

Math Circle 8/27/2016 Meeting: Challenge of the week

Make sure that your solution is correct, complete, and clearly written. You should not expect much credit if your proof refers to a false statement, or even if all your statements are true but you forgot to tell us "why?" It is one of the purposes of the Circle to help you improve your "essay-proof" writing style as well as your logical skills.

Please remember that the Challenge is **individual**. Although we strongly encourage cooperation and help among the participants of the Circle, the Weekly Challenge will be one exception to this rule: you may consult your notes, but you may not ask other people to help you.

Problem 1. In Ms. Sweetmeat's class, each girl gives a candy bar to every student who is shorter in stature than she. On the other hand, each boy in the class gives a candy bar to every pupil taller than he. The students in Ms. Sweetmeat's class are all of the different height.

1. Construct an example of such class where there are three students who get the same number of candy bars, and everyone else gets less.
2. Prove that whenever there are three students who get more candy bar than all other students in the class, at least one of them is a girl.