Name_____

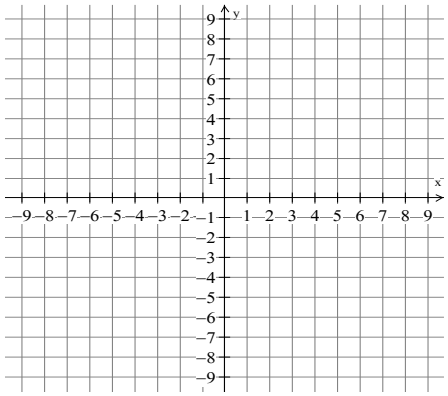
Activity – Parametric Equations

Part 1. Graphing Parametric Equations

1. To plot parametric equations we will choose t's in the domain and find corresponding x's and y's. Be sure to show the orientation of the curve.

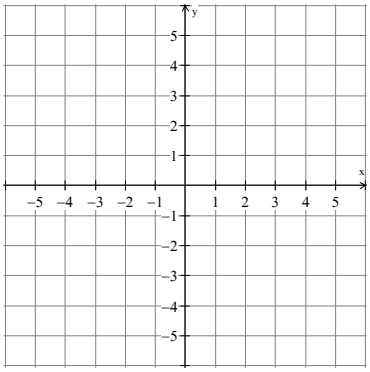
a) $x = 2t - 1, \quad y = 3 - 2t; \quad -2 \le t \le 2$

t	x	y

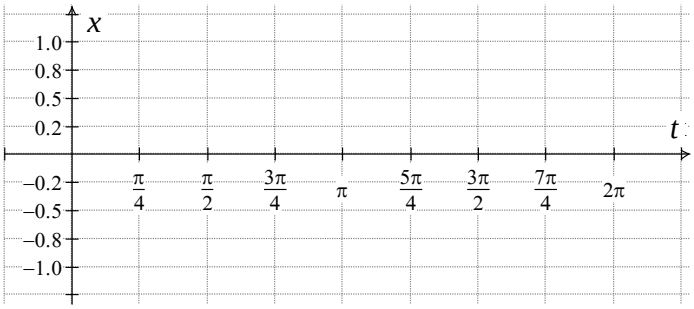


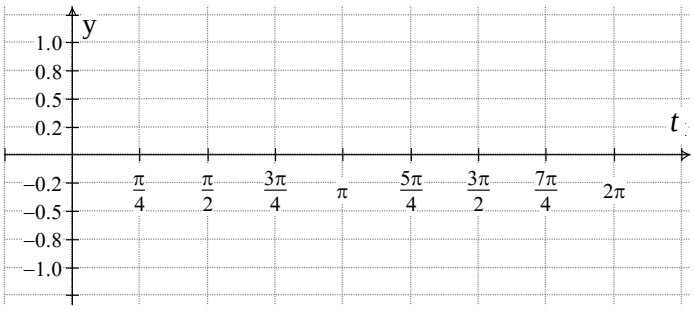
b) $x = 2t, \quad y = t^2; \quad -1 \le t \le 2$

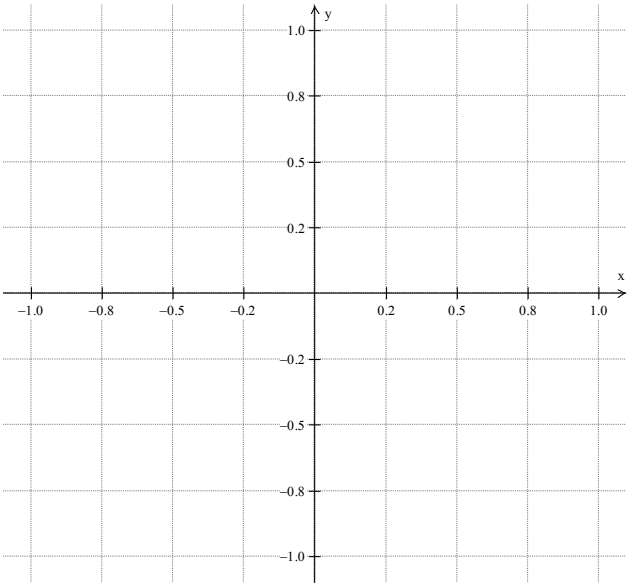
t	x	y



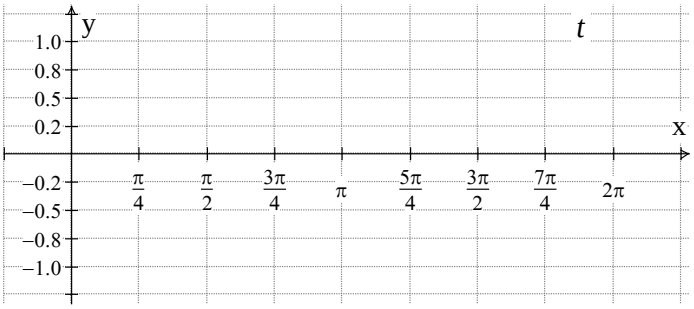
2. a) Graph $x = \cos t, y = \sin t, 0 \le t \le 2\pi$ on the x-t and y-t planes below and then on the x-y plane.

