**Problem 45**

06 June 2003

Triangle, pentagonal, and hexagonal numbers are generated by the following formulae:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Triangle |  | T*n*=*n*(*n*+1)/2 |  | 1, 3, 6, 10, 15, ... |
| Pentagonal |  | P*n*=*n*(3*n*−1)/2 |  | 1, 5, 12, 22, 35, ... |
| Hexagonal |  | H*n*=*n*(2*n*−1) |  | 1, 6, 15, 28, 45, ... |

It can be verified that T285 = P165 = H143 = 40755.

Find the next triangle number that is also pentagonal and hexagonal.