Section 14.7: Additional Problems

1. Find and classify the critical values of $f(x,y) = 2x^3 + xy^2 + 5x^2 + y^2$
2. Find the absolute maximum/absolute minimum for $f(x,y) = \sqrt{1 - x^2 - y^2}$.
3. Find the absolute maximum/absolute minimum for $f(x,y) = xy^2 + 3$ on the set D.

   $D = \left\{(x,y) \,\middle|\, x \geq 0, \;\; 0 \leq y \leq x, \;\; x^2 + y^2 \leq 6 \right\}$
4. Find the absolute maximum/absolute minimum for $f(x,y) = xy^2 - x$ on the set D.

   $D = \left\{(x,y) \,\middle|\, x \geq 0, \;\; 0 \leq y \leq 2x, \;\; x^2 + y^2 \leq 6 \right\}$

   This problem ended up being a bit more messy that what would be found on an exam.