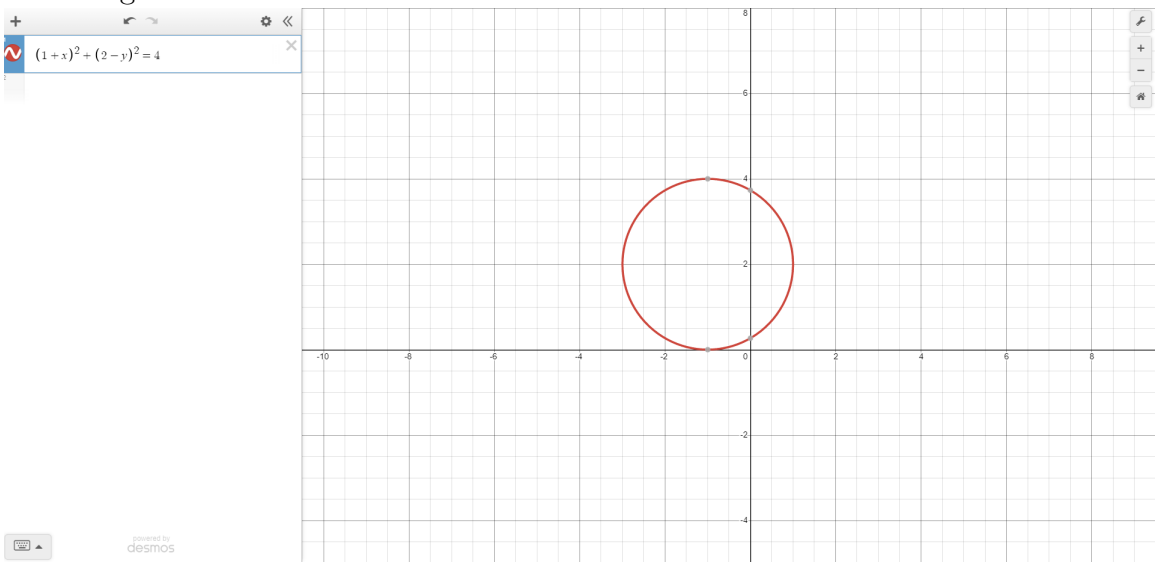
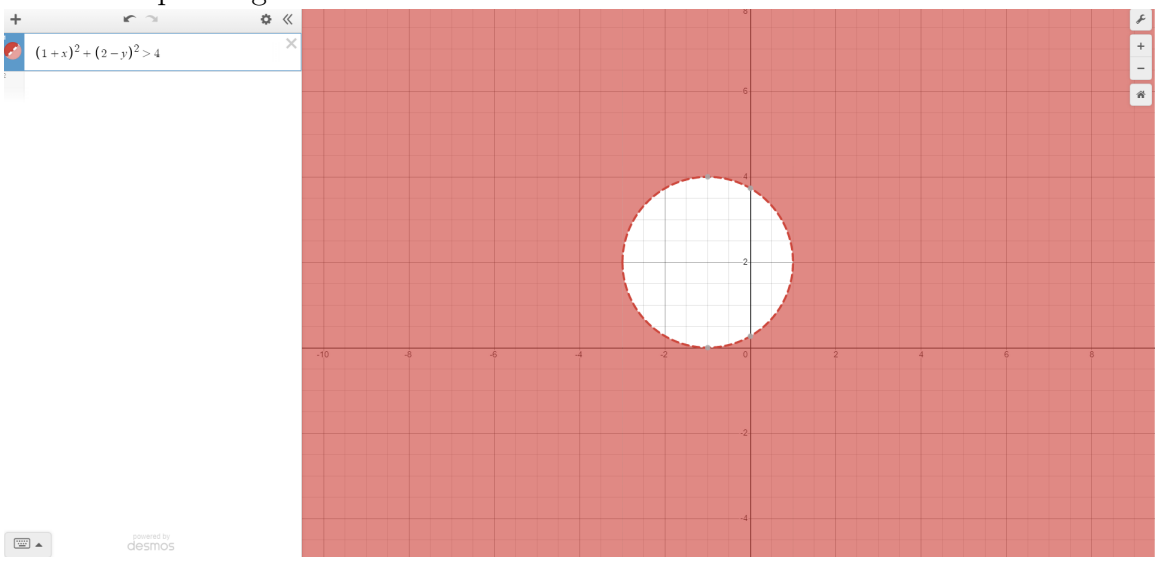
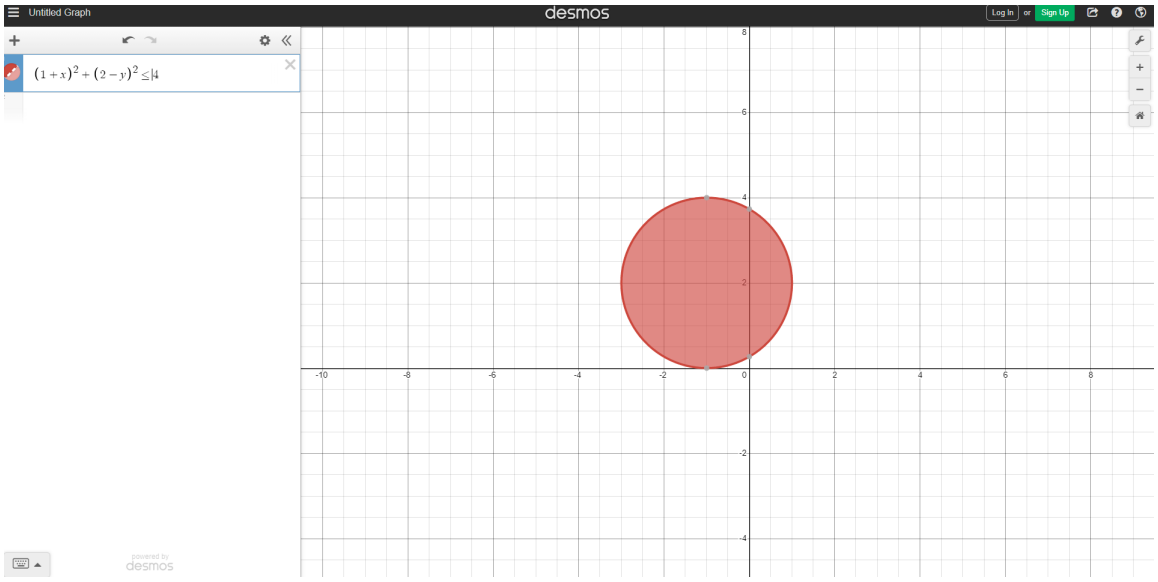
1. (a) Sketching the curve:



