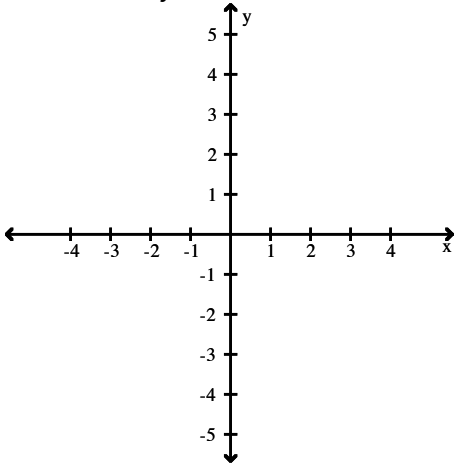


Due: _____

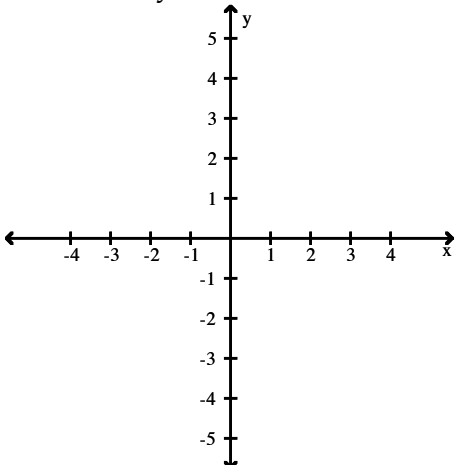
Name _____

Parametric equations and a parameter interval for the motion of a particle in the xy -plane are given. Identify the particle's path by finding a Cartesian equation for it. Graph the Cartesian equation. Indicate the portion of the graph traced by the particle and the direction of motion.

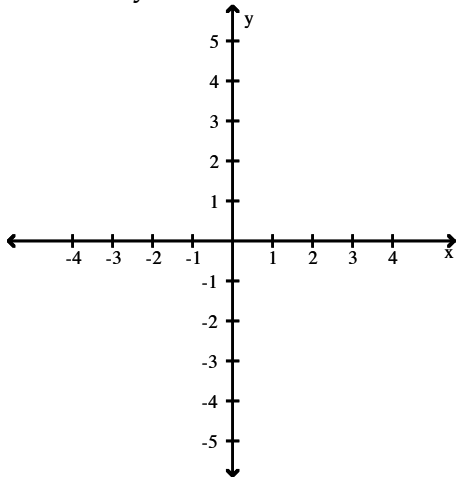
1) $x = 4 \cos t$, $y = 4 \sin t$, $\pi \leq t \leq 2\pi$



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



3) $x = 25t^2, y = 5t, -\infty \leq t \leq \infty$



Obtain the Cartesian equation of the curve by eliminating the parameter.

4) $x = \sqrt{t}, y = 2t + 8$

5) $x = 3\sqrt{t-7}, y = 9\sqrt{8-t}$

6) $x = t^3 - 5t, y = t^2 - 5$

$$7) x = 9 \sin^2 t, y = 9 \cos^2 t; 0 \leq t \leq 2\pi$$

Find dy/dx without eliminating the parameter.

$$8) x = 5t^2, y = \sqrt{11}t^3; t \neq 0$$

$$9) x = 6 \tan t - 2, y = 4 \sec t + 3, t \neq \frac{(2n+1)\pi}{2}$$

$$10) x = \ln(2t), y = e^{2t}$$

$$11) x = 1/t^6, y = -3 + \ln t$$

Find d^2y/dx^2 without eliminating the parameter.

$$12) x = 5t^2, y = \sqrt{10}t^3; t \neq 0$$

$$13) x = 1 - 2 \sin t, y = 1 + 7 \cos t, t \neq n\pi$$

$$14) x = \ln(2t), y = \ln(8t)^3, t > 0$$

$$15) x = \frac{t^2}{2} + 8t, y = \frac{t^2}{2} - 2t, t \neq -8$$

Find an equation for the line tangent to the curve at the point defined by the given value of t.

$$16) x = \sin t, y = 6 \sin t, t = \frac{\pi}{3}$$

Find the length of the parametric curve defined over the given interval.

$$17) x = 6t - 6, y = 12t + 1, 0 \leq t \leq 1$$

Find the area of the surface generated by revolving the curves about the indicated axis.

18) $x = \sin t$, $y = 3 + \cos t$, $0 \leq t \leq 2\pi$; x-axis

19) $x = t + \sqrt{6}$, $y = \frac{t^2}{2} + \sqrt{6}t$, $-\sqrt{6} \leq t \leq \sqrt{6}$; y-axis

Change the given polar coordinates (r, θ) to rectangular coordinates (x, y) .

