

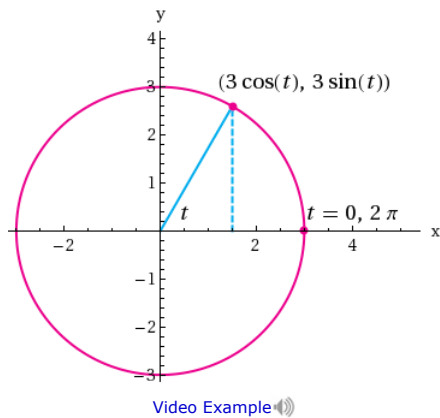
Due: Fri, May 31, 2019 12:00 AM MST

Question

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

## 1. Question Details

SCalcET8 10.1.AE.002. [3798588]

**EXAMPLE 2** What curve is represented by the following parametric equations?

$$x = 3 \cos(t) \quad y = 3 \sin(t) \quad 0 \leq t \leq 2\pi$$

**SOLUTION** If we plot points, it appears that the curve is a circle. We can confirm this impression by eliminating  $t$ . Observe that

$$x^2 + y^2 = 9 \cos^2(t) + \boxed{\phantom{000}} = \boxed{\phantom{000}}.$$

Thus the point  $(x, y)$  moves on the circle  $x^2 + y^2 = \boxed{\phantom{000}}$ . Notice that in this example the parameter  $t$  can be interpreted as the angle (in radians) shown in the figure. As  $t$  increases from 0 to  $2\pi$ , the point  $(x, y) = (3 \cos(t), 3 \sin(t))$  moves once around the circle in the

direction starting at the point  $(x, y) = (\boxed{\phantom{000}}, \boxed{\phantom{000}})$ .

## 2. Question Details

SCalcET8 10.1.512.XP.MI.SA. [3945508]

This question has several parts that must be completed sequentially. If you skip a part of the question, you will not receive any points for the skipped part, and you will not be able to come back to the skipped part.

Consider the following.

$$x = \ln(t), \quad y = \sqrt{t}, \quad t \geq 4$$

Exercise (a)

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

Exercise (b)

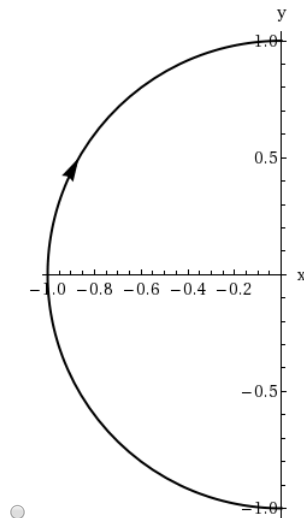
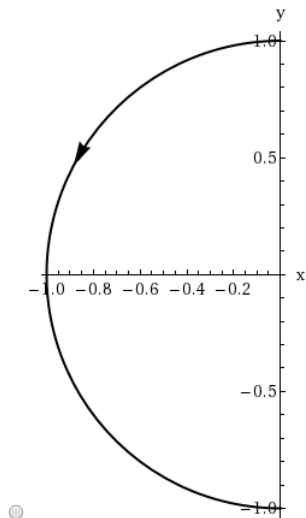
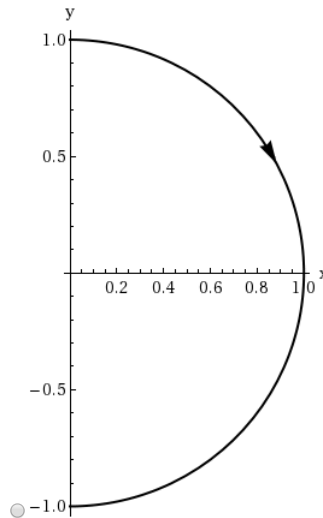
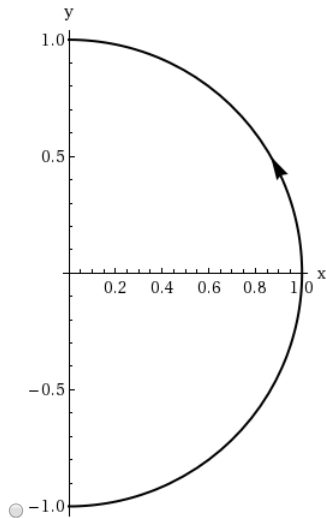
Sketch the curve and indicate with an arrow the direction in which the curve is traced as the parameter increases.

Consider the following.

$$x = \sin(\theta), \quad y = \cos(\theta), \quad 0 \leq \theta \leq \pi$$

(a) Eliminate the parameter to find a Cartesian equation of the curve.

(b) Sketch the curve and indicate with an arrow the direction in which the curve is traced as the parameter increases.



