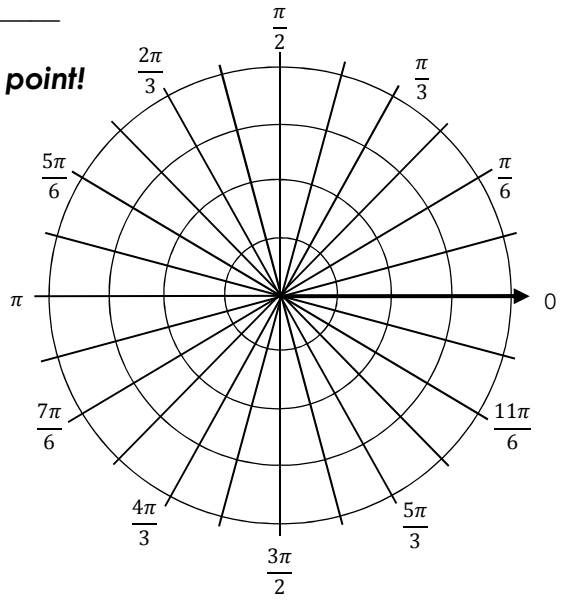
# 8.1-8.3 Review

*Pre-Calculus*

Name:_____

Hour:_____




***Plot the point that has the given polar coordinates. Label each point!***

**1**. $\left(3, \frac{5\pi}{4}\right)$

**2**. $\left(1, \frac{7\pi}{2}\right)$

**3**. $\left(-2, \frac{5\pi}{6}\right)$

**4**. $\left(-4, \frac{2\pi}{3}\right)$

**5**. $\left(3, -\frac{13\pi}{6}\right)$

**6**. $(-1, -7\pi)$

***A point P(r, θ) is given in polar coordinates. Give <u>two</u> other polar representations of the point, one with r < 0 and one with r > 0.***

**7**. $\left(2, \frac{3\pi}{4}\right)$

**8**. $(-1, 13\pi)$

**9**. $\left(-4, \frac{5\pi}{4}\right)$

**10**. $\left(2, \frac{7\pi}{6}\right)$

***Convert the polar coordinates to rectangular coordinates (X,Y).***

**11**. $\left(-3, \frac{4\pi}{3}\right)$

**12**. $\left(-1, -\frac{\pi}{2}\right)$

**13**. $(5, \pi)$

**14**. $\left(6, \frac{7\pi}{4}\right)$

***Convert the rectangular coordinates to polar coordinates with r > 0 and $0 \le \theta < 2\pi$.***

**15**. $(3\sqrt{3}, -3)$ **16**. $(-6\sqrt{2}, -6\sqrt{2})$ **17**. $(7, 24)$ **18**. $(-\sqrt{2}, \sqrt{6})$

***Convert the rectangular equation to polar form.***

**19**. y = 3 **20**. $x^2 + y^2 = 1$

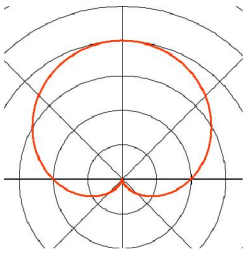
***Convert the polar equation to rectangular form.***

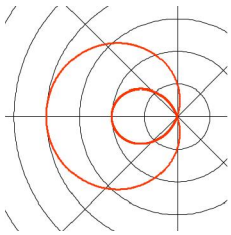
**21**. $r \sin\theta = 7$ **22**. $r = 4\sec\theta$

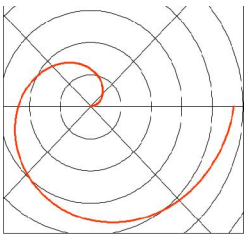
***Match the equation with its graph (try to do this WITHOUT your calculator!).***

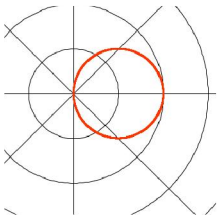
**23**. $r = \frac{3}{4}\theta$ **24**. $r = 3\sin 2\theta$ **25**. $r = 1 - 3\cos\theta$

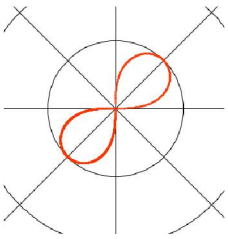
**26**. $r = 2\cos\theta$ **27**. $r = 2 + 2\sin\theta$ **28**. $r^2 = \sin 2\theta$

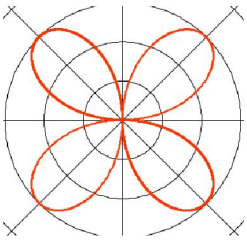
A. 

