Bridge to Calculus 1 Parametric Practice
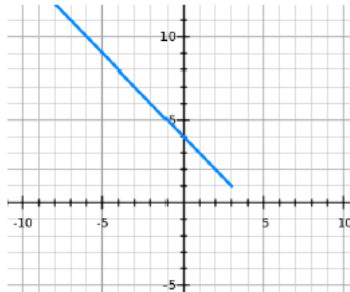
1. Sketch the graph determined by the parametric equations. In what direction is the graph traced out as the value of t increases?

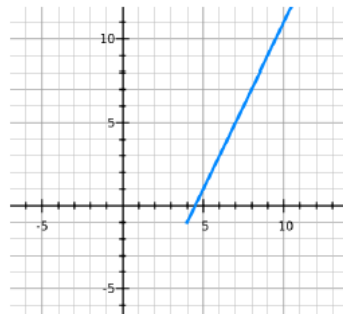$$x = 3 - 2t$$
$$y = 1 + 2t$$

Ans: Linearly, up to the left

2. Sketch the graph determined by the parametric equations. In what direction is the graph traced out as the value of t increases?

$$x = t + 4$$
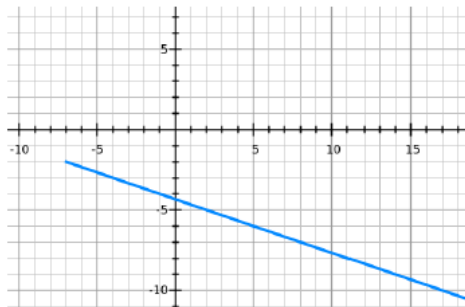$$y = 2t - 1$$

Ans: Linearly up to the right

3. Sketch the graph determined by the parametric equations. In what direction is the graph traced out as the value of t increases?

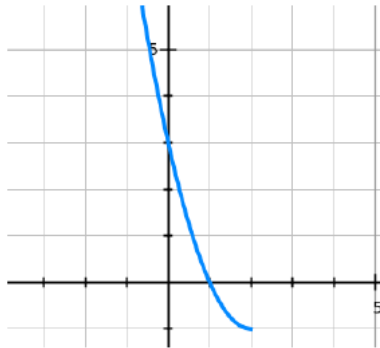$$x = 3t - 7$$
$$y = -t - 2$$

Ans: Linearly down to the right

4. Sketch the graph determined by the parametric equations. In what direction is the graph traced out as the value of t increases?
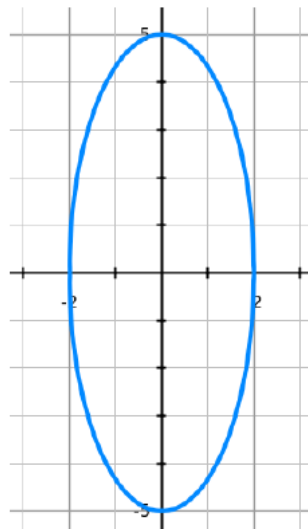
$$x = 2 - \sqrt{t-1}$$
$$y = t - 2$$

Ans: Curves up left

5. Sketch the graph determined by the parametric equations. In what direction is the graph traced out as the value of α increases?

$$x = 2 \sin \alpha$$
$$y = 5\cos \alpha$$

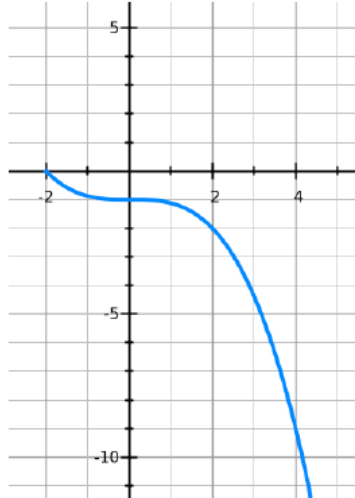Ans: beginning at (2, 0), to the right around the curve

Parametric Coordinates and Equations
…. Set 6

6. Sketch the graph determined by the parametric equations. In what direction is the graph traced out as the value of t increases?

$$x = -2t$$
$$y = t^3 - 1$$
$$-3 \le t < 1$$

Ans: up to the left

7. Eliminate the parameter in the following set of parametric equations and write as a Cartesian equation.

$$x = 3 - 2t$$
$$y = 1 + 2t$$

Ans: $y = -x + 4$

8. Eliminate the parameter in the following set of parametric equations and write as a Cartesian equation.

$$x = t + 4$$
$$y = 2t - 1$$

Ans: $y = 2x - 9$

9. Eliminate the parameter in the following set of parametric equations and write as a Cartesian equation.

$$x = 3t - 7$$
$$y = -t - 2$$

Ans: $y = \dfrac{-x - 13}{3}$

10. Eliminate the parameter and find a Cartesian equation for the parametric equations below. What is the domain restriction on x?

$$x = 2 - \sqrt{t-1}$$
$$y = t - 2$$

Ans: $y = x^2 - 4x + 3, x \le 2$

11. Eliminate the parameter and find a Cartesian equation for the parametric equations below.

$$x = 2 \sin \alpha$$
$$y = 5\cos \alpha$$

Ans: $y = \dfrac{10}{\sqrt{x^2 + 4}}$

12. Eliminate the parameter and find a Cartesian equation for the parametric equations below. What is the domain restriction on x?

$$x = -2t$$
$$y = t^3 - 1$$
$$-3 \le t < 1$$

Ans: $y = \dfrac{-x^3 - 8}{8}, -2 < x \le 6$

13. The position of an object at time t seconds, $t \ge 0$, is given by the parametric equations

$$x = 2t^2 + 1$$
$$y = 3 - t$$
$$t \ge 0$$

What is the position of the object at $t = 4$ seconds?

Does the object pass through the point (9, 1)? If so, when?

Ans: (33, -1); Yes, $t = 2$ sec

14. The position of an object at time t seconds, $t \ge 0$, is given by the parametric equations

$$x = \sqrt[3]{3 - 2t}$$
$$y = t + 4$$
$$t \ge 0$$

What is the position of the object at $t = 5.5$ seconds?
Does the object pass through the point (1, 5)? If so, when?
When is the object to the left of the y-axis?

Ans: (-2, 9.5); yes, $t = 1$ sec; $t > 3/2$

15. The position of an object at time t seconds, $t \geq 0$, is given by the parametric equations

   $x = 2 \cos t - 1$

   $y = -3 \sin t + \frac{1}{2}$

   $t \geq 0$

   What is the x-coordinate of the object's position when its y-coordinate is -2?

Ans: $x = \sqrt{11}$

16. The position of an object at time t seconds, $t \geq 0$, is given by the parametric equations

   $x = 2t^3 + 3$

   $y = t^3 - 5$

   $t \geq 0$

   What is the x-coordinate of the object's position when its y-coordinate is 3?

Ans: 19