0.1 Doing the rounds

When you first assign a problem to work on in small groups, there may not be much you have to do. No one is stuck yet; no one needs your help. There is a lot you can accomplish in this time. First, you can quickly take attendance group by group - after you know the names this takes less than half a minute. After this, you will want to quickly "do the rounds". Visit each group once just to check that they have gotten down to work. On the first round, look for any trouble with the wording of the problem that may be holding people up. If it's part of their job to decipher it, encourage them to do so. If it's a mistake, or if you need to supply a definition, then make a quick announcement. On your second round you can linger longer. This is a good time to make a mental note of which groups are going faster than the others. It helps, during the subsequent large group discussion, to have a good idea of who has gotten how far. If a group has quickly and incorrectly or incompletely answered a problem and gone on to another, this is a good time to ask (innocently) for one of them to summarize for you what they found. The correct question on your part can cause them to re-examine what they've done without feeling that you've invalidated their answer (point of philosophy: you want them to be able to criticize their own work, realizing that mathematics will determine whether they are right, and that what they discover about this cannot be overruled by the teacher).

Example: A group has quickly concluded that there no solutions, but they have used the incorrect manipulation

$$(a+b)^2 = a^2 + b^2.$$

This might be a good time to hand them a solution and have them figure out how to reslove the contradiction. Don't settle for "Gee, Teacher, your solution works so I guess we did something wrong." Instead, insist that it is you or the laws of algebra at fault. When they are able to pinpoint what went wrong, ask them to prove to you that $(a+b)^2 = a^2 + b^2$ really is not a law of algebra.

If there is only one solution and you don't want to spoil it for them, you may be able to hand them only the part of the solution that contradicts their error. If they are correct

that there is no solution but haven't adequately argued it, tell them that there is indeed a solution, namely $a = 51$. When that doesn't work, try 52. Ask them after that whether they plan to do this for all natural numbers or whether they can give you a reason why none will work.