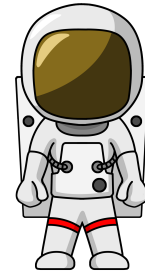


UW Math Circle
February 26, 2015
Homework

1. Show that for any $n > 3$, there is a convex polygon with n sides and exactly 3 acute angles.
2. Find a formula for the total number of dots in a hexagonal arrangement of n rings of dots. Prove your formula is correct! The cases $n = 1, 2, 3$ are drawn below:



3. Into how many regions do n straight lines divide a plane, if no two of them are parallel and no three of them meet at a single point?
4. Tim is an astronaut and he is planning on flying his spaceship around the equator of the Moon. He sent a rover to the moon to deposit fuel at equal intervals around the equator, but there was a computer glitch and the rover dropped fuel packets randomly instead. All Tim knows is that the total amount of fuel in the packets is exactly enough for him to get around the equator once. Prove that he can find a starting point on the equator to go around it without running out of fuel.



5. *This problem appeared on last week's homework!* Find a formula for the number of ways to cover a $2 \times n$ chessboard with dominoes (so that each square is covered, and no dominoes overlap). Prove your formula is correct.