

What day of the month is your birthday? _____

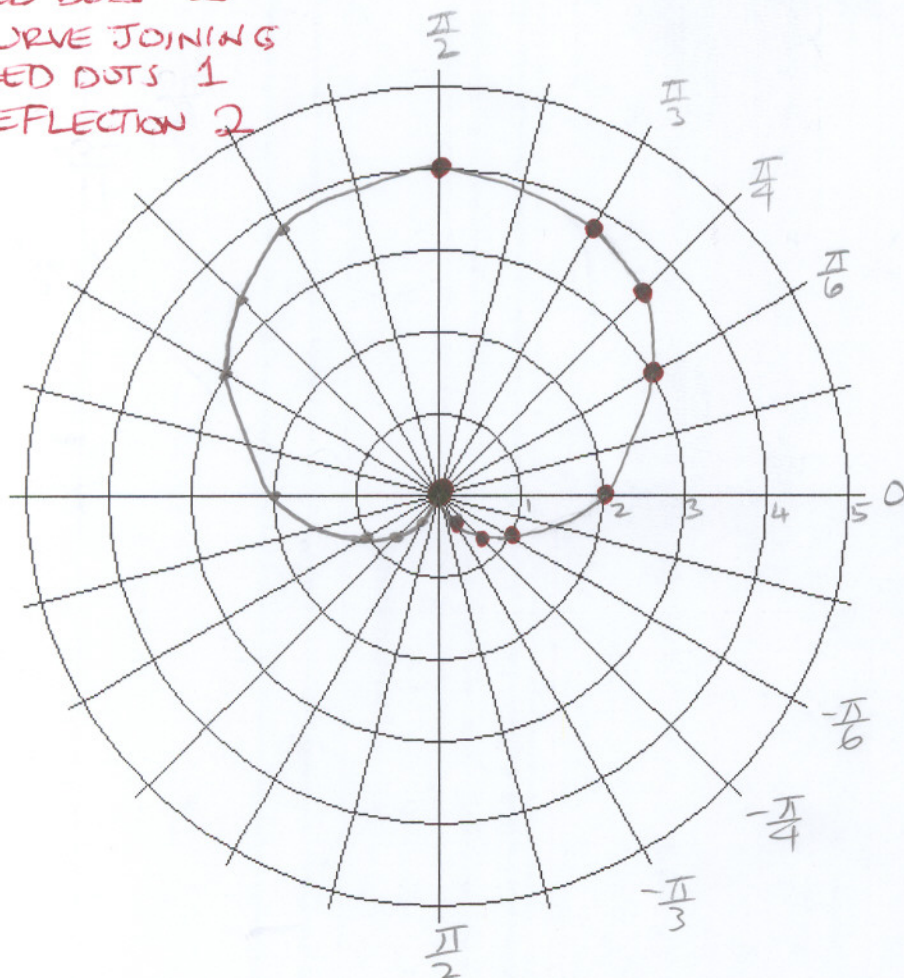
What are the last 2 digits of your address? _____

What are the last 2 digits of your zip code? _____

What are the last 2 digits of your social security number? _____

[IF YOU DO NOT HAVE A SOCIAL SECURITY NUMBER,
USE YOUR STUDENT ID NUMBER]**NO CALCULATORS ALLOWED**Draw the polar graph $r = 2 + 2 \sin \theta$. You must run symmetry tests, and use the results to calculate the least number of points required.

- RED DOTS 2
- CURVE JOINING RED DOTS 1
- REFLECTION 2



θ	r
$-\pi/2$	0
$-\pi/3$	0.2
$-\pi/4$	0.6
$-\pi/6$	1
0	2
$\pi/6$	3
$\pi/4$	3.4
$\pi/3$	3.8
$\pi/2$	4

SUBTRACT $\frac{1}{2}$ POINT FOR
EACH UNNECESSARY θ, r
PAIR

SYMMETRY $\theta = 0$ (AXIS)

① $r = 2 + 2 \sin(-\theta)$

$r = 2 - 2 \sin \theta$

② $r = 2 + 2 \sin(\pi - \theta)$

$-r = 2 + 2 \sin \theta$

$r = -2 - 2 \sin \theta$

NO CONCLUSION
ON BOTH TESTS $\theta = \pi/2$

① $r = 2 + 2 \sin(\pi - \theta)$

$r = 2 + 2 \sin \theta$

SYMMETRIC

NEED $\theta \in [-\pi/2, \pi/2]$ POLE

① $-r = 2 + 2 \sin \theta$

$r = -2 - 2 \sin \theta$

② $r = 2 + 2 \sin(\pi + \theta)$

$r = 2 - 2 \sin \theta$

NO CONCLUSION
ON BOTH TESTS

SUBTRACT 1 POINT EACH TIME YOU WROTE "NOT SYMMETRIC"