20) $(\sqrt{3}, \pi/6)$

21) $(-4, -\pi/3)$

Find a set of polar coordinates for the point for which the rectangular coordinates are given.

22) $(-5\sqrt{3}, 5)$

A) $\left(10, \frac{2\pi}{3}\right)$

B) $\left(10, \frac{5\pi}{6}\right)$

C) $\left(5, \frac{5\pi}{6}\right)$

D) $\left(5, \frac{2\pi}{3}\right)$

For the given rectangular equation, write an equivalent polar equation.

$$23) x^2 + y^2 = 64$$

$$24) x^2 + y^2 - 10x = 0$$

For the given polar equation, write an equivalent rectangular equation.

$$25) r \cos \theta = 11$$

$$26) r = -9 \csc \theta$$

$$27) r = \frac{1}{7 \cos \theta - 3 \sin \theta}$$

$$28) r^2 \sin 2\theta = 24$$

Find the area of the specified region.

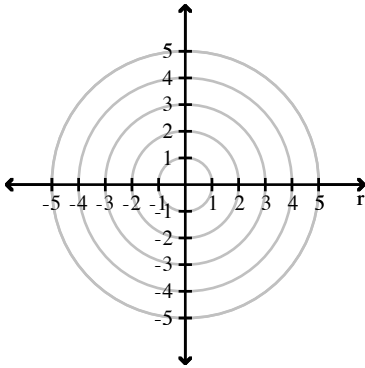
29) Inside one leaf of the four-leaved rose $r = 3 \sin 2\theta$

Find the length of the curve.

30) The spiral $r = 5\theta^2$, $0 \leq \theta \leq 2\sqrt{3}$

Graph the polar equation.

31) $r = \frac{1}{1 - \sin \theta}$



Find an equation for the line tangent to the curve at the point defined by the given value of t.

32) $x = 6t^2 - 3$, $y = t^5$, $t = 1$

Obtain the Cartesian equation of the curve by eliminating the parameter.

33) $x = \cos \theta, y = -4 \sin^2 2\theta$

34) $x = 9 \sec t, y = 7 \tan t$

Find the length of the curve.

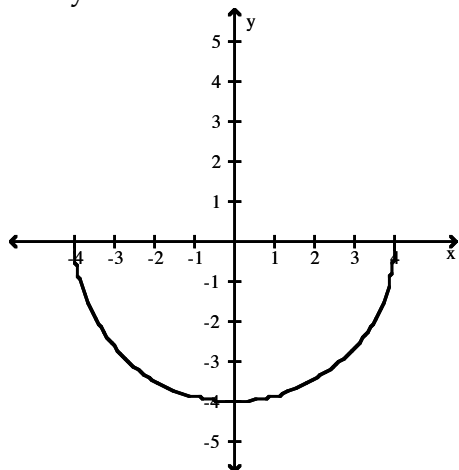
35) The spiral $r = e^{4\theta}, 0 \leq \theta \leq \pi$

36) The circle $r = 7 \cos \theta$

Answer Key

Testname: MATH3B_HWCH10

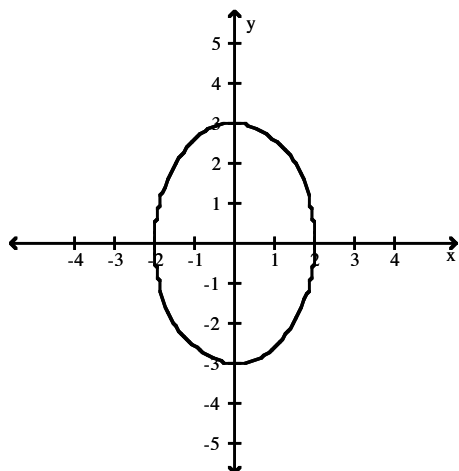
1) $x^2 + y^2 = 16$



Counterclockwise from $(-4, 0)$ to $(4, 0)$

Objective: (10.1) Graph Parametric Equations and Eliminate the Parameter

2) $\frac{x^2}{4} + \frac{y^2}{9} = 1$



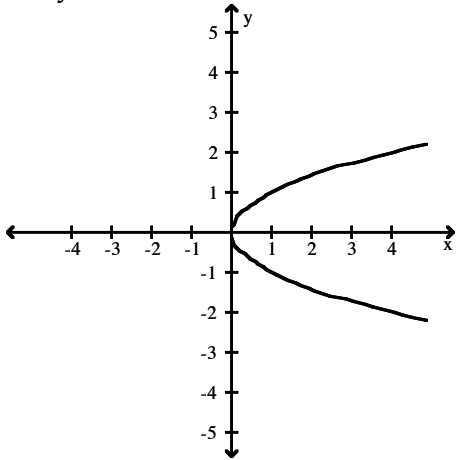
Counterclockwise from $(0, 3)$ to $(0, 3)$, one rotation

