

1. \vec{v} TERMINATES AT $(-6, 3)$ WHEN IN STANDARD POSITION.
- WRITE \vec{v} IN VECTOR COMPONENT FORM.
 - FIND $\|\vec{v}\|$
 - FIND THE ANGLE θ , $0^\circ \leq \theta < 360^\circ$, THAT \vec{v} MAKES WITH POSITIVE X-AXIS.
2. IF $\vec{u} = 2\hat{i} + 3\hat{j}$ AND $\vec{v} = 5\hat{i} - 2\hat{j}$, FIND:
- $3\vec{u} - \vec{v}$
 - $\vec{u} \cdot \vec{v}$
 - THE ANGLE BETWEEN \vec{u} AND \vec{v} (NEAREST DEGREE)
3. IF $z = -2 + 5i$,
- FIND $|z|$
 - WRITE z IN TRIGONOMETRIC FORM (NEAREST DEGREE)
4. IF $z_1 = 3 \operatorname{cis} 25^\circ$ AND $z_2 = 12 \operatorname{cis} 190^\circ$, FIND:
- z_1 IN STANDARD FORM (2 DECIMAL PLACES)
 - $z_1 \cdot z_2$ (TRIG FORM)
 - z_1^3 (TRIG FORM)

(15)

QUIZ 7 KEY

1 1. (a) $\vec{v} = \boxed{-6\hat{i} + 3\hat{j}}$

1 (b) $\|\vec{v}\| = \sqrt{(-6)^2 + 3^2} = \sqrt{36+9} = \sqrt{45} = \boxed{3\sqrt{5}}$

2 (c) $\tan \hat{\theta} = \frac{3}{6}$ so $\hat{\theta} = \tan^{-1}\left(\frac{1}{2}\right) \approx 26.6^\circ$

$$\theta = 180^\circ - 26.6^\circ = \boxed{153.4^\circ}$$

2 2. (a) $3\vec{u} - \vec{v} = (6\hat{i} + 9\hat{j}) - (5\hat{i} - 2\hat{j}) = \boxed{\hat{i} + 11\hat{j}}$

1 (b) $\vec{u} \cdot \vec{v} = 2(5) + 3(-2) = 10 + (-6) = \boxed{4}$

2 (c) $\cos \theta = \frac{\vec{u} \cdot \vec{v}}{\|\vec{u}\| \|\vec{v}\|}$ so $\theta = \cos^{-1}\left(\frac{4}{\sqrt{13}\sqrt{29}}\right) \approx \boxed{78^\circ}$

1 3. (a) $|z| = \sqrt{(-2)^2 + 5^2} = \boxed{\sqrt{29}}$

2 (b) $\tan \hat{\theta} = \frac{5}{2}$ so $\hat{\theta} = \tan^{-1}\left(\frac{5}{2}\right) \approx 68^\circ$

$$\theta = 180^\circ - 68^\circ = 112^\circ, \text{ so } z = \boxed{\sqrt{29} \operatorname{cis} 112^\circ}$$

1 4. (a) $z_1 = 3(\cos 25^\circ + i \sin 25^\circ)$

$$= 3(.9063 + i(.4226)) \approx \boxed{2.72 + 1.27i}$$

1 (b) $z_1 \cdot z_2 = 3(12) \operatorname{cis} (25^\circ + 190^\circ)$

$$= \boxed{36 \operatorname{cis} 215^\circ}$$

1 (c) $z_1^3 = 3^3 \operatorname{cis} (3 \cdot 25^\circ)$

$$= \boxed{27 \operatorname{cis} 75^\circ}$$