

1 The Module difference_of_squares.pl

square_of_sum(+N:int, -Result:int)	difference_of_squares.pl
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The square of the sum of the first n numbers, i.e., $\left(\sum_{k=1}^n k\right)^2 = \left(\frac{n(n+1)}{2}\right)^2$.

```
:- module(difference_of_squares, [square_of_sum/2, sum_of_squares/2, difference/2]).
%! square_of_sum(+N:int, -Result:int) is semidet.
%
% The square of the sum of the first =N= natural numbers.
square_of_sum(N, Result) :-
    Result is ((N * (N + 1)) / 2)^2.
```

sum_of_squares(+N:int, -Result:int)	difference_of_squares.pl
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The sum of the squares of the first n natural numbers, i.e., $\sum_{k=1}^n k^2 = \frac{n(n+1)(2n+1)}{6}$.

```
%! sum_of_squares(+N:int, -Result:int) is semidet.
%
% The sum of the squares of the first =N= natural numbers.
sum_of_squares(N, Result) :-
    Result is (N * (N + 1) * (2 * N + 1)) / 6.
```

difference(+N:int, -Result)	difference_of_squares.pl
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The difference between the square of the sum of the first n natural numbers and the sum of the squares of the first n natural numbers, i.e., $\left(\sum_{k=1}^n k\right)^2 - \sum_{k=1}^n k^2$.

```
%! difference(+N:int, -Result:int) is semidet.
%
% The difference between the square of the sum of the first =N= natural
% numbers and the sum of the squares of the first =N= natural numbers.
%
% @see square_of_sum/2, sum_of_squares/2.
difference(N, Result) :-
    square_of_sum(N, SquareOfSum),
    sum_of_squares(N, SumOfSquares),
    Result is SquareOfSum - SumOfSquares.
```