Honors Pre-Calculus **Complex Numbers** **Name:**_____

Change into polar/trigonometric form $(rcis\theta)$.

1. $-2\sqrt{3}+2i$ **2**. $3-i\sqrt{3}$ **3**. $2+2i$

1.)_____

2.)_____

3.)_____

4. $-3i$ **5**. $\frac{1}{2}-\frac{\sqrt{3}}{2}i$ **6**. -1

4.)_____

5.)_____

6.)_____

Convert the polar point (r,θ) to a rectangular point (x,y).

7. $\left(4,\frac{11\pi}{6}\right)$ **8**. $\left(\frac{1}{2},60°\right)$ **9**. $(-17,\pi)$

7.)_____

8.)_____

9.)_____

10. $\left(3,-\frac{\pi}{4}\right)$ **11**. $\left(4,\frac{13\pi}{3}\right)$ **12**. $\left(1,\frac{3\pi}{2}\right)$

10.)_____

11.)_____

12.)_____

Find the following WITHOUT CALCULATORS. Give answers in (standard) $a+bi$ form (must use polar complex numbers).

13. $(1-i)^4$ **14**. $\dfrac{\left(1-i\sqrt{3}\right)^5\left(-\sqrt{3}-i\right)^3}{\left(2+2\sqrt{3}i\right)^6}$ **15**. $(-2-2i)^5(-1-i)^4$ **13**.)_____

14.)_____

15.)_____

16. $(1+i)(4i)\left(1-i\sqrt{3}\right)\left(-2\sqrt{2}+2\sqrt{2}i\right)$ **17**. $\dfrac{\left(\frac{\sqrt{3}}{2}+\frac{1}{2}i\right)^3\left(\frac{\sqrt{2}}{2}-\frac{\sqrt{2}}{2}i\right)^4}{(-1+i)^2}$ **16**.)_____

17.)_____

1. $4 \text{ cis } \frac{5\pi}{6}$ **2**. $2\sqrt{3} \text{ cis } \frac{11\pi}{6}$ **3**. $2\sqrt{2} \text{ cis } \frac{\pi}{4}$ **4**. $3 \text{ cis } \frac{3\pi}{2}$ **5**. $1 \text{ cis } \frac{5\pi}{3}$

6. $1 \; cis \; \pi$ **7**. $(2\sqrt{3}, -2)$ **8**. $\left(\frac{1}{4}, \frac{\sqrt{3}}{4}\right)$ **9**. $(17, \; 0)$ **10**. $\left(\frac{3\sqrt{2}}{2}, -\frac{3\sqrt{2}}{2}\right)$

11. $(2, \; 2\sqrt{3})$ **12**. $(0, \; -1)$ **13**. $-4+0i$ or -4 **14**. $\frac{\sqrt{3}}{32} - \frac{1}{32}i$ **15**. $-512-512i$

16. $-16\sqrt{6} - 16\sqrt{2}i$ **17**. $\frac{1}{2} + 0i$ or $\frac{1}{2}$