

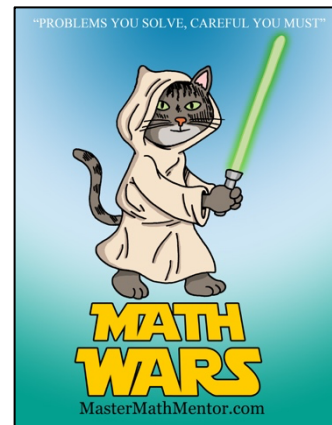
Math Wars – BC Calculus

Topic 210 – Polar Equations

Maximum Time: 7.5 Minutes



Directions: To start, you need to download the Math Wars application on your cell phone: Use the QR code or the url: <https://mastermathmentor.com/mmm/mathwars.ashx?key=210>



When ready, start the timer and then solve the problems below, entering your choice, A, B, C, D and pressing for each problem when you are sure of your answer. When complete, stop the timer. You will see problems you got correct in green and incorrect in red. You will receive a score based on how many problems you got right and your time. A perfect score is all problems correct using half the maximum time or less. You can text or email your friends with your results.

1. (1 pt) Convert the rectangular equation $y = x^2$ to polar form.

A. $r = \cot \theta \csc \theta$

B. $r = \frac{\sin \theta}{\sec^2 \theta}$

C. $r = \tan \theta \sec \theta$

D. $r = \frac{\sec^2 \theta}{\sin \theta}$

2. (3 pts) Convert the polar equation $r = \frac{6}{2\sin \theta - 3\cos \theta}$ to rectangular form.

A. $y = \frac{6-2x}{3}$

B. $y = \frac{6-3x}{2}$

C. $y = \frac{2x+6}{3}$

D. $y = \frac{3x+6}{2}$

3. (5 pts) For the polar curve $r = -5\cos \theta$, find $\frac{dy}{dx}$ at $\theta = \frac{\pi}{4}$.

A. 0

B. 1

C. -1

D. undefined

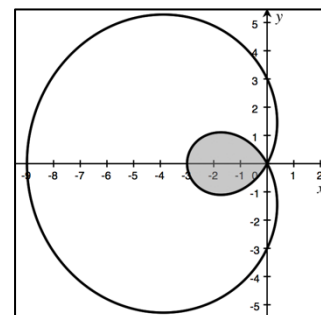
4. (7 pts) The graph of the limaçon $r = 3 - 6\cos \theta$ is shown in the figure to the right. Which of the following gives the area of the shaded inner loop?

A. $\frac{1}{2} \int_0^{\pi/3} (3 - 6\cos \theta)^2 d\theta$

B. $\int_0^{\pi/3} (3 - 6\cos \theta)^2 d\theta$

C. $\frac{1}{2} \int_{\pi/3}^{5\pi/3} (3 - 6\cos \theta)^2 d\theta$

D. $\int_{\pi/3}^{5\pi/3} (3 - 6\cos \theta)^2 d\theta$

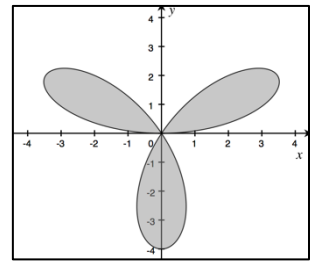


5. (9 pts) The graph of the three-leaf rose $r = 4\sin 3\theta$ is shown in the figure to the right. Which of the following gives the correct area of the figure?

I. $32 \int_0^{2\pi/3} \sin^2 3\theta d\theta$

II. $8 \int_0^{2\pi} \sin^2 3\theta d\theta$

III. $48 \int_0^{\pi/3} \sin^2 3\theta d\theta$



A. I and II only

B. I and III only

C. II and III only

D. I, II and III