

Pre-Calculus Worksheet 6.3, 6.5

1. Find the component form given the initial point $(-1,-1)$ and terminal point $(3,5)$.

$$\langle 4, 6 \rangle$$

2. Find the following given $u = \langle 9, 2 \rangle$ and $v = \langle -1, \frac{1}{2} \rangle$.

a) $5u-4v$

$$\langle 49, 8 \rangle$$

b) A unit vector in the same direction as u .

$$\left\langle \frac{9}{\sqrt{85}}, \frac{2}{\sqrt{85}} \right\rangle$$

3. Find the component form of the vector v with the given magnitude and the same direction as u . Do not use decimals. $\|v\| = 8$ $u = \langle -5, -5 \rangle$

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

4. Find the component form of the vector v with the given magnitude and the angle it makes with the positive x axis. Do not use decimals. $\|v\| = 5$ $\theta = \frac{2\pi}{3}$

$$\left\langle -\frac{5}{2}, \frac{5\sqrt{3}}{2} \right\rangle$$

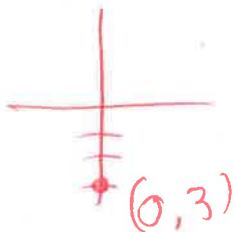
5. A plane left KCI traveling at 425 mph on a bearing of $S27^\circ W$. If the wind is blowing at 46 mph with a bearing of $N72^\circ W$, what is the actual speed and bearing of the plane?

$$434.58 \text{ mph @ } S33^\circ W$$

6. Plot the complex number and find its absolute value.

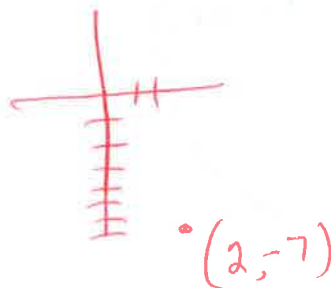
a) $-3i$

3

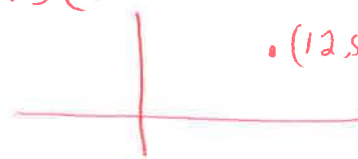


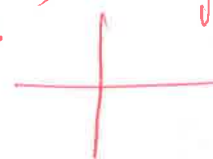
b) $2-7i$

$\sqrt{53}$





7. Represent the complex number graphically and put it into trig form.

a) $12 + 5i$
 $13(\cos 22.62^\circ + i \sin 22.62^\circ)$


b) $-7 + 4i$
 $\sqrt{65}(\cos 150.26^\circ + i \sin 150.26^\circ)$


8. Represent the complex graphically and put it into standard form.

a) $2\left(\cos \frac{3\pi}{4} + i \sin \frac{3\pi}{4}\right)$
 $(-1.41 + 1.41i)$
 $(-\sqrt{2} + i\sqrt{2})$


b) $(\cos 235^\circ + i \sin 235^\circ)$
 $(-0.574 + 0.819i)$


9. Find $z_1 \cdot z_2$ and $\frac{z_1}{z_2}$, given $z_1 = 12(\cos 137^\circ + i \sin 137^\circ)$ and $z_2 = 2(\cos 82^\circ + i \sin 82^\circ)$

$z_1 \cdot z_2 = 24(\cos 219^\circ + i \sin 219^\circ)$

$\frac{z_1}{z_2} = 6(\cos 55^\circ + i \sin 55^\circ)$

10. Find the following. Put your answers in standard form.

a) $(-2 + 6i)^4$
 $447,99 + 1536i$

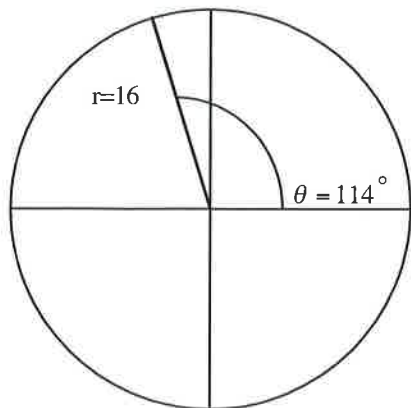
b) $(\sqrt{3} - 2i)^5$
 $-53.70 + 118i$

11. Find the indicated roots of the given complex number.

a) Fourth roots of -81
 $3(\cos 45^\circ + i \sin 45^\circ)$
 $3(\cos 135^\circ + i \sin 135^\circ)$
 $3(\cos 225^\circ + i \sin 225^\circ)$
 $3(\cos 315^\circ + i \sin 315^\circ)$

b) Cube roots of $8i$
 $2(\cos 30^\circ + i \sin 30^\circ)$
 $2(\cos 150^\circ + i \sin 150^\circ)$
 $2(\cos 270^\circ + i \sin 270^\circ)$

12. Find the cube roots of the given complex number.



$16(\cos 114^\circ + i \sin 114^\circ)$

$2\sqrt[3]{2}(\cos 38^\circ + i \sin 38^\circ)$

$2\sqrt[3]{2}(\cos 158^\circ + i \sin 158^\circ)$

$2\sqrt[3]{2}(\cos 278^\circ + i \sin 278^\circ)$