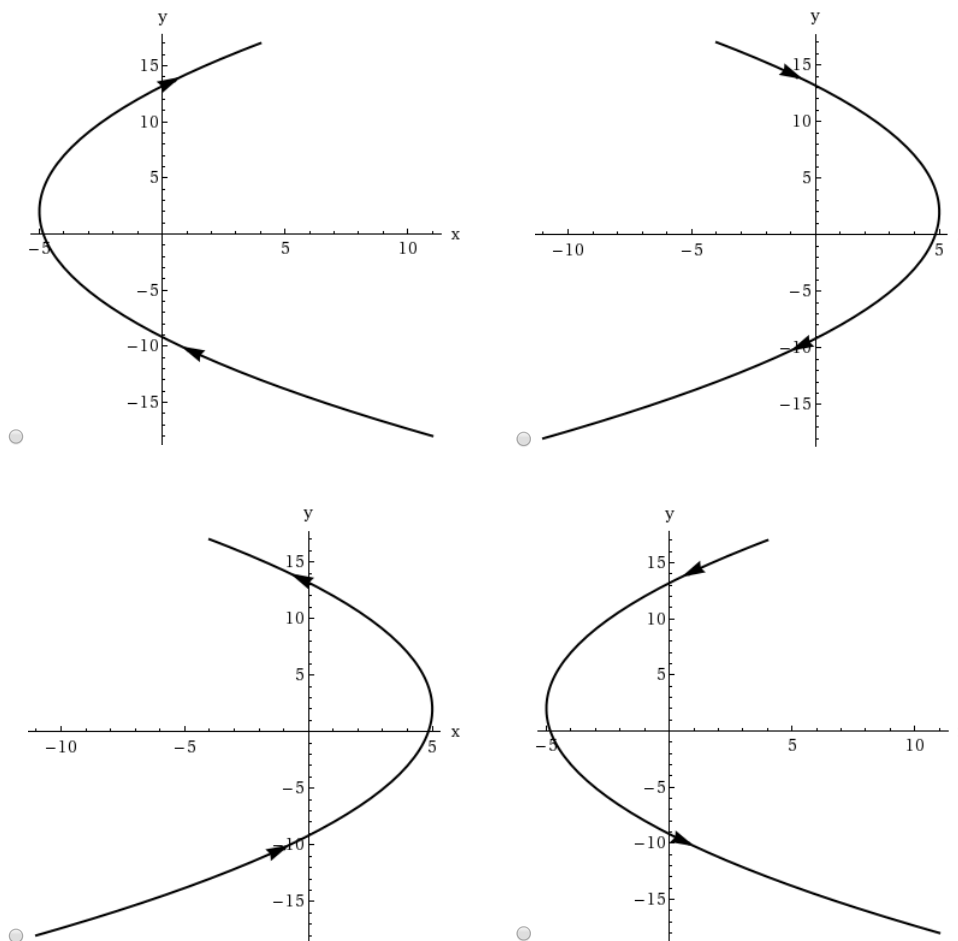
4. Question Details

SCalcET8 10.1.509.XP. [3945533]

Consider the parametric equations below.

$$x = t^2 - 5, \quad y = 2 - 5t, \quad -3 \leq t \leq 4$$

(a) Sketch the curve by using the parametric equations to plot points. Indicate with an arrow the direction in which the curve is traced as  $t$  increases.



(b) Eliminate the parameter to find a Cartesian equation of the curve.

for  $-18 \leq y \leq 17$

5. Question Details

SCalcET8 10.1.046. [3945485]

If a projectile is fired with an initial velocity of  $v_0$  meters per second at an angle  $\alpha$  above the horizontal and air resistance is assumed to be negligible, then its position after  $t$  seconds is given by the parametric equations

$$x = (v_0 \cos(\alpha))t \quad y = (v_0 \sin(\alpha))t - \frac{1}{2}gt^2$$

where  $g$  is the acceleration due to gravity ( $9.8 \text{ m/s}^2$ ). (Round your answers to the nearest whole number.)

(a) If a gun is fired with  $\alpha = 30^\circ$  and  $v_0 = 600 \text{ m/s}$ . When will the bullet hit the ground?

 s

How far from the gun will it hit the ground?

 m

What is the maximum height reached by the bullet?

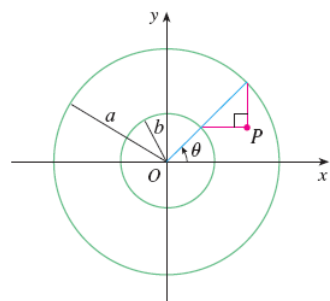
 m

(b) Find the equation of the parabolic path by eliminating the parameter.

6. Question Details

SCalcET8 10.1.041. [3943441]

If  $a$  and  $b$  are fixed numbers, find parametric equations for the curve that consists of all possible positions of the point  $P$  in the figure, using the angle  $\theta$  as the parameter. (Enter your answer as a comma-separated list of equations. Let  $x$  and  $y$  be in terms of  $\theta$ .)

