{v}=3, \quad \widehat{\mathbf{u}\mathbf{v}}=\frac{\pi}{4}$$

$$\mathbf{u}=\left(\frac{2}{3}, 0, \frac{2}{3}\right) \quad \mathbf{v}=\left(3, 3, \frac{3}{2}\right)$$

$$\text{Risposta: } |\mathbf{u}| = 2\sqrt{2}/3, \quad \frac{\mathbf{u}}{|\mathbf{u}|} = \left(\frac{1}{\sqrt{2}}, 0, \frac{1}{\sqrt{2}}\right), \quad \mathbf{u}+3\mathbf{v}=\left(\frac{29}{3}, 9, \frac{31}{6}\right), \quad \mathbf{u} \cdot \mathbf{v}=3, \quad \widehat{\mathbf{u}\mathbf{v}}=\frac{\pi}{4}$$

$$\mathbf{u}=\left(\frac{3}{2}, 0, \frac{3}{2}\right) \quad \mathbf{v}=\left(\frac{4}{3}, \frac{4}{3}, \frac{2}{3}\right)$$

$$\text{Risposta: } |\mathbf{u}| = 3/\sqrt{2}, \quad \frac{\mathbf{u}}{|\mathbf{u}|} = \left(\frac{1}{\sqrt{2}}, 0, \frac{1}{\sqrt{2}}\right), \quad \mathbf{u}+3\mathbf{v}=\left(\frac{11}{2}, 4, \frac{7}{2}\right), \quad \mathbf{u} \cdot \mathbf{v}=3, \quad \widehat{\mathbf{u}\mathbf{v}}=\frac{\pi}{4}$$

$$\mathbf{u}=\left(\frac{1}{2}, 0, \frac{1}{2}\right) \quad \mathbf{v}=(-4, -4, -2)$$

$$\text{Risposta: } |\mathbf{u}| = 1/\sqrt{2}, \quad \frac{\mathbf{u}}{|\mathbf{u}|} = \left(\frac{1}{\sqrt{2}}, 0, \frac{1}{\sqrt{2}}\right), \quad \mathbf{u}+3\mathbf{v}=\left(-\frac{23}{2}, -12, -\frac{11}{2}\right), \quad \mathbf{u} \cdot \mathbf{v}=-3, \quad \widehat{\mathbf{u}\mathbf{v}}=\frac{3\pi}{4}$$

$$\mathbf{u}=(3, 0, 3) \quad \mathbf{v}=\left(-\frac{2}{3}, -\frac{2}{3}, -\frac{1}{3}\right)$$

$$\text{Risposta: } |\mathbf{u}| = 3\sqrt{2}, \quad \frac{\mathbf{u}}{|\mathbf{u}|} = \left(\frac{1}{\sqrt{2}}, 0, \frac{1}{\sqrt{2}}\right), \quad \mathbf{u}+3\mathbf{v}=(1, -2, 2), \quad \mathbf{u} \cdot \mathbf{v}=-3, \quad \widehat{\mathbf{u}\mathbf{v}}=\frac{3\pi}{4}$$

$$\mathbf{u}=(4, 0, 4) \quad \mathbf{v}=\left(-\frac{1}{2}, -\frac{1}{2}, -\frac{1}{4}\right)$$

Risposta: $|\mathbf{u}| = 4\sqrt{2}$, $\frac{\mathbf{u}}{|\mathbf{u}|} = \left(\frac{1}{\sqrt{2}}, 0, \frac{1}{\sqrt{2}}\right)$, $\mathbf{u}+3\mathbf{v} = \left(\frac{5}{2}, -\frac{3}{2}, \frac{13}{4}\right)$, $\mathbf{u}\cdot\mathbf{v} = -3$, $\widehat{\mathbf{u}\mathbf{v}} = \frac{3\pi}{4}$

$\mathbf{u} = (0, -3, 1)$ $\mathbf{v} = (-2, -1, -3)$

Risposta: $|\mathbf{u}| = \sqrt{10}$, $\frac{\mathbf{u}}{|\mathbf{u}|} = \left(0, -\frac{3}{\sqrt{10}}, \frac{1}{\sqrt{10}}\right)$, $\mathbf{u}+3\mathbf{v} = (-6, -6, -8)$, $\mathbf{u}\cdot\mathbf{v} = 0$, $\widehat{\mathbf{u}\mathbf{v}} = \frac{\pi}{2}$

