

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)  $i^{62}$

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

3. [30 pts] Complete the table with the exact values (write answers as fractions, *not* decimals) of the trigonometric functions. If a value is undefined, write "undef."

$\theta$ in degrees	$\sin \theta$	$\cos \theta$	$\tan \theta$	$\csc \theta$	$\sec \theta$	$\cot \theta$
$0^\circ$						
$30^\circ$						
$45^\circ$						
$60^\circ$						
$90^\circ$						

4. [5 pts each] Find the exact (fractions not decimals) value of

(a)  $\sin \frac{5\pi}{3} =$

(b)  $\sec(210^\circ) =$

5. [5 pts] Find the exact value (fractions not decimals) of  $\tan(\cos^{-1}(\frac{3}{7})) =$

6. [10 pts] Given  $\theta$  in Quadrant III and the value of  $\sin \theta$ , find the exact values (fractions not decimals) of the remaining trigonometric functions:

$$\sin \theta = -\frac{5}{8}$$

$$\csc \theta =$$

$$\cos \theta =$$

$$\sec \theta =$$

$$\tan \theta =$$

$$\cot \theta =$$

7. [10 pts] Find the period and phase shift of the function  $y = 5 \sec \frac{1}{4}(x - \pi)$ . Then graph one period and label all relevant points along the axes.

$$\text{Period} =$$

$$\text{Phase Shift} =$$



8. [10 pts] Given the following information, solve for all possible triangles. If no triangle is possible, write, "Impossible." If two triangles are possible, list both sets of values. Express answers to one decimal place.

$$\angle A = \qquad a = 3.0$$

$$\angle B = \qquad b = 6.0$$

$$\angle C = \qquad c = 4.0$$

9. [10 pts] A 300 foot support cable is attached to the top of a 70 foot flagpole. The flagpole itself is mounted at the top of a hill that has an angle of inclination of  $38^\circ$ . How far down the side of hill will the cable reach, as measured from the base of the pole (distance  $d$  in the figure)?

