Solutions for Quiz 2, Section A02

Find an equation in x and y for the parametric curve

$$x = 1 + \cos(2t), \quad y = 1 - \sin(2t)$$

by eliminating the parameter. Describe the trajectory in words.

Solution: First, we rearrange the equations:

$$x - 1 = \cos(2t)$$

$$y - 1 = -\sin(2t)$$

Now, we can square both sides of both equations:

$$(x-1)^2 = \cos^2(2t)$$

$$(y-1)^2 = \sin^2(2t)$$

And finally we can add the two equations together to get:

$$(x-1)^2 + (y-1)^2 = \cos^2(2t) + \sin^2(2t)$$

$$(x-1)^2 + (y-1)^2 = 1$$

This is the equation of a circle with center $(1, 1)$ and radius 1.