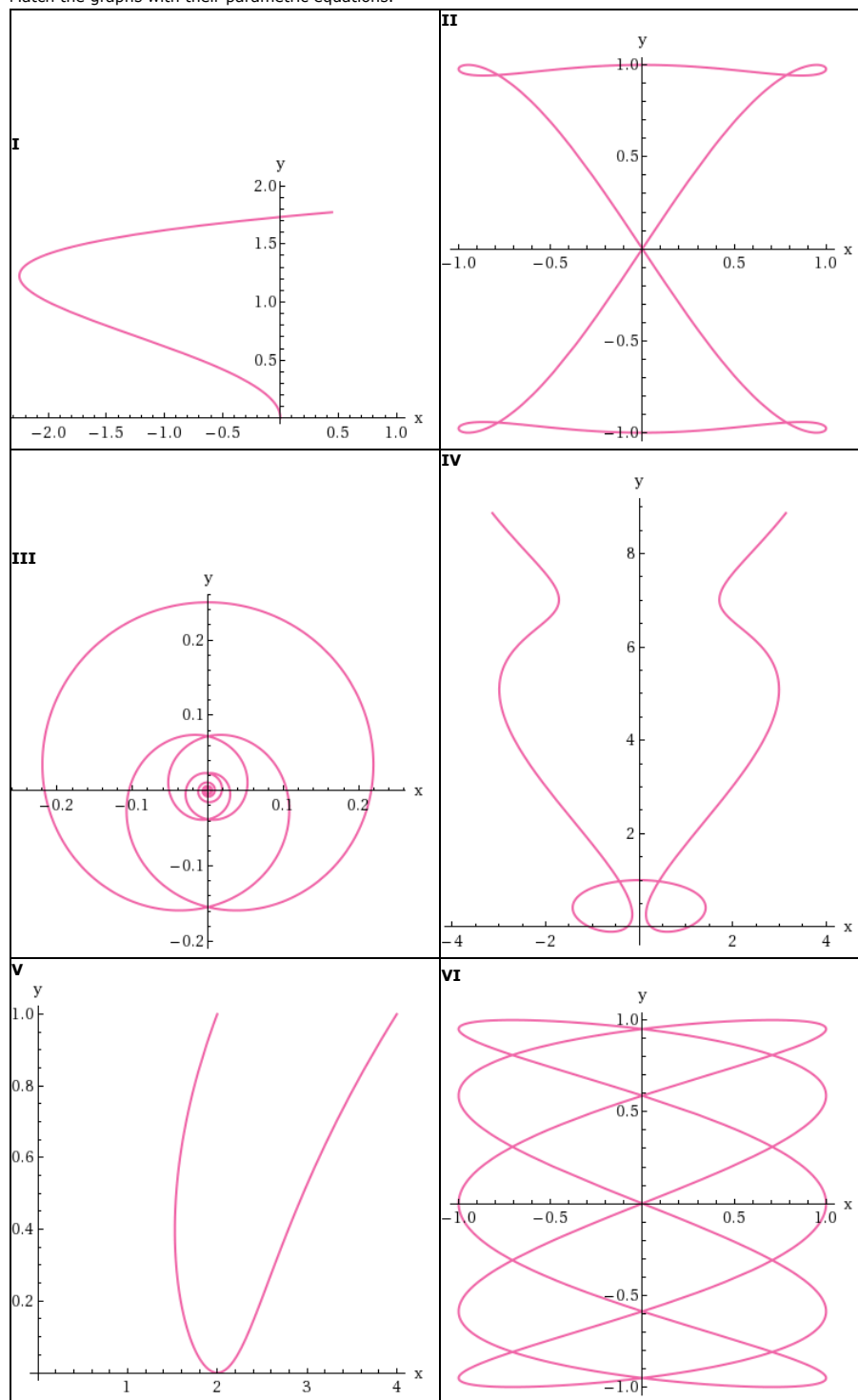


Eliminate the parameter.

Identify the curve.

- ☐ ellipse
- ☐ circle
- ☐ parabola
- ☐ hyperbola

Match the graphs with their parametric equations.



(a)  $x = t^4 - t + 2$ ,  $y = t^2$

---Select---

(b)  $x = t^2 - 3t$ ,  $y = \sqrt{t}$

---Select---

(c)  $x = \sin(2t)$ ,  $y = \sin(t + \sin(2t))$

---Select---

(d)  $x = \cos(5t)$ ,  $y = \sin(2t)$

---Select---

(e)  $x = t + \sin(4t)$ ,  $y = t^2 + \cos(3t)$

---Select---

...  $\sin(2t)$   $\cos(2t)$

$$(t) \quad x = \frac{t}{4 + t^2}, \quad y = \frac{t}{4 + t^2}$$

---Select---

## 8. Question Details

SCalcET8 10.2.001. [3799016]

Find  $dy/dx$ .

