

Student Name: _____

Show all relevant work (use back of pages for scratch paper, if needed). **CIRCLE FINAL ANSWERS.**

1. [5 pts each] Evaluate the following and express answers in standard form $a + bi$:

a) $(2 - 4i) - (5 + 8i)$

b) $\frac{7 - 3i}{4 + 2i}$

c) $(2 + 7i)(1 - 3i)$

d) i^{63}

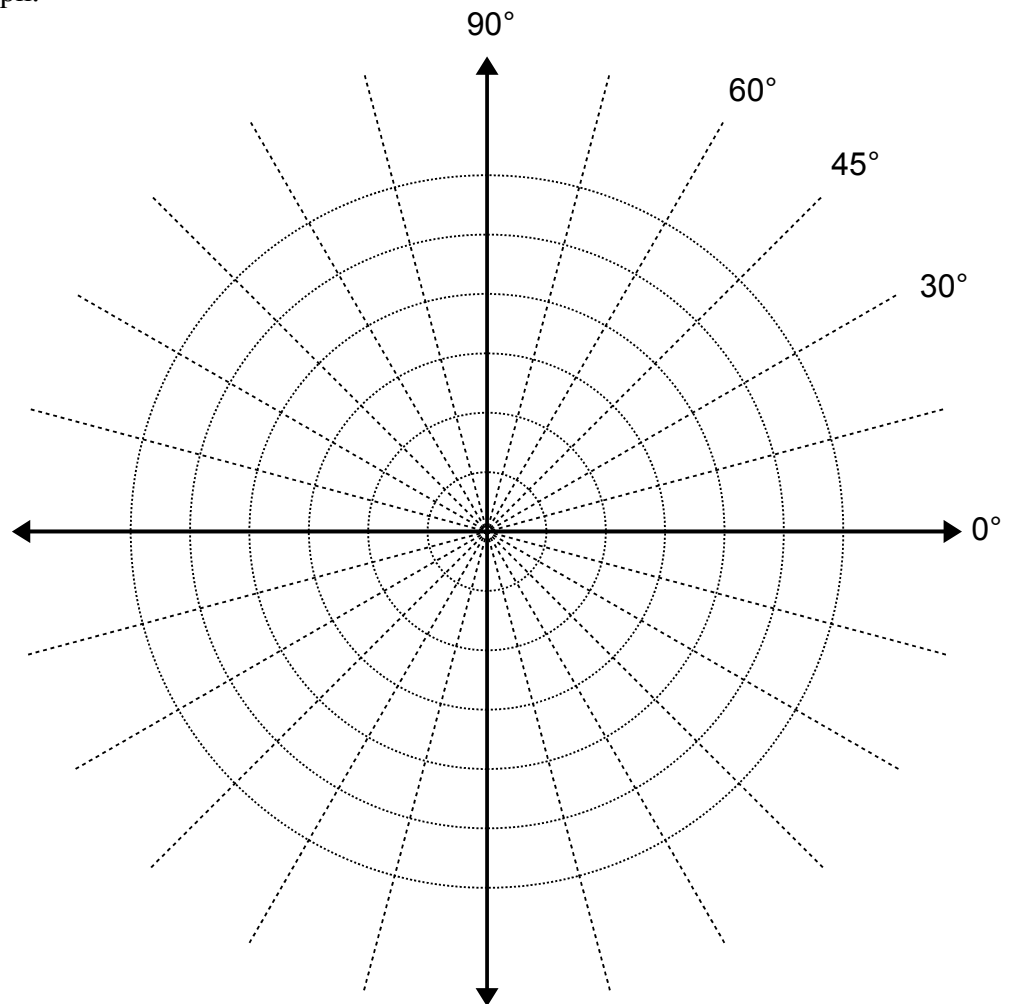
2. [5 pts] Find all solutions of the equation $3x^2 + 2x + 7 = 0$ and express them in the form $a + bi$.

3. [5 pts] Convert the polar coordinates $(8, -\frac{\pi}{6})$ to rectangular coordinates (exact answer, no decimals).

4. [5 pts] Convert the rectangular equation $x^2 + y^2 = 16$ to polar form.

5. [20 pts.] Complete the table below by evaluating the equation: $r = 2 + 4 \sin \theta$ (you may use a calculator and leave answers as decimals). Then, plot each of the points, and 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°	



6. [15 pts.] Calculate $\left(-\frac{\sqrt{3}}{2} + \frac{1}{2}i\right)^7$ (express answer in $a+bi$ form exactly — no decimals).

7. [15 pts.] List below the five fifth roots of $-32i$ (express answers in standard or polar form).

$$w_0 =$$

$$w_1 =$$

$$w_2 =$$

$$w_3 =$$

$$w_4 =$$

8. [5 pts. each part] 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) find $\mathbf{u} \cdot \mathbf{v} =$

d) calculate the angle between \mathbf{u} and \mathbf{v} (to the nearest degree)