

1. Graph BY HAND the following sets of parametric equations using your calculator to check. Make a table of values with $-3 \leq t \leq 3$.

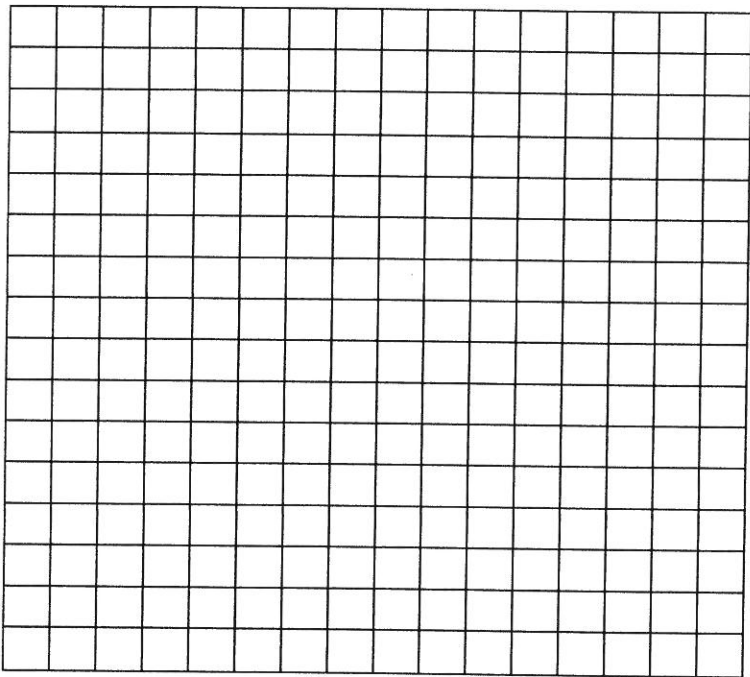
$$a. \begin{cases} x = t \\ y = t + 2 \end{cases}$$

$$b. \begin{cases} x = t \\ y = -\frac{3}{4}t \end{cases}$$

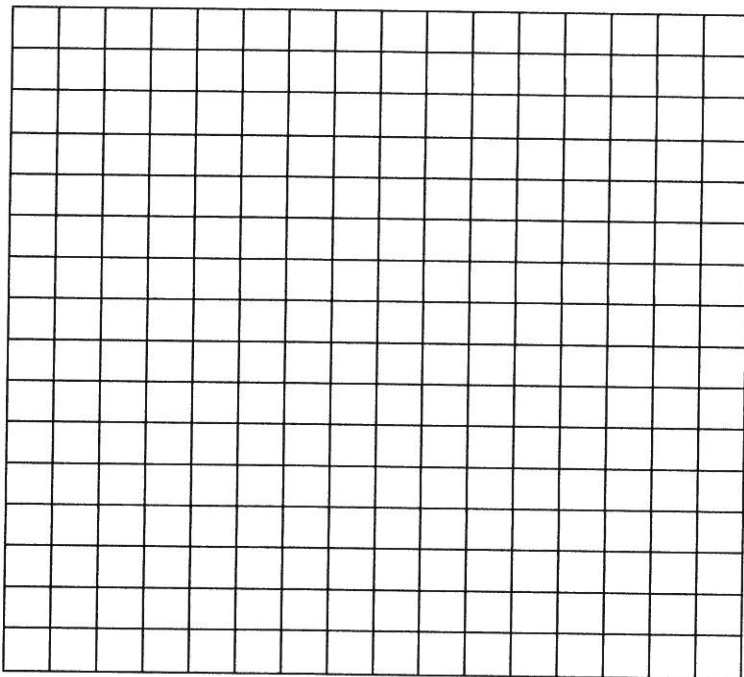
$$c. \begin{cases} x = t^2 \\ y = 2 - t \end{cases}$$

$$d. \begin{cases} x = \sqrt{t} \\ y = 2 - t \end{cases}$$

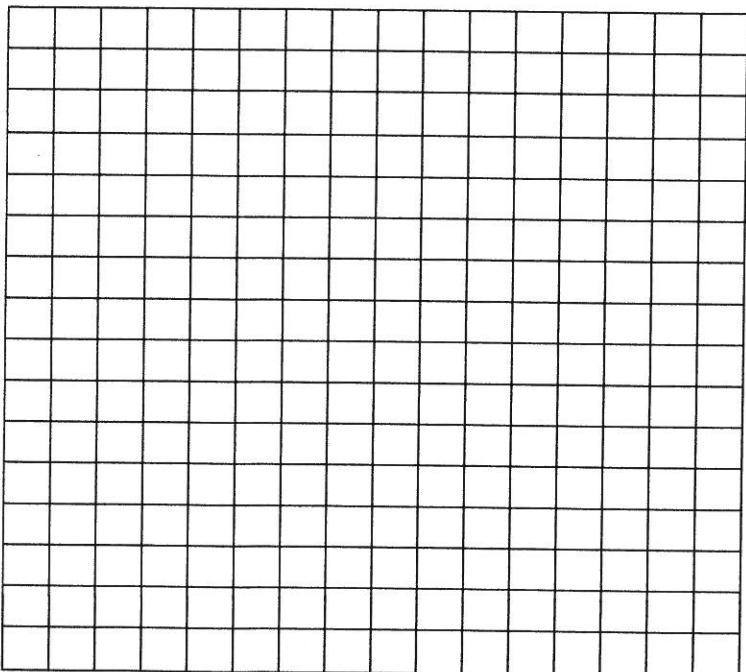
a.