B. 

C. 

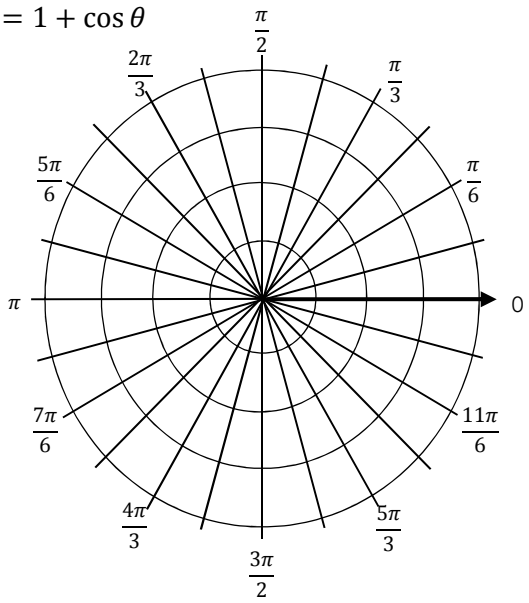
D. 

E. 

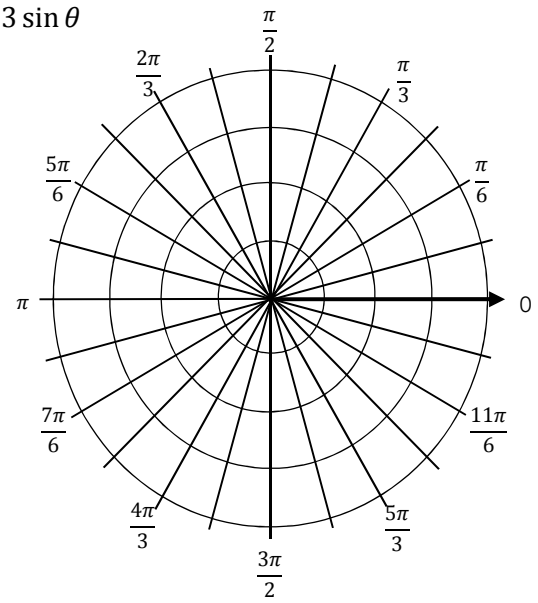
F. 

