

HW14 MATH 1540 Fall 2018

§10.8 : $2x - 4y + 3z = 16$

#18 | $\vec{u} = \langle 2, -3 \rangle, \vec{v} = \langle 1, 5 \rangle$

$\vec{u} + \vec{v} = \langle 2, -3 \rangle + \langle 1, 5 \rangle = \langle 2+1, -3+5 \rangle = \langle 3, 2 \rangle$

$\vec{u} - \vec{v} = \langle 2, -3 \rangle - \langle 1, 5 \rangle = \langle 2-1, -3-5 \rangle = \langle 1, -8 \rangle$

$2\vec{u} - 3\vec{v} = 2\langle 2, -3 \rangle - 3\langle 1, 5 \rangle = \langle 4, -6 \rangle - \langle 3, 15 \rangle$

$= \langle 4-3, -6-15 \rangle$

$= \langle 1, -21 \rangle$

#29 | $\langle 6, 5 \rangle$

magnitude: $\|\langle 6, 5 \rangle\| = \sqrt{6^2 + 5^2} = \sqrt{36 + 25} = \sqrt{61}$

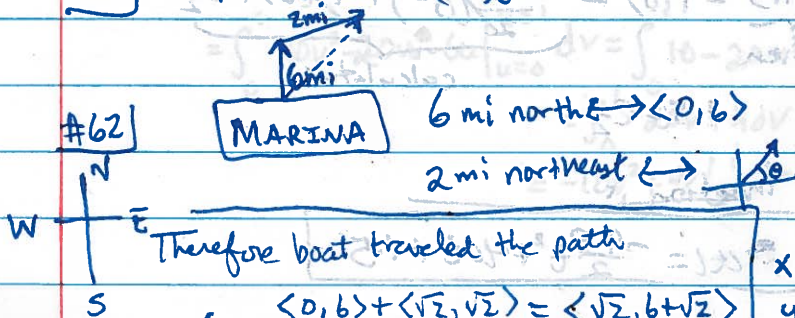
direction: $\theta = \tan^{-1}\left(\frac{5}{6}\right) \approx 39.81^\circ$

#33 | Calculate $(-\vec{i} - \vec{j}) \cdot (\vec{i} + 5\vec{j})$

Rewrite $-\vec{i} - \vec{j} = \langle -1, -1 \rangle \Rightarrow \langle -1, -1 \rangle \cdot \langle 1, 5 \rangle = (-1)(1) + (-1)(5)$

$\vec{i} + 5\vec{j} = \langle 1, 5 \rangle$
 $= -1 - 5 = -6$

#34 | $\langle -2, 4 \rangle \cdot \langle -3, 1 \rangle = (-2)(-3) + (4)(1) = 6 + 4 = 10$



Therefore boat traveled the path

$\langle 0, 6 \rangle + \langle \sqrt{2}, \sqrt{2} \rangle = \langle \sqrt{2}, 6 + \sqrt{2} \rangle$

∴ Must travel back in direction of

$\tan^{-1}\left(\frac{6 + \sqrt{2}}{\sqrt{2}}\right) = 79.2^\circ$ south of west. How far: $\|\langle \sqrt{2}, 6 + \sqrt{2} \rangle\| = \sqrt{2 + (6 + \sqrt{2})^2} \approx 7.54$

$x = 2 \cos(\pi/4) = \sqrt{2}$
 $y = 2 \sin(\pi/4) = \sqrt{2}$