1108-05-367 **Tri Lai*** (tmlai@ima.umn.edu), 207 Church Street SE, 306 Lind Hall, Minneapolis, MN 55455.
Lozenge tilings of a hexagon with holes on boundary and plane partitions that fit in a special box.

MacMahon's classic theorem on the number of plane partitions that fit in a given box is equivalent to the fact that the number of lozenge tilings of a centrally symmetric hexagon of side-lengths a, b, c, a, b, c (in cyclic order) on the triangular lattice is equal to

$$\frac{H(a)H(b)H(c)H(a+b+c)}{H(a+b)H(b+c)H(c+a)},$$

where the hyperfactorial function $H(n)$ is defined by

$$H(n) := 0!1!\dots(n-1)!.$$

We generalize MacMahon's theorem by enumerating lozenge tilings of the hexagon when some holes appear along its boundary. This also gives the number of plane partitions that fit in a *special* box consisting of several connected rooms. In addition, we consider a q-analog of the result and its connection to MacMahon's q-formula. (Received January 18, 2015)