$\mathbf{u} = (1, -3, 0)$ $\mathbf{v} = (-3, -1, -2)$

Risposta: $|\mathbf{u}| = \sqrt{10}$, $\frac{\mathbf{u}}{|\mathbf{u}|} = \left(\frac{1}{\sqrt{10}}, -\frac{3}{\sqrt{10}}, 0\right)$, $\mathbf{u}+3\mathbf{v} = (-8, -6, -6)$, $\mathbf{u}\cdot\mathbf{v} = 0$, $\widehat{\mathbf{u}\mathbf{v}} = \frac{\pi}{2}$

$\mathbf{u} = (2, -3, -1)$ $\mathbf{v} = (-2, 3, 1)$

Risposta: $|\mathbf{u}| = \sqrt{14}$, $\frac{\mathbf{u}}{|\mathbf{u}|} = \left(\frac{\sqrt{2}}{\sqrt{7}}, -\frac{3}{\sqrt{14}}, -\frac{1}{\sqrt{14}}\right)$, $\mathbf{u}+3\mathbf{v} = (-4, 6, 2)$, $\mathbf{u}\cdot\mathbf{v} = -14$, $\widehat{\mathbf{u}\mathbf{v}} = \pi$

$\mathbf{u} = (2, 2, -1)$ $\mathbf{v} = (2, 8, 2)$

Risposta: $|\mathbf{u}| = 3$, $\frac{\mathbf{u}}{|\mathbf{u}|} = \left(\frac{2}{3}, \frac{2}{3}, -\frac{1}{3}\right)$, $\mathbf{u}+3\mathbf{v} = (8, 26, 5)$, $\mathbf{u}\cdot\mathbf{v} = 18$, $\widehat{\mathbf{u}\mathbf{v}} = \frac{\pi}{4}$

$\mathbf{u} = (2, 8, 2)$ $\mathbf{v} = (1, -2, -2)$

Risposta: $|\mathbf{u}| = 6\sqrt{2}$, $\frac{\mathbf{u}}{|\mathbf{u}|} = \left(\frac{1}{3\sqrt{2}}, \frac{2\sqrt{2}}{3}, \frac{1}{3\sqrt{2}}\right)$, $\mathbf{u}+3\mathbf{v} = (5, 2, -4)$, $\mathbf{u}\cdot\mathbf{v} = -18$, $\widehat{\mathbf{u}\mathbf{v}} = \frac{3\pi}{4}$

$\mathbf{u} = (-1, 0, -\sqrt{3})$ $\mathbf{v} = (\sqrt{3}, 0, 1)$

Risposta: $|\mathbf{u}| = 2$, $\frac{\mathbf{u}}{|\mathbf{u}|} = \left(-\frac{1}{2}, 0, -\frac{\sqrt{3}}{2}\right)$, $\mathbf{u}+3\mathbf{v} = (-1 + 3\sqrt{3}, 0, 3 - \sqrt{3})$, $\mathbf{u}\cdot\mathbf{v} = -2\sqrt{3}$, $\widehat{\mathbf{u}\mathbf{v}} = \frac{5\pi}{6}$

$\mathbf{u} = \left(-\frac{1}{2}, 0, -\frac{\sqrt{3}}{2}\right)$ $\mathbf{v} = (2\sqrt{3}, 0, 2)$

Risposta: $|\mathbf{u}| = 1$, $\frac{\mathbf{u}}{|\mathbf{u}|} = \left(-\frac{1}{2}, 0, -\frac{\sqrt{3}}{2}\right)$, $\mathbf{u}+3\mathbf{v} = \left(-\frac{1}{2} + 6\sqrt{3}, 0, 6 - \frac{\sqrt{3}}{2}\right)$, $\mathbf{u}\cdot\mathbf{v} = -2\sqrt{3}$, $\widehat{\mathbf{u}\mathbf{v}} = \frac{5\pi}{6}$