

Student Name: _____

Show all relevant work (use back of pages for scratch paper, if needed). **CIRCLE FINAL ANSWERS.**
All problems are worth 9 points except #6 which is worth 15 points.

1. Find the rectangular coordinates (exact, no decimals) for the point with polar coordinates $(4, \frac{2\pi}{3})$.

2. Convert the polar equation $r = 3 \csc \theta$ to a rectangular equation.

3. Write the complex number $9 - 12i$ in polar form.

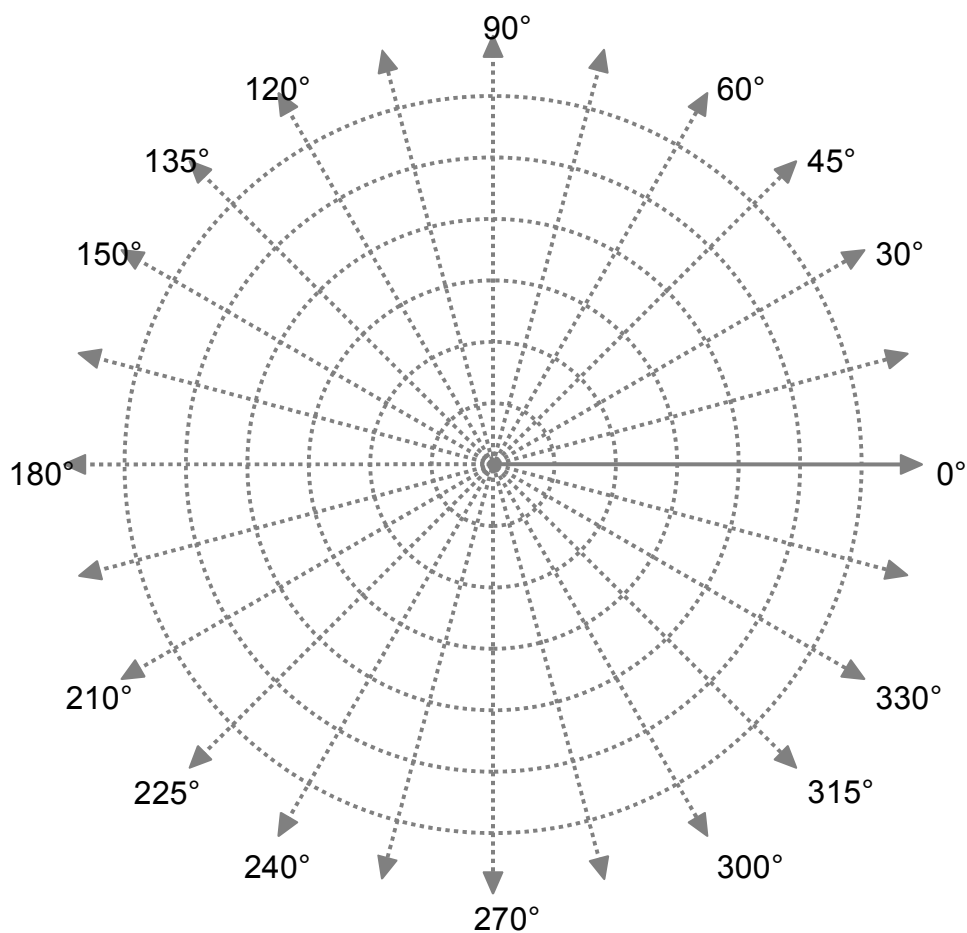
4. Given $z_1 = 12(\cos 125^\circ + i \sin 125^\circ)$ and $z_2 = 4(\cos 35^\circ + i \sin 35^\circ)$, find the product $z_1 z_2$ (leave answer in polar form).

5. Calculate $(-5\sqrt{3}+5i)^5$ (express final answer in standard form exactly — no decimals).

6. Complete the table below by evaluating the equation: $r=2+4\sin\theta$.

Plot each of the points, and then connect them in order to draw a sketch of the graph.

θ	r
0°	
30°	
45°	
60°	
90°	
120°	
135°	
150°	
180°	
210°	
225°	
240°	
270°	
300°	
315°	
330°	
360°	



7. Given vectors $\mathbf{u} = \langle 3, -2 \rangle$, and $\mathbf{v} = \langle 1, 5 \rangle$:

a) find $5\mathbf{u} - 3\mathbf{v} =$

b) find the magnitude of \mathbf{u} : $|\mathbf{u}| =$

c) to the nearest tenth of a degree, find the direction of \mathbf{v} .

d) find $\mathbf{u} \cdot \mathbf{v} =$

e) calculate the angle between \mathbf{u} and \mathbf{v} (to the nearest tenth of a degree)