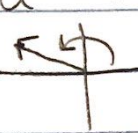


Writing Vectors in Trig Form

1) $\vec{u} = \langle -8, 3 \rangle$




$$\sqrt{(-8)^2 + (3)^2} = \sqrt{64+9} = \sqrt{73}$$

$$\theta = \tan^{-1}\left(\frac{3}{-8}\right) = -20.56$$

$$180 - 20.56 = 159.44^\circ$$

$$\sqrt{73} \langle \cos 159.44^\circ, \sin 159.44^\circ \rangle$$

2) $\vec{b} = -11\vec{j} \quad \langle 0, -11 \rangle$



$$\sqrt{0^2 + (-11)^2} = \sqrt{121} = 11$$


$$\theta = \tan^{-1}\left(-\frac{11}{0}\right)$$

$$\theta = \tan^{-1}(\text{undefined})$$

$$\theta = 270^\circ$$

$$11 (\cos 270^\circ \vec{i} + \sin 270^\circ \vec{j})$$

3) $\vec{d} = -2\vec{i} - 5\vec{j}$



$$\sqrt{(-2)^2 + (-5)^2} = \sqrt{4+25} = \sqrt{29}$$


$$\theta = \tan^{-1}\left(\frac{-5}{-2}\right) = 68.2$$

$$180 + 68.2 = 248.2^\circ$$

$$\sqrt{29} (\cos 248.2^\circ \vec{i} + \sin 248.2^\circ \vec{j})$$

4) \vec{MN} with point $M(-4, 8)$ and point $N(2, -9)$

$$\langle 2 - (-4), -9 - 8 \rangle = \langle 6, -17 \rangle$$



$$\sqrt{(6)^2 + (-17)^2} = \sqrt{36+289} = \sqrt{325} = 5\sqrt{13}$$

$$\theta = \tan^{-1}\left(\frac{-17}{6}\right) = -70.56$$

$$360 - 70.56 = 289.44^\circ$$

$$5\sqrt{13} \langle \cos 289.44^\circ, \sin 289.44^\circ \rangle$$

$$5\sqrt{13} (\cos 289.44^\circ \vec{i} + \sin 289.44^\circ \vec{j})$$

OR

5. $\vec{v} = 5 (\cos 30^\circ \vec{i} + \sin 30^\circ \vec{j})$

Component form $\langle 5\left(\frac{\sqrt{3}}{2}\right), 5\left(\frac{1}{2}\right) \rangle = \langle \frac{5\sqrt{3}}{2}, \frac{5}{2} \rangle$

Magnitude $\sqrt{\left(\frac{5\sqrt{3}}{2}\right)^2 + \left(\frac{5}{2}\right)^2} = \sqrt{\frac{75}{4} + \frac{25}{4}} = \sqrt{\frac{100}{4}} = \frac{10}{2} = 5$

direction $\theta = \tan^{-1}\left(\frac{5/2}{5\sqrt{3}/2}\right) = \tan^{-1}\left(\frac{5}{2} \cdot \frac{2}{5\sqrt{3}}\right) = \tan^{-1}\left(\frac{1}{\sqrt{3}}\right)$

$$= \tan^{-1}\left(\frac{\sqrt{3}}{3}\right) = 30^\circ$$

6. $\vec{v} = 8(\cos 135^\circ i + \sin 135^\circ j)$

Component form $\langle 8(-\frac{\sqrt{2}}{2}), 8(\frac{\sqrt{2}}{2}) \rangle = \langle -4\sqrt{2}, 4\sqrt{2} \rangle$

Magnitude $\sqrt{(-4\sqrt{2})^2 + (4\sqrt{2})^2} = \sqrt{32+32} = \sqrt{64} = 8$

direction $\theta = \tan^{-1}(\frac{4\sqrt{2}}{-4\sqrt{2}}) = \tan^{-1}(-1) = -45^\circ$

$180 - 45^\circ = 135^\circ$

7. $2(\cos 40^\circ i + \sin 40^\circ j) + 3(\cos 110^\circ i + \sin 110^\circ j)$

$\langle 2\cos 40 + 3\cos 110, 2\sin 40 + 3\sin 110 \rangle$

$\langle .51, 4.10 \rangle$

8. $10(\cos 219^\circ i + \sin 219^\circ j) - 6(\cos 301^\circ i + \sin 301^\circ j)$

$\langle 10\cos 219 - 6\cos 301, 10\sin 219 - 6\sin 301 \rangle$

$\langle -10.86, -1.15 \rangle$

9. $\|v\| = 5$ $u = \langle 3, 3 \rangle$

$\theta = \tan^{-1}(\frac{3}{3}) = \tan^{-1}(1) = 45^\circ$ $5\langle \cos 45, \sin 45 \rangle$

$5\langle \frac{\sqrt{2}}{2}, \frac{\sqrt{2}}{2} \rangle = \langle \frac{5\sqrt{2}}{2}, \frac{5\sqrt{2}}{2} \rangle = \langle 3.54, 3.54 \rangle$

10. $\|v\| = 3$ $u = \langle 4, -4 \rangle$

$\theta = \tan^{-1}(\frac{-4}{4}) = \tan^{-1}(-1) = -45$ $360 - 45 = 315^\circ$ $3\langle \cos 315, \sin 315 \rangle$

$3\langle \frac{\sqrt{2}}{2}, -\frac{\sqrt{2}}{2} \rangle = \langle \frac{3\sqrt{2}}{2}, -\frac{3\sqrt{2}}{2} \rangle = \langle 2.12, -2.12 \rangle$

11. $\|v\| = 10$ $u = 2i - 3j$

$\theta = \tan^{-1}(\frac{-3}{2}) = -56.31$ $360 - 56.31 = 303.69$

$10(\cos 303.69^\circ i + \sin 303.69^\circ j) = 5.55i - 8.32j$

12. $\|v\| = 8$ $u = -2i \langle -2, 0 \rangle$

$\theta = \tan^{-1}(\frac{0}{-2}) = \tan^{-1}(0) = 0^\circ$ $\theta = 180^\circ$

$8(\cos 180^\circ i + \sin 180^\circ j) = -8i + 0 = -8i$