***Sketch the graph of the polar equation.***

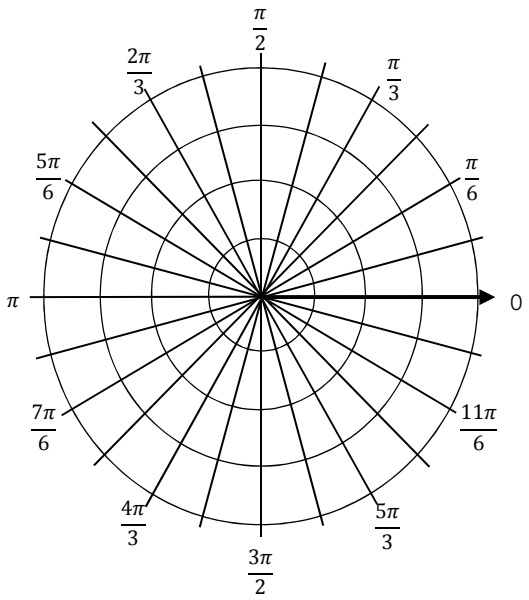
**29**. $r = 1 + \cos\theta$



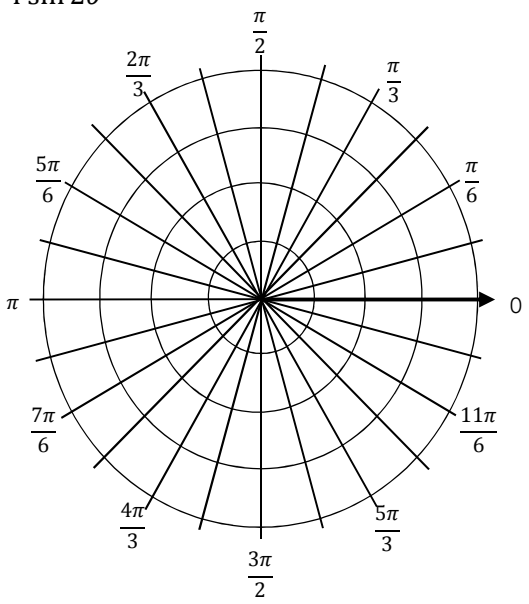

**30**. $r = 3\sin\theta$




**31**. $r = 2\cos 2\theta$

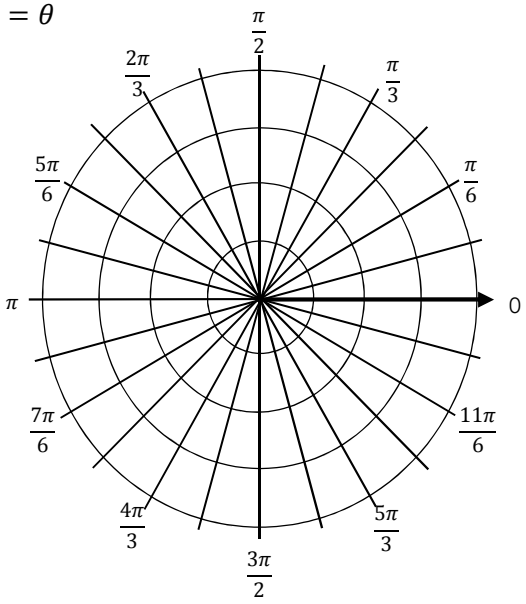



**32**. $r^2 = 4\sin 2\theta$

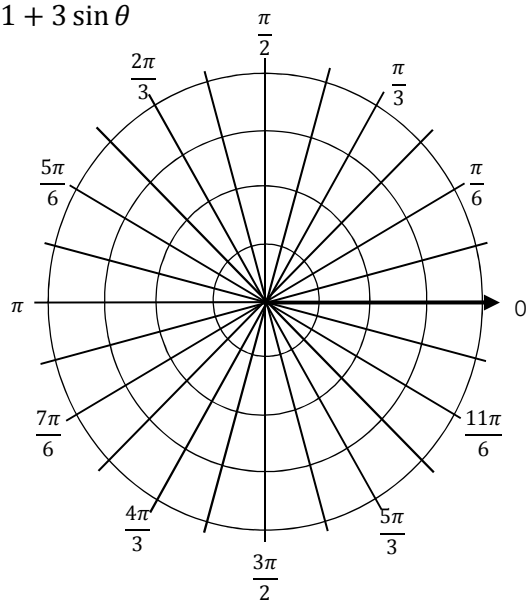


***Sketch the graph of the polar equation.***

**33**. $r = \theta$




**34**. $r = 1 + 3\sin\theta$




***Write the complex number in <u>polar</u> <u>form</u> $(rcis\theta)$ with argument between 0 and 2π. (To do this, you must find the modulus and the argument.)***

**35**. $4 + 4i$

**36**. $-1 - \sqrt{3}i$

**37**. $\sqrt{3} - i$

***Find the product $z_1z_2$ and the quotient $\frac{z_1}{z_2}$. Find <u>exact</u> <u>values</u> if possible!***

**38**. $z_1 = 3\left(\cos\frac{\pi}{6} + i\sin\frac{\pi}{6}\right)$;
$z_2 = 5\left(\cos\frac{4\pi}{3} + i\sin\frac{4\pi}{3}\right)$