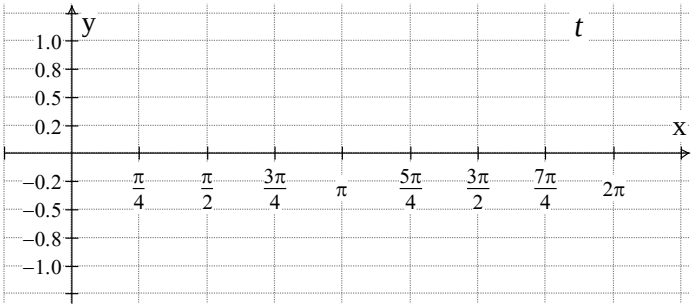


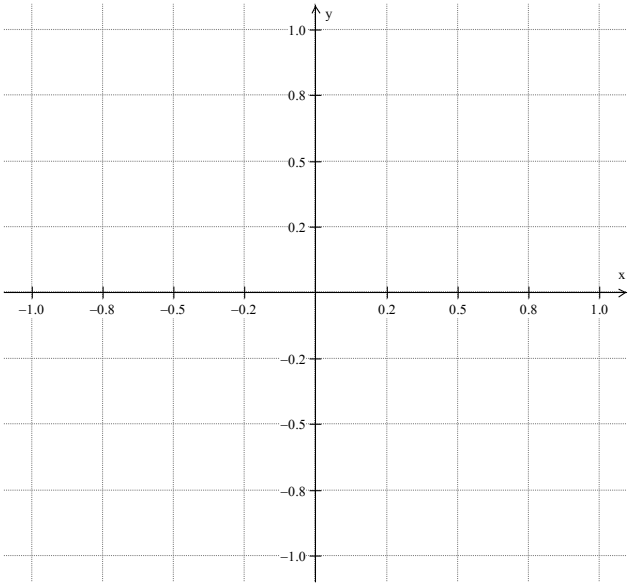




b) Let's see what happens to the graph if we use $-t$ instead of t. Graph $x=\cos(-t)$, $y=\sin(-t)$ on the x-t and y-t planes below and then on the x-y plane.



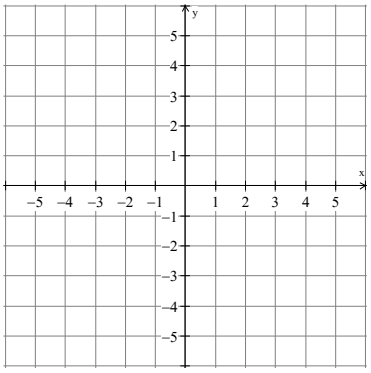




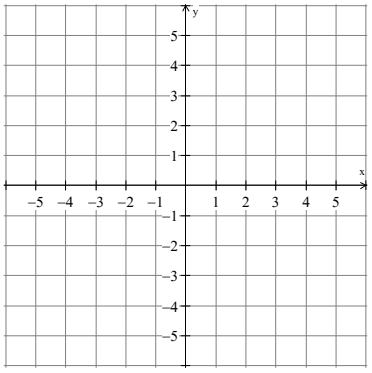
How does the $-t$ affect the graph?

