

Name: \_\_\_\_\_

Multiple choice problems are worth five points each. Circle the **Letter** of the correct choice. Do NOT circle the entire answer. No penalty for guessing. The other problems are worth various points as marked.

1. In  $\triangle ABC$ ,  $A + B + C =$

A.  $\sin A + \sin B + \sin C$

B.  $\sin(A + B + C)$

C.  $\frac{a}{\sin A} + \frac{b}{\sin B} + \frac{c}{\sin C}$

D.  $180^\circ$

2. According to the Law of Cosines

A.  $\frac{a}{\cos A} = \frac{b}{\cos B} = \frac{c}{\cos C}$

B.  $\cos(90^\circ - A) = \sin A$

C.  $c^2 = a^2 + b^2 - 2ab \cos C$

D.  $c^2 = a^2 + b^2 + 2ab \cos C$

3. (9 pts) Given  $B = 48.2^\circ$ ,  $C = 34.7^\circ$ ,  $a = 12.5$  solve the triangle  $\triangle ABC$ . The quantities are not necessarily computed in the order given. Compute them in whichever order seems logical.

I. Compute  $A$  here:II. Compute  $b$  here:III. Compute  $c$  here:

4. (9 pts) Given  $a = 23.7$ ,  $b = 10.2$ ,  $C = 31.4^\circ$  solve the triangle  $\triangle ABC$ . The quantities are not necessarily computed in the order given. Compute them in whichever order seems logical.

I. Compute  $A$  here:

II. Compute  $B$  here:

III. Compute  $c$  here:

5. In  $\triangle ABC$  if  $\sin A = 0.4321$  then either  $A = 25.6^\circ$  or  $A =$

- A.  $154.4^\circ$
- B.  $-25.6^\circ$
- C.  $64.4^\circ$
- D.  $385.6^\circ$

6. If  $A(-2, 5)$  and  $B(3, 1)$  are two points in the plane, then the vector  $\overrightarrow{AB}$  expressed in component form is

- A.  $\langle -6, 5 \rangle$
- B.  $\langle -5, 4 \rangle$
- C.  $\langle 1, -4 \rangle$
- D.  $\langle 5, -4 \rangle$

7. (12 pts) Given that  $\vec{u} = \langle 4, -3 \rangle$ , and  $\vec{v} = \langle -12, 5 \rangle$  find the following:

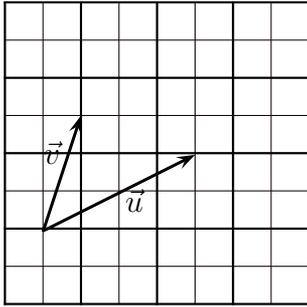
I.  $\|\vec{u}\|$

II.  $\|\vec{v}\|$

III.  $\|\vec{u} - \vec{v}\|$

IV.  $\|\vec{u} + \vec{v}\|$

8. (8 pts) Sketch the vector  $\vec{u} + \vec{v}$ .



9. Convert  $z = 2(\cos 30^\circ + i \sin 30^\circ)$  to rectangular form.
- A.  $\sqrt{3} + i$
  - B.  $1 + \sqrt{3}i$
  - C.  $1 - \sqrt{3}i$
  - D.  $\sqrt{3} - i$
10. Convert  $-2$  to polar form.
- A.  $2(\cos 90^\circ + i \sin 90^\circ)$
  - B.  $-2(\cos 180^\circ + i \sin 180^\circ)$
  - C.  $2(\cos 180^\circ + i \sin 180^\circ)$
  - D.  $2(\cos 270^\circ + i \sin 270^\circ)$
11. (12 pts) Convert  $z = -6 + 6i$  to polar form.
- I. Compute  $|z|$  here:

II. Find the angle  $\theta$  here:

III. Write  $z$  in polar form here:



Bonus: (10 points) From a point  $A$  on a beach a ship is spotted at a point  $B$  three miles away. A second ship is spotted at a point  $C$  two miles away from  $A$ . If  $\angle BAC = 112^\circ$ , how far is ship  $B$  from ship  $C$  to the nearest tenth of a mile?