Analysis H – Deggeller / Gleason / Hahn

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Polar Quiz 1 [26 points]

Period: 6

NO CALCULATOR

26/26

1. Convert the polar point $\left(-7, \frac{31\pi}{6}\right)$ into rectangular coordinates. [2 pts]

$\frac{31\pi}{6} = \frac{24\pi}{6} + \frac{7\pi}{6}$

$= 4\pi + \frac{7\pi}{6}$

$\left(-7\cos\frac{31\pi}{6}, -7\sin\frac{31\pi}{6}\right)$

$\cos\frac{31\pi}{6} = \cos\frac{7\pi}{6} = -\frac{\sqrt{3}}{2}$

$\sin\frac{31\pi}{6} = \sin\frac{7\pi}{6} = -\frac{1}{2}$

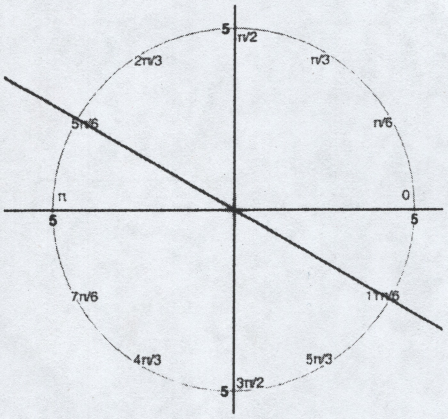
$= \left(\frac{7\sqrt{3}}{2}, \frac{7}{2}\right)$

2. Convert the polar equation $r = 2\csc\theta$ into rectangular form. [3 pts]

$r = \frac{2}{\sin\theta} \rightarrow 1 = \frac{2}{r\sin\theta} \rightarrow 1 = \frac{2}{y} \rightarrow y = 2$

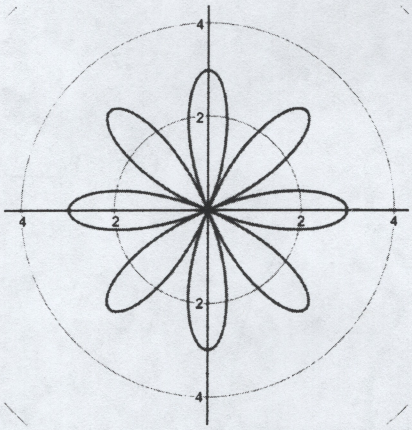
3. Write the equation of each polar graph. [3 pts each]

a)



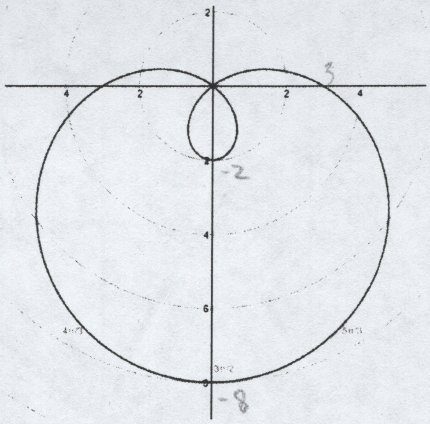
Equation: $\theta = \frac{5\pi}{6}$

b)



Equation: $r = 3\cos 4\theta$

c)

