CLASS QUIZ: FRIDAY JANUARY 11: POLAR COORDINATES

MATH 195, SECTION 59 (VIPUL NAIK)

Your name (print clearly in capital letters): _____

YOU ARE ALLOWED TO DISCUSS ONLY QUESTIONS THAT BEGIN WITH A (*) OR (**). PLEASE ATTEMPT ALL OTHER QUESTIONS BY YOURSELF. EVEN FOR THE QUESTIONS YOU DISCUSS, PLEASE FINALLY ENTER ONLY THE ANSWER OPTION YOU ARE PERSONALLY MOST CONVINCED ABOUT – DON'T ENGAGE IN GROUPTHINK.

(1) (*) Consider a straight line that does not pass through the pole in a polar coordinate system. The equation of such a line in the polar coordinate system can be expressed as $r = F(\theta)$. What kind of function is F? *Last time:* 8/21 *correct*
(A) $F(\theta)$ is a linear combination of $\sin\theta$ and $\cos\theta$
(B) $F(\theta)$ is the reciprocal of a linear combination of $\sin\theta$ and $\cos\theta$.
(C) $F(\theta)$ is a linear combination of $\tan\theta$ and $\cot\theta$.
(D) $F(\theta)$ is the reciprocal of a linear combination of $\tan\theta$ and $\cot\theta$.
(E) $F(\theta)$ is a linear combination of $\sec\theta$ and $\csc\theta$.

Your answer: _____

(2) Consider the curve $r = \sin^2\theta$. Which of the following symmetries does the curve enjoy? Please see options (D) and (E) before answering. *Last time:* 10/21 *correct*
(A) Mirror symmetry about the polar axis
(B) Mirror symmetry about an axis perpendicular to the polar axis (what would be the y-axis if the polar axis is the x-axis)
(C) Half turn symmetry about the pole
(D) All of the above
(E) None of the above

Your answer: _____

(3) Which of the following is the correct expression for the length of the part of the curve $r = F(\theta)$ from $\theta = \alpha$ to $\theta = \beta$, with $\alpha < \beta$? *Last time:* 14/21 *correct*
(A) $\int_\alpha^\beta \sqrt{(F(\theta))^2 + (F'(\theta))^2}\, d\theta$
(B) $\int_\alpha^\beta |F(\theta) + F'(\theta)|\, d\theta$
(C) $\int_\alpha^\beta |F(\theta) - F'(\theta)|\, d\theta$
(D) $\int_\alpha^\beta \sqrt{(F(\theta))^2 + (F'(\theta))^2 + 4F(\theta)F'(\theta)}\, d\theta$
(E) $\int_\alpha^\beta \sqrt{(F(\theta))^2 + (F'(\theta))^2 - 4F(\theta)F'(\theta)}\, d\theta$

Your answer: _____