$$x = \frac{t}{9 + t}, \quad y = \sqrt{9 + t}$$

$$\frac{dy}{dx} = \boxed{\phantom{000}}$$

## 9. Question Details

SCalcET8 10.2.003. [3799282]

Find an equation of the tangent to the curve at the point corresponding to the given value of the parameter.

$$x = t^3 + 1, \quad y = t^4 + t; \quad t = -1$$

$$y = \boxed{\phantom{000}}$$

## 10. Question Details

SCalcET8 10.2.005. [3798977]

Find an equation of the tangent to the curve at the point corresponding to the given value of the parameter.

$$x = t \cos(t), \quad y = t \sin(t); \quad t = \pi$$

$$y = \boxed{\phantom{000}}$$

## 11. Question Details

SCalcET8 10.2.011. [3799284]

Find  $dy/dx$  and  $d^2y/dx^2$ .

$$x = t^2 + 3, \quad y = t^2 + 3t$$

$$\frac{dy}{dx} = \boxed{\phantom{000}}$$

$$\frac{d^2y}{dx^2} = \boxed{\phantom{000}}$$

For which values of  $t$  is the curve concave upward? (Enter your answer using interval notation.)

$$\boxed{\phantom{000}}$$

## 12. Question Details

SCalcET8 10.2.017. [3798082]

Find the points on the curve where the tangent is horizontal or vertical. If you have a graphing device, graph the curve to check your work. (Enter your answers as a comma-separated list of ordered pairs.)

$$x = t^3 - 3t, \quad y = t^2 - 5$$

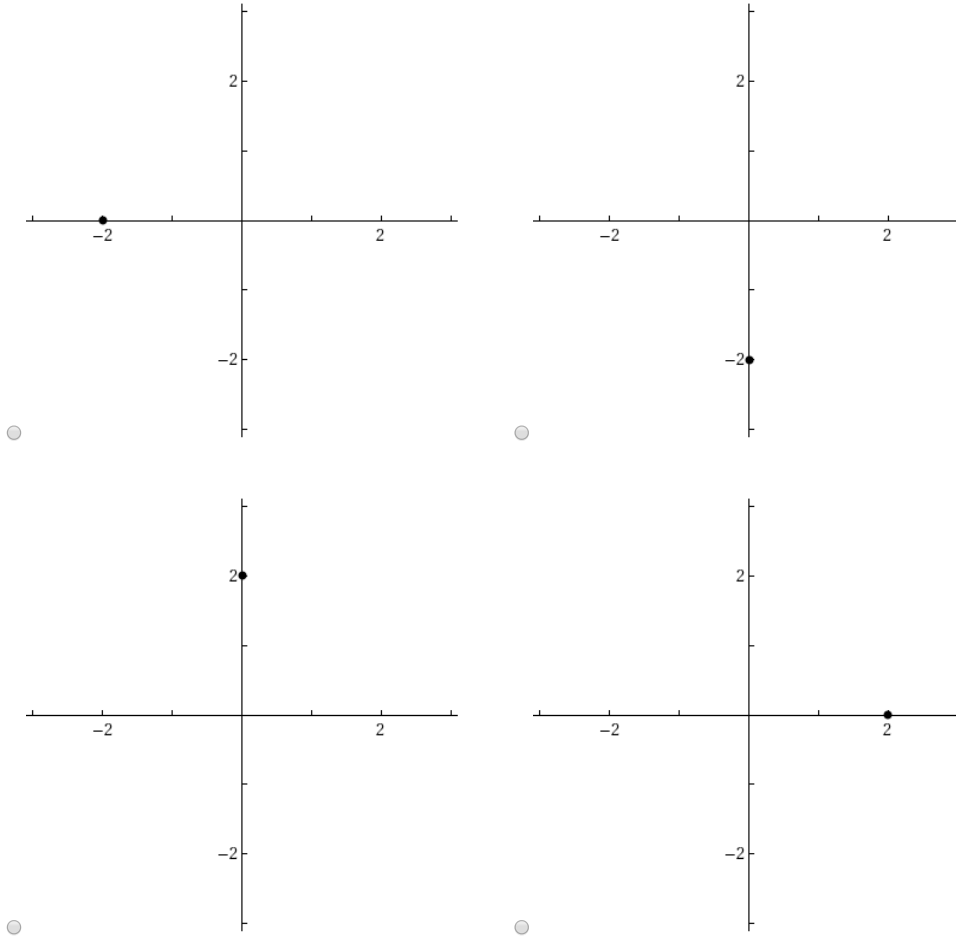
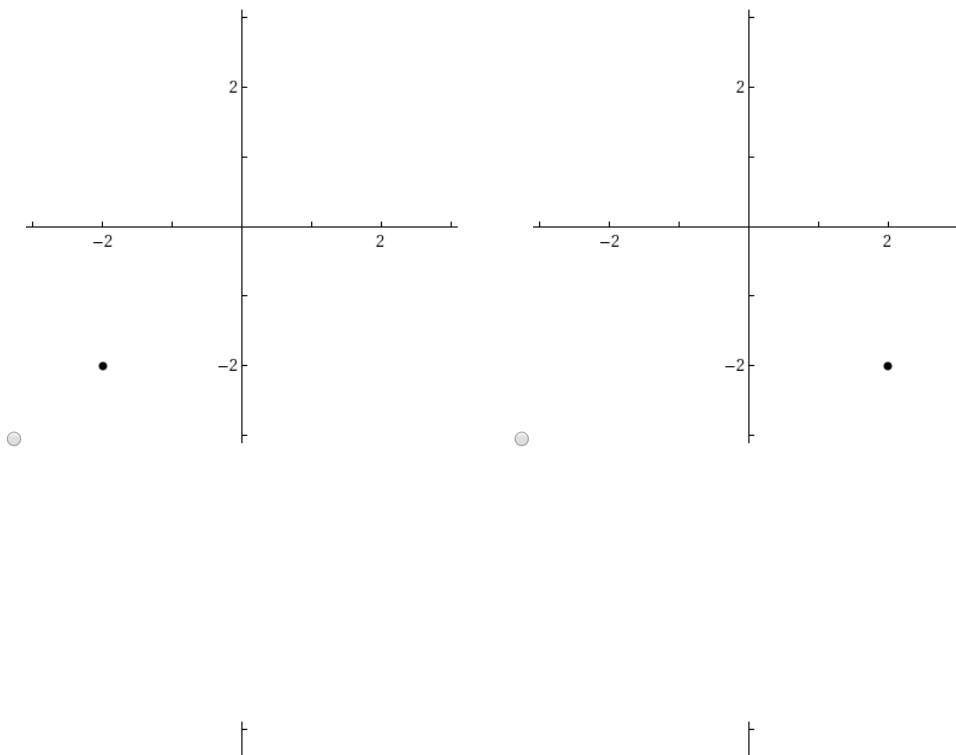
horizontal tangent  $(x, y) = \boxed{\phantom{000}}$

