

Calculus II Week5 extraHW-Questions

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补充习题集 (Supplemental Homework) : 第11章: 4、12、13、15、16

4. Find the area of the surface generated by revolving the curve about the y-axis:

$$x = 2 \cos t, \quad y = 3 + \sin t, \quad 0 < t < 2\pi.$$

12. Assume that the curve is given by

$$x = \sin t, \quad y = \cos(2t), \quad 0 \leq t \leq \frac{\pi}{2}.$$

Find the Cartesian equation for the curve and identify the graph. Further, find the area enclosed by the curve and x -axis and the volume of the solid generated by revolving the curve about x -axis.

13. Assume $f \neq 0$ are differentiable. compute $\frac{d^2 y}{dx^2}$.

$$x = \int_0^{t^2} f(u^2) du$$

$$y = \int_0^t f(u) f(u^2) du$$

15. Compute $\frac{d^3 y}{dx^3}$ for the function given by

$$x = \ln(1 + t^2), y = t - \arctan t$$

16. Given the following curve:

$$x = \cos(t^2), \quad y = t \cos(t^2) - \int_1^{t^2} \frac{\cos u}{2\sqrt{u}} du, \quad 0 < t < \sqrt{2\pi}.$$

(a) Compute $\frac{dy}{dx}$ and $\frac{d^2y}{dx^2}$;

(b) Find the equation for the tangent line and the normal line at $t = 1$.