

PPV review wksht #1

*no calculator

- * Find the area of one petal of the rose curve given by $r = 3\cos 3\theta$.
- * Find the area of the region common to the two regions bounded by $r = -6\cos\theta$ and $r = 2 - 2\cos\theta$.
- * Find the length of the arc from $\theta = 0$ to $\theta = 2\pi$ for the cardioid $r = 2 - 2\cos\theta$.
- * Find the intersections of $r = 1 - 2\cos\theta$ and $r = 1$.
- * Find the horizontal and vertical tangent lines of $r = \sin\theta$ $0 \leq \theta \leq \pi$.
- * Find the equation of the tangent line to the curve at the given parametric value.
 $x = 4\cos\theta$ and $y = 3\sin\theta$ $\theta = \frac{3\pi}{4}$
- Find the arc length $x = t^2$ $y = 4t^3 - 1$ $t \in [-1,1]$
- * Find all the points (if any) of horizontal and vertical tangency to the curve
 $x = 1 - t$ $y = t^3 - 3t$
- * Find the velocity and acceleration vectors if the position vector $r(t) = \langle \sin(3t), \cos(5t) \rangle$
- * A particle moves in an elliptical path so that its position at any time $t \geq 0$ is given by
 $r(t) = (4\sin t)i + (2\cos t)j$
 - Find the velocity and acceleration vectors.
 - Find the velocity, acceleration and speed at $t = \frac{\pi}{4}$.
- A particle moves in the plane with velocity vector $v(t) = \langle t - 3\pi\cos\pi t, 2t - \pi\sin\pi t \rangle$ at $t=0$, the particle is at the point (1,5)
 - * Find the position of the particle at $t=4$.
 - What is the total distance traveled by the particle from $t=0$ to $t=4$