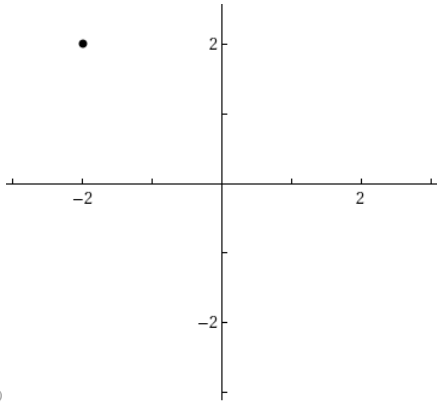
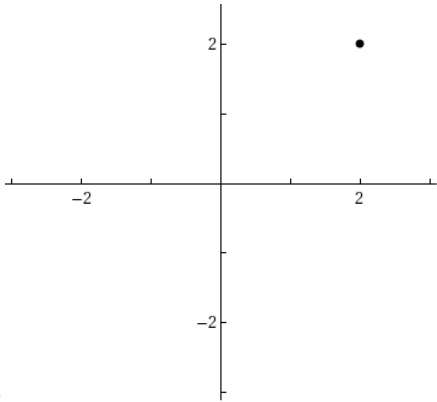
vertical tangent  $(x, y) = \boxed{\phantom{000}}$

13. Question Details

SCalcET8 10.3.003. [3799486]

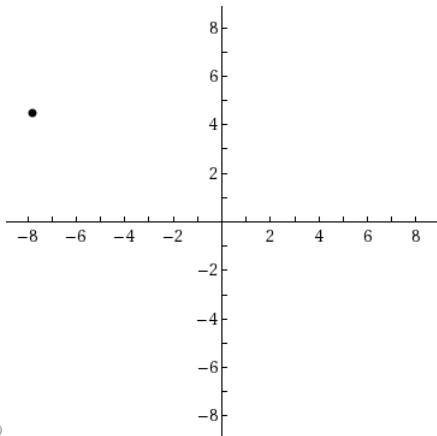
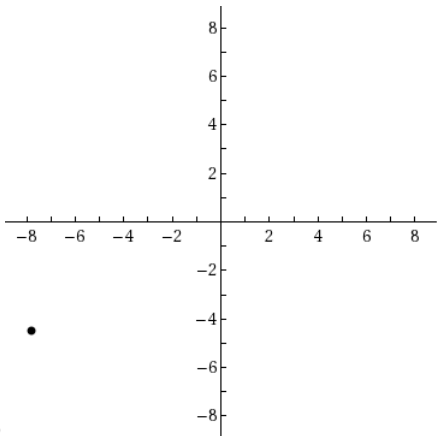
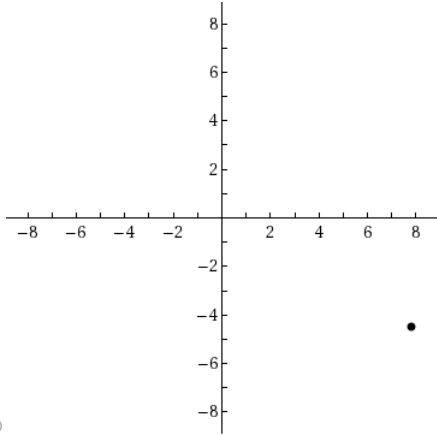
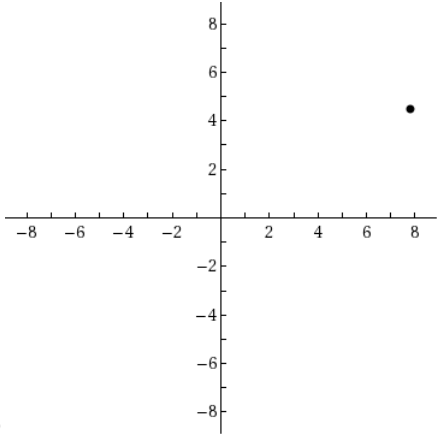
Plot the point whose polar coordinates are given. Then find the Cartesian coordinates of the point.

