# $2=1+1$ and Other Compositions <br> Math Teachers' Circle <br> Joshua Zucker, joshua.zucker@stanfordalumni.org, July 27, 2012 

In each problem below, I'll show you all the "legal" ways to make a certain number. Your job is, for each problem separately, to:

- Figure out what the rules are that determine which ways are legal.
- Figure out how many ways there are to make 10.
- Ask your own further questions! For example, try subcategorizing things in some way or other, and then count the number of ways to make a particular number in each subcategory.

1. Ways to make 3 :

3
$2+1$
$1+2$
$1+1+1$
2. Ways to make 6 :
$5+1$
$1+5$
$3+3$
$3+1+1+1$
$1+3+1+1$
$1+1+3+1$
$1+1+1+3$
$1+1+1+1+1+1$
3. Ways to make 3 :

3
$2+1$
$2+1$
$1+2$
$+2$
$1+1+1$
$1+1+1$
$1+1+1$
$1+1+1$
$1+1+1$
$1+1+1$
$1+1+1$
$1+1+1$