3. Graph the equations

a) $x=2\cos t,\ y=3\sin t,\ \dfrac{\pi}{2}\le t\le 2\pi$

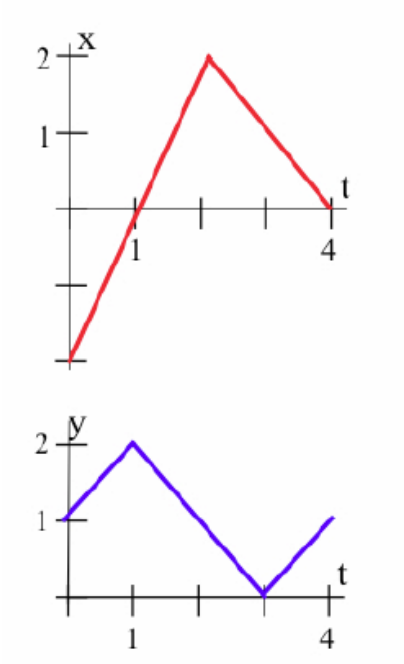


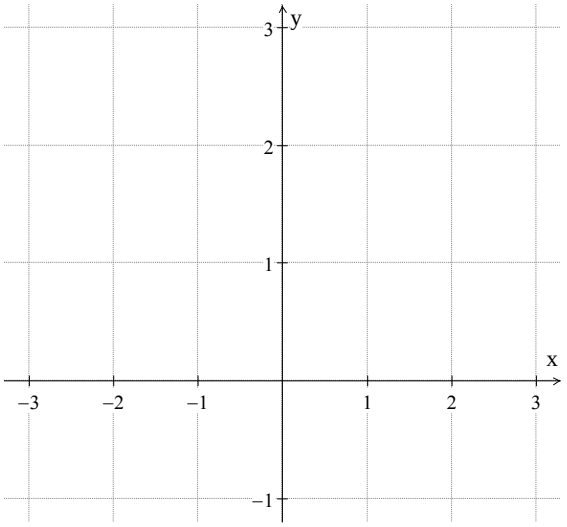
b) $x=\sec t,\ y=\tan t,\ -\dfrac{\pi}{2}<t<\dfrac{\pi}{2}$



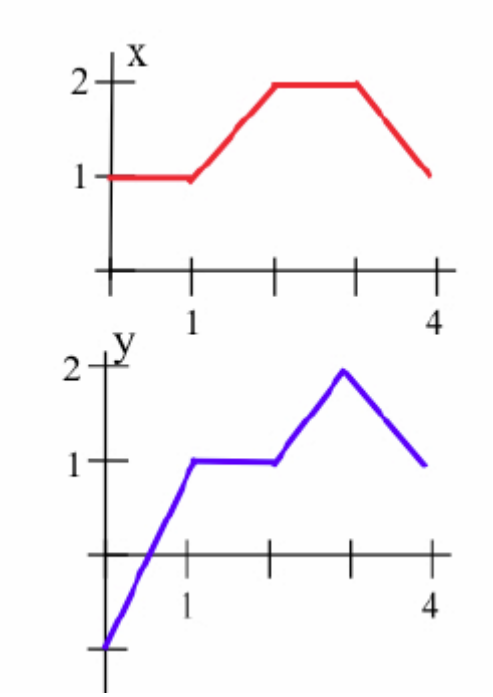
4. .Use the values for $x(t)$ and $y(t)$ for the curves below to sketch the graph on the x-y plane.

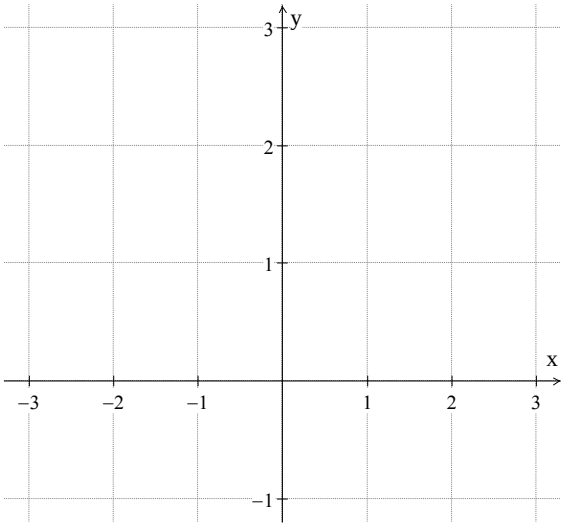
a)





b)





Part 2. Eliminating the Parameter

1. Eliminate the parameter in Part 1 1a and 1b by solving for *t* in one of the equations and substituting that in the other equation.

a) $x = 2t - 1, \quad y = 3 - 2t \quad -2 \le t \le 2$

b) $x = 2t, \quad y = t^2 \quad -1 \le t \le 2$

How do the graphs of these equations you obtain compare to what you graphed in Part 1?

2. To eliminate the parameter for the equations in Part 1, 2a and 3a and 3b, you use an appropriate Pythagorean Identity and then substitute for the trig functions. Eliminate the parameter for these equations.

a) $x = \cos t, \; y = \sin t, \; 0 \le t \le 2\pi$ Which Pythagorean Identity connects sine and cosine?

b) $x = 2\cos t, \; y = 3\sin t, \; \dfrac{\pi}{2} \le t \le 2\pi$

c) $x = \sec t, \; y = \tan t, \; -\dfrac{\pi}{2} < t < \dfrac{\pi}{2}$

How do the graphs of these equations you obtain compare to what you graphed in Parts 2 and 3?

Part 3. Finding Parametric Descriptions of Curves

Find a parametric description for the oriented curves

a) The directed line segment from (–2,1) to 3, –4)

b) The circle $x^2 + y^2 = 25$ directed counter-clockwise

c) The circle $x^2 + y^2 = 25$ directed clockwise