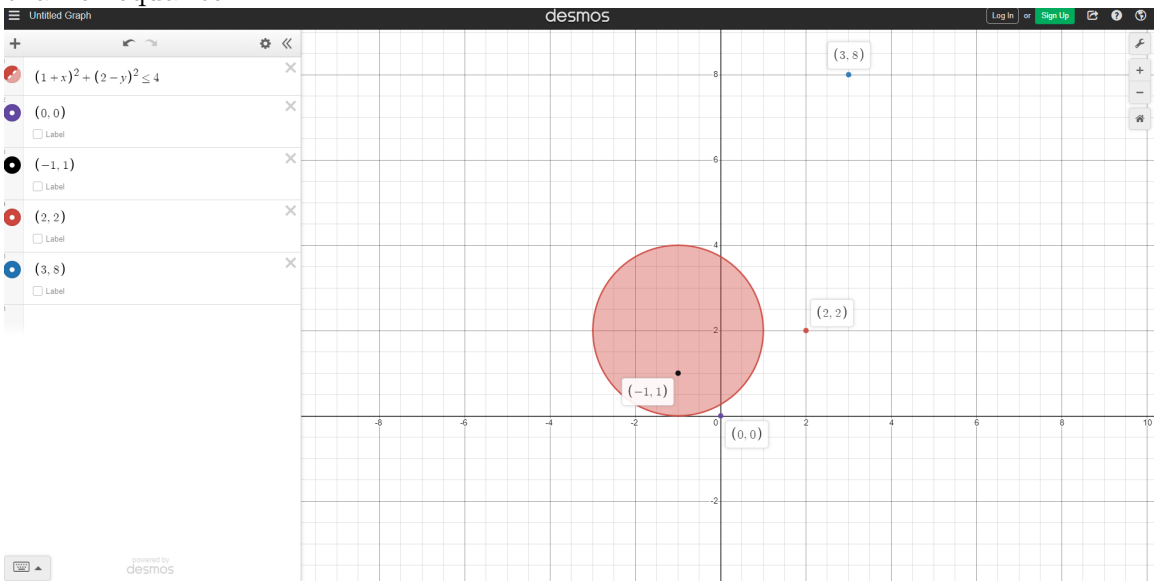
(b) For all the points greater than 4:



For all the points less than or equal to 4:



(c) From the points plotted as well as the graph shaded where the points are less than or equal to 4:



We see only the point $(-1, 1)$ lies within the shaded region, and thus will be the only one assigned to be red. All other points will be assigned to blue.

(d) Looking at the equation of the circle, we find that the variable terms are X_1, X_1^2, X_2, X_2^2. Thus, since the equation of a circle is a linear combination of those four terms, the equation $(1 - X_1)^2 + (2 - X_2)^2 = 4$ is linear in terms of X_1, X_1^2, X_2, X_2^2.