Calculus Ⅱ Week5 HW-Questions

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- Section 11.2，#23,29,34,48

23.Find the area enclosed by the ellip

$x = a\cos t, \mathrm{y} = b\sin t, 0 \leq t \leq 2\pi.$

29.Find the length of the curve

$$x = 8\cos t + 8t\sin t$$
$$y = 8\sin t - 8t\cos t,$$
$$0 \leq t \leq \pi/2$$

34.Find the areas of the surfaces generated by revolving the curves.
$x = \ln(\sec t + \tan t) - \sin t, y = \cos t$

48.Volume-Find the volume swept out by revolving the region rounded by the x-axis and one arch of the cycloid.

$$x = t - \sin t, \quad y = 1 - \cos t$$

about the x-axis.

- Section 11.3， #42,64

  Polar to Cartesian Equations

  Replace the polar equation with equivalent Cartesian equations. Then describe or identify the graph.

  $42.\ r\sin\theta\ = \ln r\ + \ln\cos\theta$

  Cartesian to Polar Equations

  Replace the Cartesian equations in Exercises 53–66 with equivalent polar equations.

  $64. (x-5)^2 + y^2 = 25$

- Section 11.4，#12,19,30（不需要画图）

  Symmetries and Polar Graphs

  12.Identify the symmetries of the curve. Then sketch the curves in the xy-plane.

  $$12. r^2 = -\cos\theta$$

  Slopes of Polar Curves in the xy-Plane

  19.Find the slopes of the curve at the given points. Sketch the curves along with their tangents at these points.

  Four-leaved rose

  $$r = \sin 2\theta; \quad \theta = \pm\pi/4, \pm 3\pi/4$$

30.Which of the following has the same graph as $r = \cos 2\theta$?

a. $r = -\sin(2\theta + \pi/2)$

b. $r = -\cos(\theta/2)$

Confirm your answer with algebra.

- Section 11.5， #8,18,22

  Find the areas of the regions

  8.inside the six-leaved rose

$$r^2 = 2\sin 3\theta$$

18.Inside the circle $r = 4\sin\theta$ and below the horizontal line
$r = 3\csc\theta$

22.Find the lengths of the curves

22. The spiral $r = \dfrac{e^{\theta}}{\sqrt{2}}, \quad 0 \le \theta \le \pi$

- Section 12.1, #32,38,65
  Describe the given set with a single equation or
  with a pair of equations.
  32.The set of points in space equidistant from the origin and the
  point (0, 2, 0)

  Write inequalities to describe the sets
  38.The upper hemisphere of the sphere of radius 1 centered at the origin

65.Find the point on the sphere $x^2 + (y-3)^2 + (z+5)^2 = 4$ nearest

a. the xy-plane.

b. the point $(0, 7, -5)$.

- Section 12.2， #26,51

  26.express each vector as a product of its length and direction.

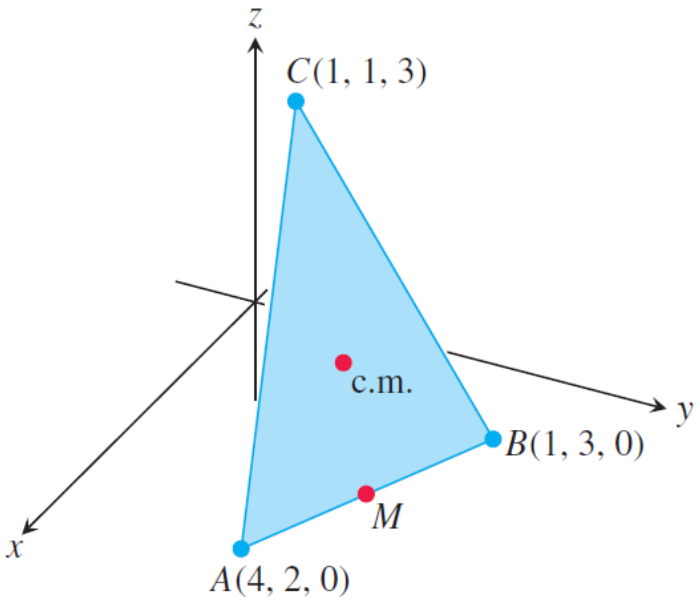
$$9i - 2j + 6k$$

51.Medians of a triangle Suppose that A, B, and C are the corner points of the thin triangular plate of constant density shown here.

a. Find the vector from C to the midpoint M of sidc AB.

b. Find the vector from C to the point that lies two-thirds of the way from C to M on the median CM.

c. Find the coordinates of the point in which the medians ofΔABC intersect. According to Exercise 19, Section 6.6, this point is the plate's center of mass. (See the accompanying figure.



- Section 12.3, #14,25,48

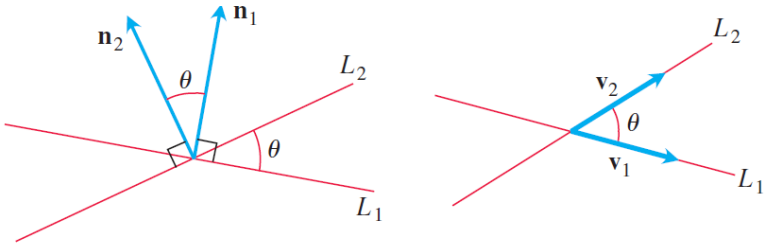
  14.Rectangle Find the measures of the angles between the diagonals of the rectangle whose vertices are $A = (1, 0), B = (0, 3),$ $C = (3, 4)$, and $D = (4, 1)$.

  25.a. $\mathbf{Cauchy - Schwartz\ inequality}$ Since show that the inequality $|\mathbf{u} \cdot \mathbf{v}| \leq |\mathbf{u}||\mathbf{v}|$ holds for any vectors u and v.

  b. Under what circumstances, if any, does $|\mathbf{u} \cdot \mathbf{v}|$ equal $|\mathbf{u}||\mathbf{v}|$? Give reasons for your answer.

Angles Between Lines in the Plane

The acute angle between intersecting lines that do not cross at right angles is the same as the angle determined by vectors normal to the lines or by the vectors parallel to the lines.



find the acute angle between the lines

$48. x + \sqrt{3}y = 1, \left(1 - \sqrt{3}\right)x + \left(1 + \sqrt{3}\right)y = 8$