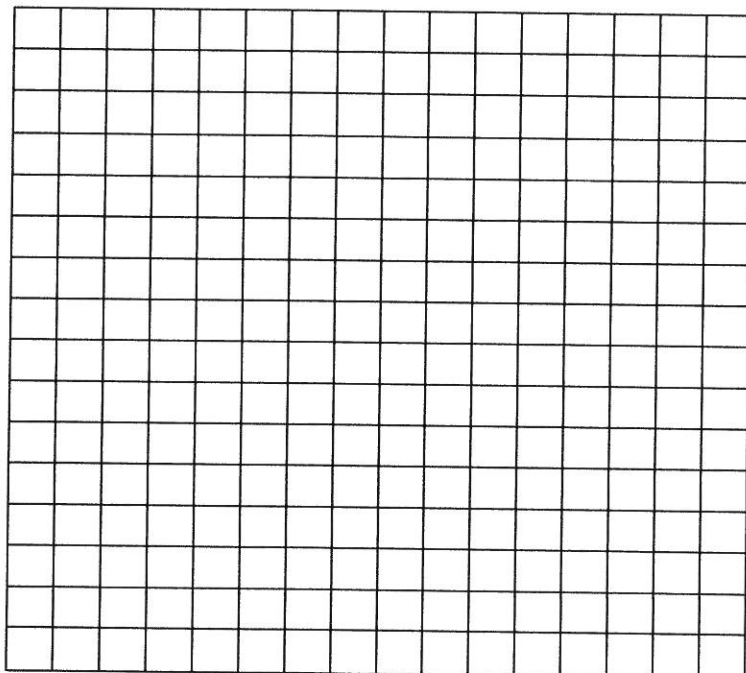
b.



c.



d.



2. Find a rectangular equation by eliminating the parameter for all of the equations in #1.

3. Find two different sets of parametric equations for the given rectangular equations. Let $t = x$ and $t = x - 1$

a. $y = 3x - 2$

b. $y = x^2$

c. $x = y^{\frac{5}{4}}$

4. Write a set of parametric equations for each of the following.

a. $\frac{(x-2)^2}{49} + \frac{(y+6)^2}{25} = 1$

b. $(x+3)^2 + (y-2)^2 = 16$

$$c. \frac{(x-5)^2}{4} - \frac{(y+4)^2}{36} = 1$$

$$d. \frac{(y+9)^2}{8} - \frac{(x-7)^2}{81} = 1$$

5. Eliminate the parameter in each of the following.

$$a. \begin{cases} x = 2 \cos(t) + 3 \\ y = 6 \sin(t) - 2 \end{cases}$$

$$b. \begin{cases} x = 6 \tan(t) + 2 \\ y = 3 \sec(t) - 7 \end{cases}$$

$$c. \begin{cases} x = 3 \sin(t) + 2 \\ y = 3 \cos(t) - 3 \end{cases}$$

6. Find the equation of the line that passes through $(-2, 7)$ and $(4, 3)$. Then find a pair of parametric equations for the line.

7. Write a pair of parametric equations for a circle with end points of the diameter at $(-8, 11)$ and $(6, 1)$.

8. A helicopter takes off with a horizontal speed of 5 ft/s and a vertical speed of 20 ft/s.

a. Find a set of parametric equations for the motion of the helicopter.

b. Describe the location of the helicopter at $t = 10$ seconds. _____

9. From her starting point, a hiker walks along a straight path. Her speed to the north is 3 mi/h. Her speed to the east is 0.4 mi/h. Let x represent how far east of her starting point the hiker is, and let y represent how far north she is.

a. Find a set of parametric equations for her motion. $\begin{cases} x = \\ y = \end{cases}$

b. Write an equation in x and y only (rectangular) for her motion. _____

c. Find the location of the hiker 90 minutes into her trip. _____

10. Our Robot is on the move again. We find it at $(13, 5)$ and after watching for 5 seconds it is at $(7, 10)$.

a. What are the parametric equations for the Robot's path?

b. Where is the robot after 16 seconds?

c. At what time will the robot cross the y -axis?

11. Bart the robot travels from $(2, 5)$ to $(10, 13)$ in 4 seconds. Silvia the robot travels from $(10, 1)$ to $(7, 13)$ in 6 seconds.

a. Write a pair of parametric equations for both robots.

b. Do the robots cross paths? If so, where?

c. Do the robots meet?