**39**. $z_1 = \sqrt{2}(\cos 75° + i\sin 75°)$;
$z_2 = 3\sqrt{2}(\cos 60° + i\sin 60°)$

**40**. $z_1 = \frac{4}{5}(\cos 25° + i\sin 25°)$
$z_2 = \frac{1}{5}(\cos 155° + i\sin 155°)$

***Find the indicated power using DeMoivre's Theorem. Find exact values if possible!***

**41**. $\left(1 - \sqrt{3}i\right)^4$

**42**. $\left(\frac{1}{2} + \frac{\sqrt{3}}{2}i\right)^{20}$

**43**. $(1 + i)^{11}$

**44**. Find the square roots of $z = (1 + i)$ (answers in ***(rcisθ)*** form *please*)

**45**. Solve the following equation: $x^3 + 27 = 0$ (answers in $a + bi$ form *please*)

**8.1-8.3 Review Answers**

**1 – 6.** See online key

**7.** $\left(2, \frac{11\pi}{4}\right); \left(-2, \frac{7\pi}{4}\right)$

**8.** $(-1, 15\pi); (1, 14\pi)$

**9.** $\left(4, \frac{9\pi}{4}\right); \left(-4, \frac{13\pi}{4}\right)$

**10.** $\left(2, \frac{19\pi}{6}\right); \left(-2, \frac{13\pi}{6}\right)$

**11.** $\left(\frac{3}{2}, \frac{3\sqrt{3}}{2}\right)$

**12.** (0, 1)

**13.** (-5, 0)

**14.** $(3\sqrt{2}, -3\sqrt{2})$

**15.** $\left(6, \frac{11\pi}{6}\right)$

**16.** $\left(12, \frac{5\pi}{4}\right)$

**17.** $\left(25, \tan^{-1}\left(\frac{24}{7}\right)\right)$

**18.** $\left(2\sqrt{2}, \frac{2\pi}{3}\right)$

**19.** $r = 3\csc\theta$

**20.** r = 1

**21.** y = 7

**22.** x = 4

**23.** C

**24.** F

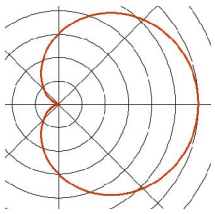
**25.** B

**26.** D

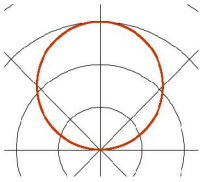
**27.** A

**28.** E

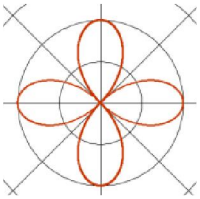
**29.**



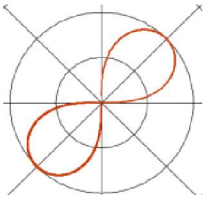
**30.**



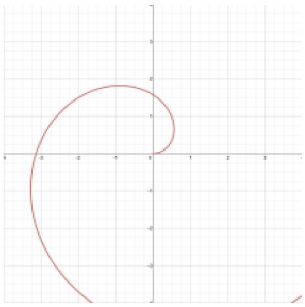
**31.**



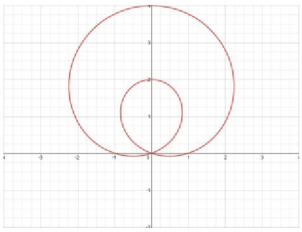
**32.**



**33.**



**34.**



**35.** $z = 4\sqrt{2}\left(\cos\frac{\pi}{4} + i\sin\frac{\pi}{4}\right)$

**36.** $z = 2\left(\cos\frac{4\pi}{3} + i\sin\frac{4\pi}{3}\right)$

**37.** $z = 2\left(\cos\frac{11\pi}{6} + i\sin\frac{11\pi}{6}\right)$

**38.** $z_1 z_2 = -15i$ ; $\frac{z_1}{z_2} = -\frac{3\sqrt{3}}{10} + \frac{3}{10}i$

**39.** $z_1 z_2 = -3\sqrt{2} + 3i\sqrt{2}$ ; $\frac{z_1}{z_2} = \frac{1}{3}(\cos 15° + i\sin 15°)$

**40.** $z_1 z_2 = -\frac{4}{25}$ ; $\frac{z_1}{z_2} = 4(\cos(-130°) + i\sin(-130°))$

**41.** $-8 + 8i\sqrt{3}$

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

**43.** $-32 + 32i$

**44.** $\sqrt[4]{2}cis(22.5°), \sqrt[4]{2}cis(202.5°)$

**45.** $-3, \frac{3}{2} + \frac{3i\sqrt{3}}{2}, \frac{3}{2} - \frac{3i\sqrt{3}}{2}$