(a)  $(2, 3\pi/2)$  $(x, y) = ( \text{input box} )$ (b)  $(2\sqrt{2}, \pi/4)$ 



$(x, y) = ( \text{input box} )$

(c)  $(-9, -\pi/6)$



$(x, y) = ( \text{input box} )$



14. Question Details

SCalcET8 10.3.005. [3798950]

The Cartesian coordinates of a point are given.

(a)  $(-6, 6)$

(i) Find polar coordinates  $(r, \theta)$  of the point, where  $r > 0$  and  $0 \leq \theta < 2\pi$ .

$(r, \theta) = ( \text{ } , \text{ } )$

(ii) Find polar coordinates  $(r, \theta)$  of the point, where  $r < 0$  and  $0 \leq \theta < 2\pi$ .

$(r, \theta) = ( \text{ } , \text{ } )$

(b)  $(3, 3\sqrt{3})$

(i) Find polar coordinates  $(r, \theta)$  of the point, where  $r > 0$  and  $0 \leq \theta < 2\pi$ .

$(r, \theta) = ( \text{ } , \text{ } )$

(ii) Find polar coordinates  $(r, \theta)$  of the point, where  $r < 0$  and  $0 \leq \theta < 2\pi$ .

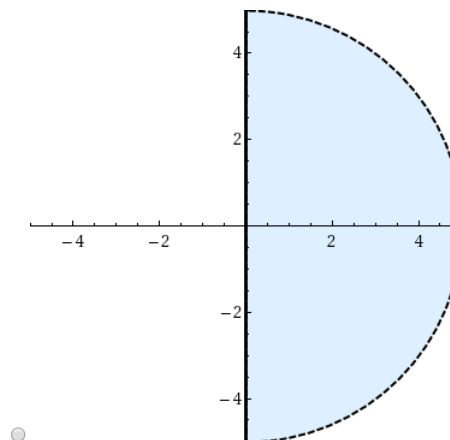
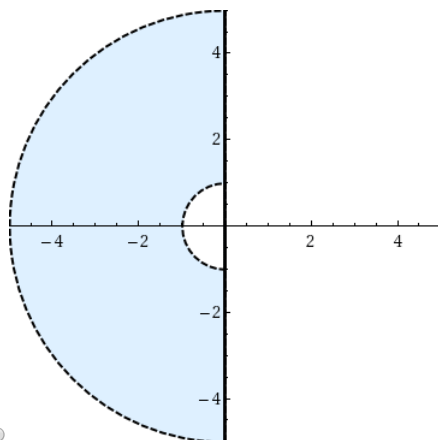
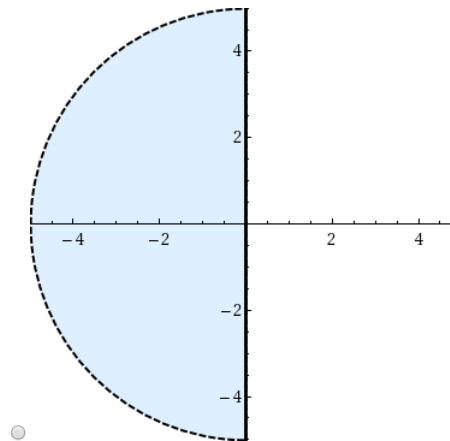
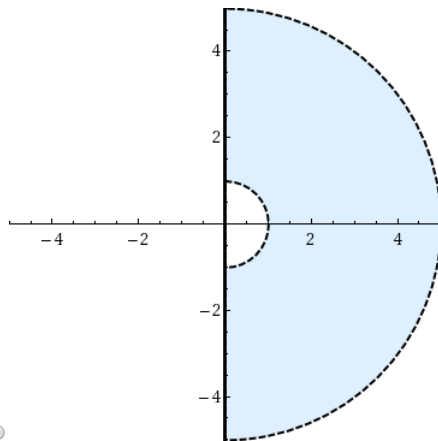
$(r, \theta) = ( \text{ } , \text{ } )$

