Math 152 - Week-In-Review 11

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Eliminate the parameter to find the Cartesian equation of the curve.

1. $x = t^2 - 3,\ y = t + 2,\ -3 \leq t \leq 3$

2. $x = \sin t,\ y = 1 - \cos t,\ 0 \leq t \leq 2\pi.$

3. $x = \sqrt{t},\ y = 1 - t.$

4. Sketch the curve given by $x = \sin 4\theta,\ y = \cos 4\theta,\ 0 \le \theta \le \pi/2$ and indicate the direction of the curve that is traced as the parameter increases.

5. Describe the motion of the particle with position (x, y) given as $x = 2 + \sin t,\ y = 1 + 3\cos t$, as t varies from $\pi/2$ to 2π.

6. Set up an integral to find the length of the part of the parametric curve given by $x = t + e^{-t},\ y = t^2 + t,\ 1 \leq t \leq 2$.

7. Find the exact length of the curve $x = e^t - t,\ y = 4e^{t/2},\ 0 \leq t \leq 2$.

8. Set up an integral to represent the surface area obtained by rotating the curve $x = \sin t,\ y = \sin 2t,\ 0 \le t \le \pi/2$ about the x-axis.

9. Find the surface area obtained by rotating the curve $x = t^3,\ y = t^2,\ 0 \le t \le 1$ about the x-axis.

10. Give the polar coordinates for the cartesian point $(x, y) = (-4, 4)$ when $r > 0$ and when $r < 0$.

11. Plot the point and find the cartesian coordinates for the polar point $(r, \theta) = (-1, -\pi/6)$.

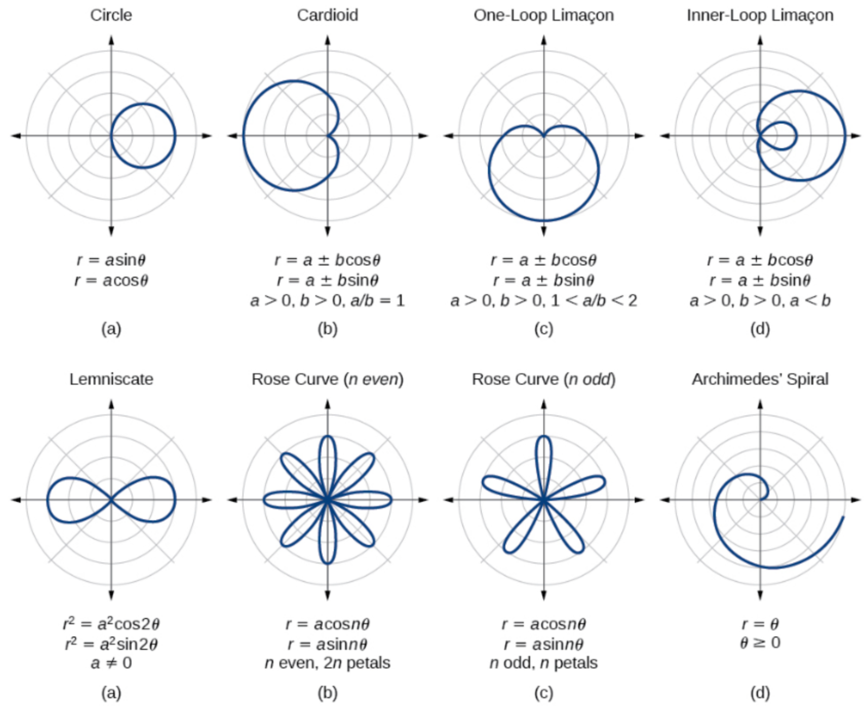
12. Sketch the region given by $0 \leq r \leq 1,\ -\pi/2 \leq \theta \leq \pi/2$.

13. Find the cartesian equation for the polar curve $r^2 = 10$.

14. Find the cartesian equation for the polar curve $r^2 \sin 2\theta = 1$.

15. Find the polar equation for the cartesian curve $x^2 + y^2 = 4y$.

Brief overview of polar Curves:



16. Sketch the polar curve $r = -2\sin\theta$.
State the bounds of integration to find the area inside the curve in the 3^{rd} quadrant?
At what angles will the above curve intersect with the polar curve $r = 1$?

17. Find the area of the region enclosed by one loop of the curve $r = 4\cos 3\theta$.
    Can you use symmetry in this case? What about for one loop of the curve $r = 4\sin 3\theta$?

18. Find the area of the region inside the curve $r = 3\cos\theta$ and outside the curve $r = 1 + \cos\theta$.