Honors Precalculus
Chapter 6 and 9 PRACTICE TEST

Name: $\qquad$ Per: $\qquad$
Use an additional sheet, if necessary, to show your work

2. For the triangle shown and the values provided, state how many triangles are possible $(0,1$, or 2$)$.

a) $A=62^{\circ}, a=10, b=12$

$$
\sin 62=\frac{\frac{h}{12} \quad h=12 \sin 62=10.6 \quad h=10.6}{0 \text { triangles because } a<h}
$$

$$
b=10.93 \quad c=9.80 \quad \angle B=75^{\circ}
$$

3. Sketch a triangle where $C=120^{\circ}, a=4, b=6$ and then find its area.

4. Find the measure of angle $C$ to 1 decimal place.
$\cos C=\frac{a^{2}+b^{2}-c^{2}}{2 a b}$
$\cos C=\frac{81+25-64}{2(9)(5)}$

$\cos C=\frac{42}{90}$
$\cos ^{-1}\left(\frac{42}{90}\right)=62.18^{\circ}$
5. Given $\vec{u}=\langle 2,-1>$ and $\vec{v}=<1,5>$ sketch $2 \vec{u}+\vec{v}$.

b) $A=58^{\circ}, a=11, b=12$
$\sin 58=\frac{h}{12} \quad h=12 \sin 58=10.2$
6. Find how many square miles the Bermuda Triangle covers using Heron's formula.
$A=\sqrt{s(s-a)(s-b)(s-c)}$
where $s=\frac{a+b+c}{2}$


$$
\begin{aligned}
A= & \sqrt{1511(1511-954)(1511-1033)(1511-103 s)} \\
& A \approx 437,600 \text { miles }^{2}
\end{aligned} \quad s=\frac{954+1033+1035}{2}
$$


4. Find the length of side $c$ to 1 decimal place.

$$
\begin{aligned}
& c^{2}=a^{2}+b^{2}-2 a b \cos C \\
& c^{2}=8^{2}+11^{2}-2(8)(11) \cos (37)
\end{aligned}
$$

$c^{2}=44.44$
$c=6.67$

8. Given $\mathbf{u}=4 \mathbf{i}-2 \mathbf{j}$ and $\mathbf{v}=-3 \mathbf{i}+8 \mathbf{j}$ find the following:
a) $\frac{1}{2} u-v=\frac{1}{2}(4 i-2 j)-(-3 i+8 j)$

$$
(2 i-1 j)-(-3 i+8 j)
$$

b) $5 u+2 v$

$$
5 i-9 j
$$

$$
\begin{aligned}
& 5(4 i-2 j)+2(-3 i+8 j) \\
& (20 i-10 j)+(-6 i+16 j)=14 i+6 j
\end{aligned}
$$

8. $\quad$ Sketch in vector $\boldsymbol{v}=-2 \boldsymbol{i}+5 \boldsymbol{j}$ and then find the magnitude and direction of $\boldsymbol{v}$.


$$
\|\vec{v}\|=\sqrt{(-2)^{2}+(5)^{2}}=\sqrt{29}=5.39
$$

$$
\tan \theta=\frac{y}{x} \Leftrightarrow \theta=\tan ^{-1}\left(\frac{5}{-2}\right)+180^{\circ}=111.8^{\circ}
$$


10. Graph the equation $(x+3)^{2}+(y-2)^{2}=49$.

$$
\begin{aligned}
& C:(-3,2) \\
& (x-h)^{2}+(y-k)^{2}=r^{2} \\
& \text { Center: }(h, k) \\
& \text { Radius }=\sqrt{49}=7
\end{aligned}
$$

12. List the polar coordinates for the points shown.
$A:(5, \pi / 6)$
$B:(3,11 \pi / 6)$
$C:(4, \pi)$
$D:(4,3 \pi / 4)$
13. A plane with an airspeed of 330 mph at a bearing of $\mathrm{N} 65^{\circ} \mathrm{E}$ encounters wind with a velocity of 75 mph at E $30^{\circ} \mathrm{N}$. Find the resultant (airplane + wind) speed and direction of the two.


$$
\vec{p}=\langle 330 \cos 25,330 \sin 25\rangle
$$

$$
\vec{p}=\langle 299,139.5\rangle
$$

$$
\vec{w}=\langle 75 \cos 30,75 \sin 30\rangle
$$

$$
\vec{w}=\langle 65,37.5\rangle
$$

$$
\vec{p}+\vec{w}=\langle 299+65.139 .5+37.5\rangle
$$

$$
\vec{p}+\vec{w}=\langle 364,177\rangle
$$

$$
\|\vec{p}+\vec{w}\|=\sqrt{364^{2}+177^{2}}=404.8 \mathrm{mph}
$$

$$
\begin{aligned}
& \theta=\tan ^{-1}\left(\frac{177}{364}\right)=25.93^{\circ} \\
& N 64.07^{\circ} E \in \text { or } \quad E 25.93^{\circ} \mathrm{N}
\end{aligned}
$$

11. Write the equation for the ellipse shown.
Center: $(2,-1)$
Minor radius $(x): 3$
Major radius $(y)$ : 5

$$
\frac{(x-2)^{2}}{9}+\frac{(y+1)^{2}}{25}=1
$$


13. a) Convert point A from problem 12 to

$$
A:(5, \pi / 6) \rightarrow(x, y) \rightarrow(4.33,2.5)
$$

Polar

$$
\begin{aligned}
& x=5 \cos \left(\frac{\pi}{6}\right)=4.33 \\
& y=5 \sin \left(\frac{\pi}{6}\right)=2.5
\end{aligned}
$$

b) Convert $(-2,-2)$ to polar coordinates.
-2-1
14. For the equation $r=4 \sin \theta$, fill in the table and plot the points. Then sketch the graph of the equation. $(0,0)(2, \pi / 6)(3.46, \pi / 3)(4, \pi / 2)\left(3.46, \frac{2 \pi}{3}\right)(2,5 \pi / 6)(0, \pi)$

| $\theta$ | 0 | $\pi / 6$ | $\pi / 3$ | $\pi / 2$ | $2 \pi / 3$ | $5 \pi / 6$ | $\pi$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| $r$ | 0 | 2 | 3.46 | 4 | 3.46 | 2 | 0 |
|  |  |  |  |  |  |  |  |
| 4 | $4 \sin \frac{\pi}{6}$ | $\cdots$ |  |  | $4 \sin \pi$ |  |  |