15. Question Details

SCalcET8 10.3.011. [3799463]

Sketch the region in the plane consisting of points whose polar coordinates satisfy the given conditions.

$$1 < r < 5, \quad 3\pi/2 \leq \theta \leq 5\pi/2$$



16. Question Details

SCalcET8 10.3.015. [3798275]

Find a Cartesian equation for the curve and identify it.

$$r^2 = 11$$

- ☐ hyperbola
- ☐ parabola
- ☐ circle
- ☐ ellipse
- ☐ limaçon

17. Question Details

SCalcET8 10.3.017. [3799115]

Find a Cartesian equation for the curve and identify it.

$$r = 9 \cos(\theta)$$

- ☐ ellipse
- ☐ circle
- ☐ parabola
- ☐ hyperbola
- ☐ limaçon

18. Question Details

SCalcET8 10.3.028. [3945551]

For each of the described curves, decide if the curve would be more easily given by a polar equation or a Cartesian equation. Then write an equation for the curve.

(a) A circle with radius 5 and center (1, 1).

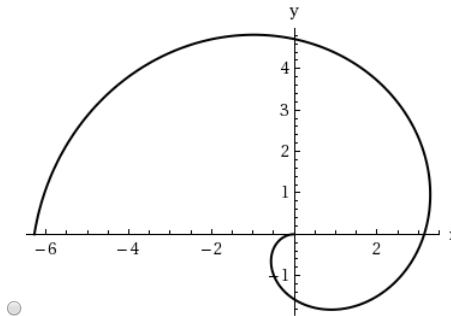
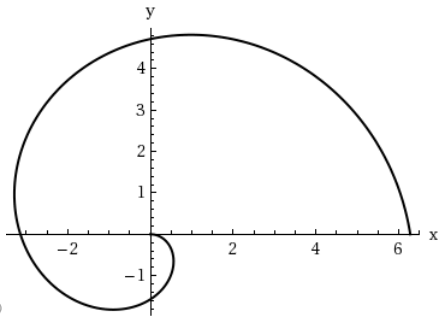
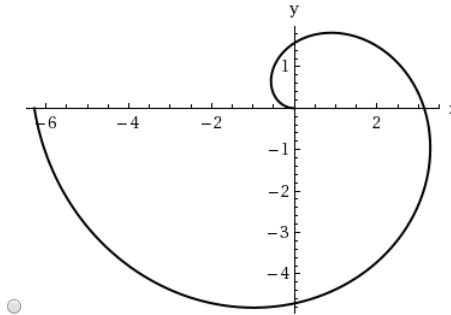
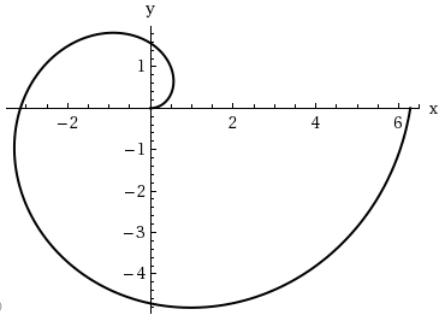
(b) A circle centered at the origin with radius 1.

19. Question Details

SCalcET8 10.3.033. [3798565]

Sketch the curve with the given polar equation by first sketching the graph of  $r$  as a function of  $\theta$  in Cartesian coordinates.

