(31) $\{(x,y) \mid 0 < y < 3\}$

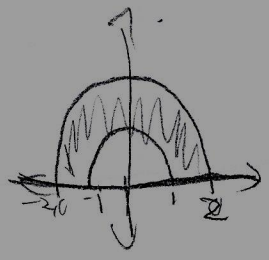
a) open is defined as not having any boundary points. $Y \in (0,3)$ contains no boundary points, therefore is open

b) connected is defined as having any 2 points in D, in a path entirely in D. The set fulfills this, therefore the set is connected.

c) simply connected is a connected region without holes, and cannot be in two pieces. the set fulfills this definition, and is simply connected.

(33) $\{(x,y) \mid 1 \leq x^2+y^2 \leq 4 \wedge y \geq 0\}$

a) open is defined as not having any boundary points. D in the above set has boundary points. therefore isn't open.

b) 

Disconnected because any 2 points can have a path entirely in D. Thus satisfying definition of connected.

c) D is simply connected as D is connected, D doesn't contain any holes or discontinuities, and D isn't in 2 pieces. Therefore fulfilling def of simply connected.