Objective: (10.1) Graph Parametric Equations and Eliminate the Parameter

Answer Key

Testname: MATH3B_HWCH10

3) $x = y^2$



Entire parabola, bottom to top (from fourth quadrant to origin to first quadrant)

Objective: (10.1) Graph Parametric Equations and Eliminate the Parameter

4) $y = 2x^2 + 8$

Objective: (10.4) Convert Parametric Equations to Cartesian Equation I

5) $\frac{x^2}{9} + \frac{y^2}{81} = 1$

Objective: (10.4) Convert Parametric Equations to Cartesian Equation I

6) $x^2 = y^3 + 5y^2$

Objective: (10.4) Convert Parametric Equations to Cartesian Equation I

7) $x + y = 9$

Objective: (10.4) Convert Parametric Equations to Cartesian Equation II

8) $\frac{3\sqrt{11}}{10}t$

Objective: (10.4) Find dy/dx Given Parametric Equations

9) $\frac{2}{3} \sin t$

Objective: (10.4) Find dy/dx Given Parametric Equations

10) $2te^{2t}$

Objective: (10.4) Find dy/dx Given Parametric Equations

11) $-\frac{t^6}{6}$

Objective: (10.4) Find dy/dx Given Parametric Equations

12) $\frac{3\sqrt{10}}{100t}$

Objective: (10.4) Find d^2y/dx^2 Given Parametric Equations

Answer Key

Testname: MATH3B_HWCH10

13) $-\frac{7}{4} \sec^3 t$

Objective: (10.4) Find d^2y/dx^2 Given Parametric Equations

14) 0

Objective: (10.4) Find d^2y/dx^2 Given Parametric Equations

15) $\frac{10}{(t+8)^3}$

Objective: (10.4) Find d^2y/dx^2 Given Parametric Equations

16) $y = 6x$

Objective: (10.4) Find Equation of Tangent Given Parametric Equations

17) $6\sqrt{5}$

Objective: (10.4) Find Length of Parametric Curve I

18) $12\pi^2$

Objective: (10.4) Find Surface Area of Revolution

19) $\frac{248}{3}\pi$

Objective: (10.4) Find Surface Area of Revolution

20) $\left(\frac{3}{2}, \frac{\sqrt{3}}{2}\right)$

Objective: (10.5) Convert From Polar to Cartesian Coordinates

21) $(-2, 2\sqrt{3})$

Objective: (10.5) Convert From Polar to Cartesian Coordinates

22) B

Objective: (10.5) Convert From Cartesian to Polar Coordinates

23) $r = 8$

Objective: (10.5) Convert Cartesian Equation to Polar Form

24) $r = 10 \cos \theta$

Objective: (10.5) Convert Cartesian Equation to Polar Form

25) $x = 11$

Objective: (10.5) Convert Polar Equation to Cartesian Form

26) $y = -9$

Objective: (10.5) Convert Polar Equation to Cartesian Form

27) $7x - 3y = 1$

Objective: (10.5) Convert Polar Equation to Cartesian Form

28) $y = \frac{12}{x}$

Objective: (10.5) Convert Polar Equation to Cartesian Form

29) $\frac{9\pi}{8}$

Objective: (10.5) Find Area of Region Inside Polar Curve

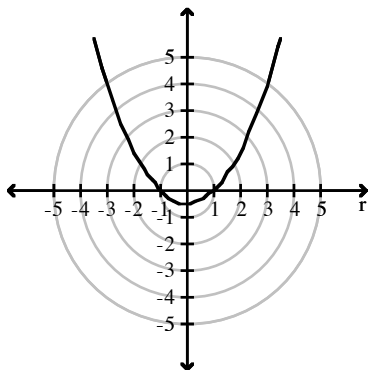
Answer Key

Testname: MATH3B_HWCH10

30) $\frac{280}{3}$

Objective: (10.5) Find Length of Polar Curve

31)



Objective: (10.5) Graph Polar Equation II

32) $y = \frac{5}{12}x - \frac{1}{4}$

Objective: (10.4) Find Equation of Tangent Given Parametric Equations

33) $y = -16x^2(1 - x^2)$

Objective: (10.4) Convert Parametric Equations to Cartesian Equation II

34) $\frac{x^2}{81} - \frac{y^2}{49} = 1$

Objective: (10.4) Convert Parametric Equations to Cartesian Equation II

35) $\frac{\sqrt{17}}{4}(e^{4\pi} - 1)$

Objective: (10.5) Find Length of Polar Curve

36) 7π

Objective: (10.5) Find Length of Polar Curve