Math Analysis Honors Polar WS 1

***Write the letter of the correct answer on the blank at the right of each question.***

1. Which is a value for $\theta$ if the points $(3, 300°)$ and $(-3, \theta)$ are equivalent? 1. _____
   A. $-30°$ B. $-60°$ C. $120°$ D. $150°$

2. What is the graph of $\theta = \frac{\pi}{2}$? 2. _____
   A. a point B. a vertical line C. a horizontal line D. a circle

3. Which is the polar equation for a circle with center at the pole and radius $\pi$? 3. _____
   A. $r = \cos \pi$ B. $\theta = \pi$ C. $\theta = r \cos \pi$ D. $r = \pi$

4. Which of the following is an equation of a spiral of Archimedes? 4. _____
   A. $r = \sqrt{2}\theta$ B. $r = \sqrt{2} \cos \theta$ C. $r = \sqrt{2} + \sqrt{2} \sin \theta$ D. $r = \cos \sqrt{2}\theta$

5. How many petals does the rose given by $r = \cos 4\theta$ have? 5. _____
   A. 2 B. 8 C. 16 D. 4

6. What is the solution of this system of equations? 6. _____
   $r = 2 \cos \theta$
   $r = 1 + \cos \theta$
   A. $(0, \pi)$ B. $(2, 0)$ C. $(0, 0)$ and $(2, 0)$ D. $(0, \pi)$ and $(2, 0)$

7. What are the polar coordinates of $(\sqrt{3}, -1)$? 7. _____
   A. $(4, 300°)$ B. $(-2, 120°)$ C. $(2, 330°)$ D. $(\sqrt{3}, 270°)$

8. What are the rectangular coordinates of $(-\sqrt{3}, 135°)$? 8. _____
   A. $\left(\frac{\sqrt{6}}{2}, -\frac{\sqrt{6}}{2}\right)$ B. $(\sqrt{3}, -\sqrt{3})$ C. $\left(\frac{-\sqrt{6}}{2}, \frac{\sqrt{6}}{2}\right)$ D. $(-3, 3)$

9. What is the polar form of $x^2 + 4x + y^2 = 0$? 9. _____
   A. $r = \sqrt{r}$ B. $r^2 + 4x = 0$ C. $r = -4 \cos \theta$ D. $4 \sin \theta + r = 0$

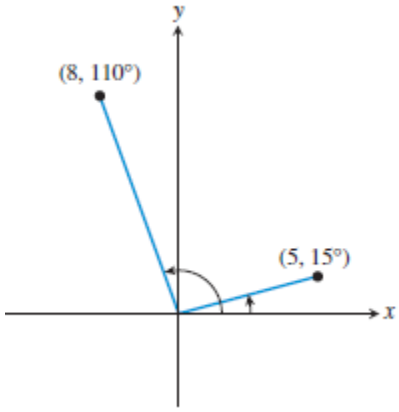
10. Which of the following is equivalent to $i^{18}$? 10. _____
   A. $-i$ B. 1 C. $i$ D. $-1$

11. a) Find the distance between the following points in the polar coordinate system

P(2; $\frac{\pi}{2}$) and Q(3;$\frac{\pi}{4}$)

b) Show that the distance is the same when the points are converted to the rectangular coordinate system.

12. Radar detects two airplanes at the same altitude.
Their polar coordinates are (8 mi, 110°) and (5 mi, 15°) See Figure
How far apart are the airplanes?




13. Before large road construction projects or building a new home can take place, a surveyor maps out the characteristics of the land. A surveyor uses a device called a theodolite to measure angles. The precise locations of various land features are determined using distances and the angles measured with the theodolite. While mapping out a level site, a surveyor identifies a landmark 450 feet away and 30° to the left and another landmark 600 feet away and 50° to the right. What is the distance between the landmarks?