$$r = \theta, \quad \theta \geq 0$$

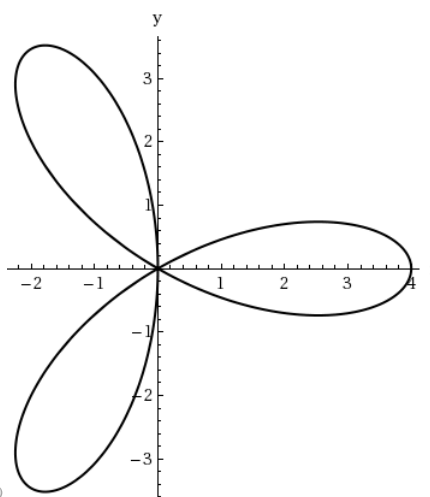
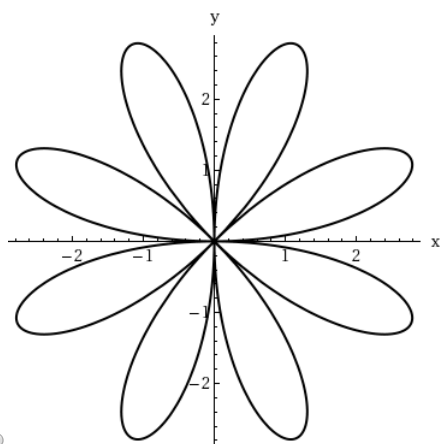
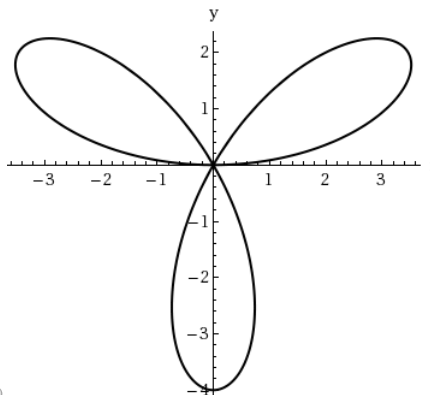
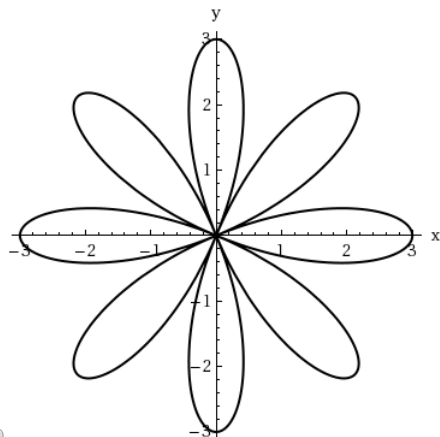


20. Question Details

SCalcET8 10.3.037. [3798896]

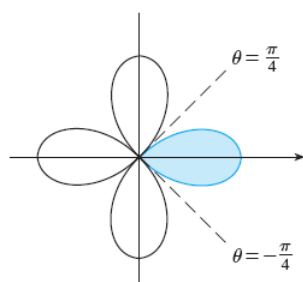
Sketch the curve with the given polar equation by first sketching the graph of  $r$  as a function of  $\theta$  in Cartesian coordinates.

$$r = 3 \cos(4\theta)$$



21. Question Details

SCalcET8 10.4.AE.001. [3798865]



Video Example 

**EXAMPLE 1** Find the area enclosed by one loop of the four-leaved rose  $r = 5 \cos(2\theta)$ .

**SOLUTION** The curve  $r = 5 \cos(2\theta)$  is sketched in the figure to the left. Notice from the figure that the region enclosed by the right loop is swept out by a ray that rotates from  $\theta = -\pi/4$  to  $\theta = \pi/4$ . Therefore [this formula](#) gives

$$\begin{aligned} A &= \int_{-\pi/4}^{\pi/4} \frac{1}{2} r^2 d\theta \\ &= \frac{1}{2} \int_{-\pi/4}^{\pi/4} \left( \boxed{\phantom{000000}} \right) d\theta \\ &= 25 \int_0^{\pi/4} \left( \boxed{\phantom{000000}} \right) d\theta \\ &= 25 \int_0^{\pi/4} \frac{1}{2} (1 + \cos(4\theta)) d\theta \\ &= \frac{25}{2} \left[ \boxed{\phantom{000000}} \right]_0^{\pi/4} \\ &= \boxed{\phantom{000000}}. \end{aligned}$$

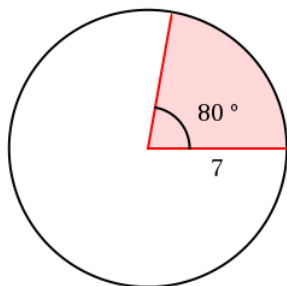
22. Question Details

SCalcET8 10.4.JIT.001. [3799146]

This exercise involves the formula for the area of a circular sector.

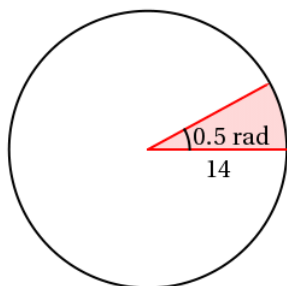
Find the area  $A$  of the sector shown in each figure.

(a)



$A =$

(b)



$A =$

23. Question Details

SCalcET8 10.4.019. [3798720]

Find the area of the region enclosed by one loop of the curve.

$$r = \sin(2\theta)$$

24. Question Details

SCalcET8 10.4.051. [3798587]

Use a calculator to find the length of the curve correct to four decimal places. If necessary, graph the curve to determine the parameter interval.

One loop of the curve  $r = \cos(2\theta)$

## Assignment Details

Name (AID): Chap 10 HW -- Parametric and Polar (11708646)

Submissions Allowed: 15

Category: Homework

Code:

Locked: Yes

Author: Bird, Brian ( [brian.bird@gccaz.edu](mailto:brian.bird@gccaz.edu) )

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