

Writing Vectors in Trig Form WS

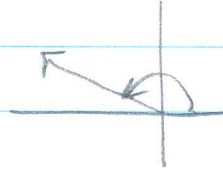
1) $\vec{u} = \langle -8, 3 \rangle$

$$\|\vec{u}\| = \sqrt{64+9} = \sqrt{73}$$

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

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

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

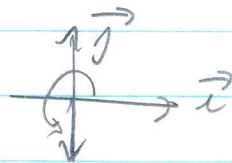


2) $\vec{b} = -11\vec{j}$

$$\|\vec{b}\| = 11$$

$$\theta = 270^\circ$$

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



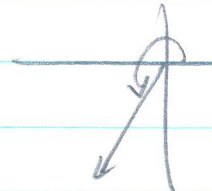
3) $\vec{d} = -2\vec{i} - 5\vec{j}$

$$\|\vec{d}\| = \sqrt{4+25} = \sqrt{29}$$

$$\theta' = \tan^{-1}\left(\frac{5}{2}\right) = 68.20^\circ$$

$$\theta = 180^\circ + 68.20^\circ = 248.20^\circ$$

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



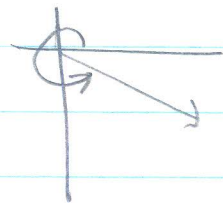
4) $\vec{MN} = \langle 6, -17 \rangle$

$$\|\vec{MN}\| = \sqrt{36+289} = \sqrt{325} = 5\sqrt{13}$$

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

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

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



$$5) \vec{v} = 5 \langle \cos 30^\circ, \sin 30^\circ \rangle = 5 \left\langle \frac{\sqrt{3}}{2}, \frac{1}{2} \right\rangle = \left\langle \frac{5\sqrt{3}}{2}, \frac{5}{2} \right\rangle$$

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

duh!

$$6) \vec{v} = 8 \langle \cos 135^\circ, \sin 135^\circ \rangle$$

$$= 8 \left\langle -\frac{\sqrt{2}}{2}, \frac{\sqrt{2}}{2} \right\rangle$$

$$= \langle -4\sqrt{2}, 4\sqrt{2} \rangle$$

look at the original vector!
(that's why trig form is nice!)

$$7) \langle 2\cos 40^\circ + 3\cos 110^\circ, 2\sin 40^\circ + 3\sin 110^\circ \rangle$$

$$= \langle 0.51, 4.10 \rangle$$

$$8) \langle 10\cos 219^\circ - 6\cos 301^\circ, 10\sin 219^\circ - 6\sin 301^\circ \rangle$$

$$= \langle -10.86, -1.15 \rangle$$

↗ 9) $\theta' = \tan^{-1}\left(\frac{3}{3}\right) = 45^\circ \rightarrow \theta = 45^\circ$

$$\vec{v} = 5 \langle \cos 45^\circ, \sin 45^\circ \rangle = 5 \left\langle \frac{\sqrt{2}}{2}, \frac{\sqrt{2}}{2} \right\rangle = \left\langle \frac{5\sqrt{2}}{2}, \frac{5\sqrt{2}}{2} \right\rangle$$

$$= \langle 3.54, 3.54 \rangle$$

↘ 10) $\theta' = \tan^{-1}\left(\frac{-4}{4}\right) = 45^\circ \rightarrow \theta = 315^\circ$

$$\vec{v} = 3 \langle \cos 315^\circ, \sin 315^\circ \rangle = 3 \left\langle \frac{\sqrt{2}}{2}, -\frac{\sqrt{2}}{2} \right\rangle = \left\langle \frac{3\sqrt{2}}{2}, -\frac{3\sqrt{2}}{2} \right\rangle$$

$$= \langle 2.12, -2.12 \rangle$$

↙ 11) $\theta' = \tan^{-1}\left(\frac{-3}{2}\right) = 56.31^\circ \rightarrow \theta = 303.69^\circ$

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

← 12) $\theta = 180^\circ$

$$\vec{v} = 8(\cos 180^\circ \vec{i} + \sin 180^\circ \vec{j}) = -8\vec{i}$$