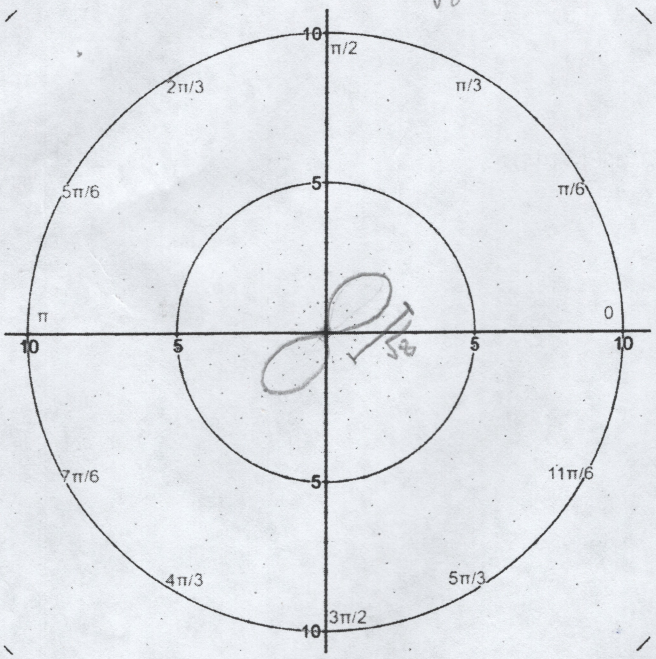


Equation: $r = 3 - 5\sin\theta$

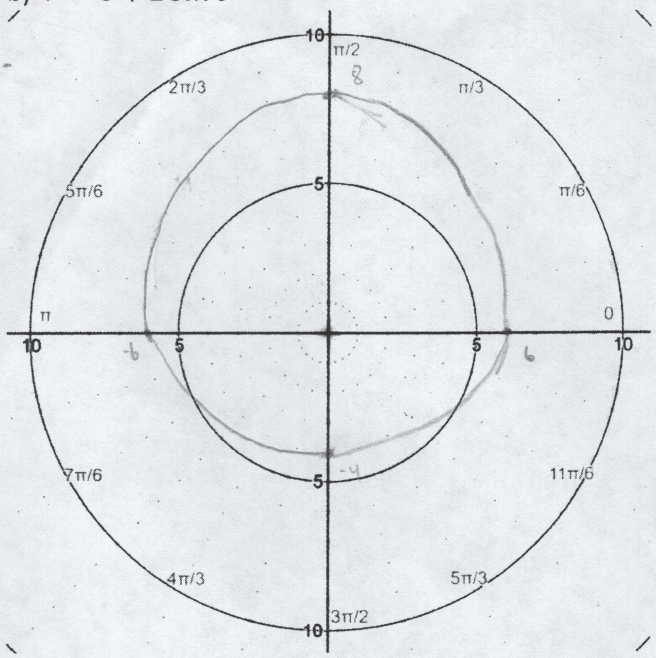
10

4. Graph each polar graph [4 pts each]

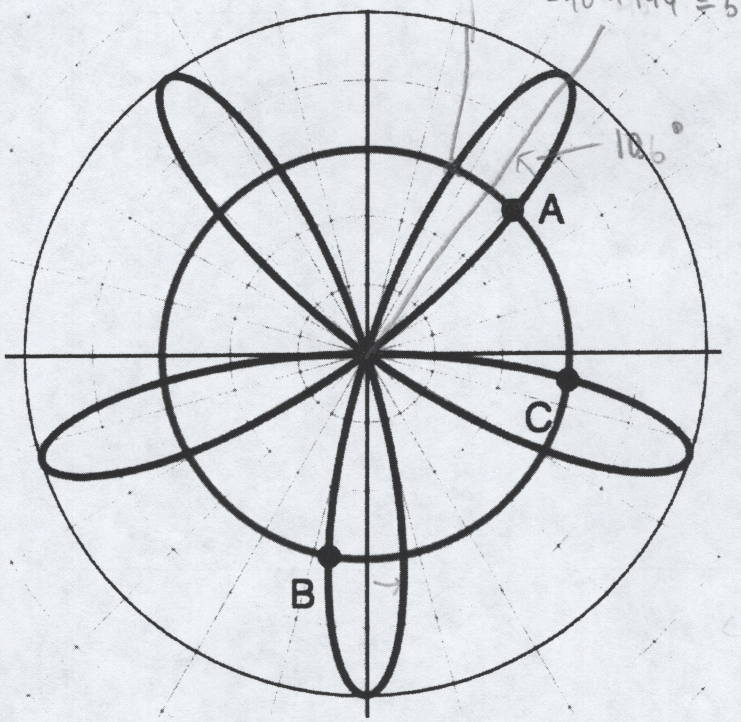
a) $r^2 = 8\sin(2\theta)$



b) $r = 6 + 2\sin\theta$



5. The graph below shows a rose curve and a circle graphed on a polar axis. Both curves are symmetric around the line $\theta = \frac{\pi}{2}$. If point A is (3, 43.4), where the angle is measured in **degrees**, find the coordinates of points B and C. Give your angles in degrees. [4 pts]



Point B: (3, 259.4°), Point C: (3, 352.6°)