Ficha 3 Resolução:

1) $x = (1, -2, 1)$ $\quad y = (-1, 1, 0)$

a) $x + y = (1, -2, 1) + (-1, 1, 0) = (0, -1, 1)$

$x - y = (1, -2, 1) - (-1, 1, 0) = (0, -3, 1)$ → 2

$3x - 2y = 3(1, -2, 1) - 2(-1, 1, 0) = (3, -6, 3) - (-2, 2, 0) =$

$= (5, -8, 3)$

b) Se $\perp$, $x \cdot y = 0$

$(1, -2, 1) \cdot (-1, 1, 0) = -1 - 2 + 0 = -3 \neq 0$ logo não são perpendiculares

nem serem colineares

$(1, -2, 1) = k(-1, 1, 0)$

$\begin{cases} 1 = -k \\ -2 = k \\ 1 = 0 \end{cases}$ Eq. Impossível, logo os vetores x e y não são colineares

c) $\theta = \arccos\left(\frac{x \cdot y}{\|x\| \times \|y\|}\right) \Leftrightarrow \theta = \arccos\left(\frac{(1, -2, 1) \cdot (-1, 1, 0)}{\sqrt{(1)^2 + (-2)^2 + (1)^2} \times \sqrt{(-1)^2 + (1)^2 + (0)^2}}\right)$

$\rightsquigarrow \theta = \arccos\left(\frac{-1 - 2 + 0}{\sqrt{1+4+1} \times \sqrt{1+1+0}}\right) (\Leftrightarrow)$

$\theta = \arccos\left(\frac{-3}{\sqrt{6} \times \sqrt{2}}\right) (\Leftrightarrow) \theta = \arccos\left(\frac{-3}{\sqrt{12}}\right)$

d)

$\|x\| = \sqrt{(1)^2 + (-2)^2 + (1)^2} = \sqrt{6}$

$\frac{1}{\sqrt{6}}\left(\frac{1}{\sqrt{6}}, \frac{-2}{\sqrt{6}}, \frac{1}{\sqrt{6}}\right)$