

# PRGRNS Calculations with progressiones - Comercial Interest

**Progressions**

**Arithmetic**  $a_n = a_1 + d(n-1)$  2, 5, 8, 11, 14, 17, 20, 23, ...

$a_1 = 2$   $d = 3$   $n = 8$   $a_n = 23$   $S_n = 100$

**Interpolate** 6 terms between 5 and 1  $d = \frac{b-a}{k+1} = -4/7$  31/7, 27/7, 23/7, 1

$a_n = a_1 + d(n-1)$   
 $S_n = \frac{(a_1 + a_n) n}{2}$

**Geometric**  $a_n = a_1 \cdot r^{n-1}$  4, 2, 1, 1/2, ...

$a_1 = 4$   $r = 1/2$   $n = 4$   $a_n = 1/2$   $S_n = 15/2$

**Interpolate** 2 terms between 4 and 5  $r = e^{\frac{\ln(b/a)}{k+1}} = 1.07$  4.309, 4.642

$a_n = a_1 \cdot r^{n-1}$   
 $S_n = \frac{a_1 \cdot r - a_n \cdot r}{r-1}$   
 dec:  $S_\infty = \frac{a_1}{1-r}$

**Interest** Monetary symbol: €

**Simple interest**  $C = c(1+rt/100)$

$c = 1000$  €  $r = 6$  %  $t = 15$   $C = 1900$  €

**Compound interest**  $C = c(1+r/100)^t$

$c = 4000$  €  $r = 12$  %  $t = 5$   $C = 7049.37$  €

**Annuities of...**


**capitalization**  $a = \frac{C \cdot i}{(1+i)((1+i)^t - 1)}$

$C = 5000$  €  $r = 10$  %  $t = 10$   $a = 285.21$  €

$i = r/100$

**amortization**  $a = \frac{D \cdot i \cdot (1+i)^t}{(1+i)^t - 1}$

$D = 6000$  €  $r = 5$  %  $t = 10$   $a = 777.03$  €

In all the cases it's necessary to introduce 3 data (or generate them with the button ) and after pressing **Ok** the rest of parameters will be calculated.

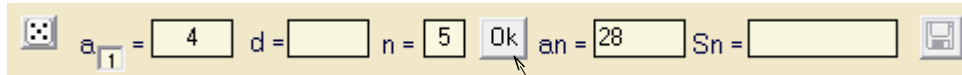
Any of the parameters can be a data or an unknown, although the **n** of progressiones only will be accepted when it has an integer value.

If there are more than 3 values in the textboxes of a case they will be interpreted as data the 3 to the left, and the other ones will become results.

If you want to invalidate a textbox like a data you must put it in white.

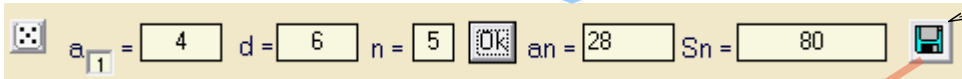
## Example

Here are entered as data of an arithmetic progression:  $a_1$  (the first term),  $n$  (the number of terms) and  $a_n$  (that is:  $a_5$ ). Unknowns are: the difference ( $d$ ) and the sum of the  $n$  (5) first terms,  $S_n$  (here,  $S_5$ ), that is: the textboxes in white.



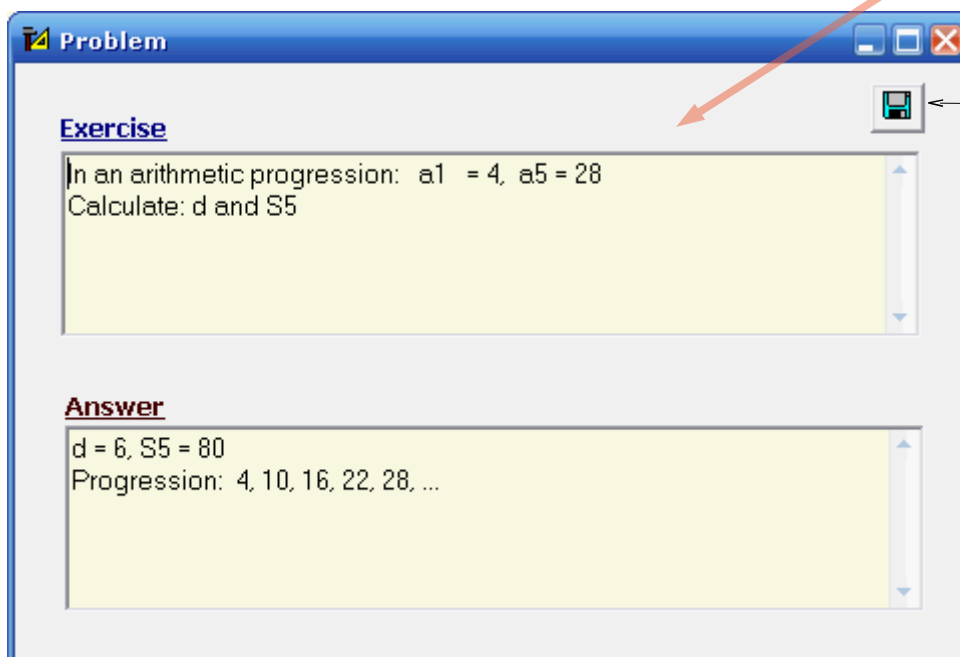
A screenshot of a software interface for creating a math problem. It features several input fields:  $a_1 = 4$ ,  $d =$  (empty),  $n = 5$ , an **Ok** button,  $a_n = 28$ , and  $S_n =$  (empty). There are also icons for a calculator and a save function.

Results are shown by clicking **Ok**



A screenshot of the software interface showing the results. The input fields now contain:  $a_1 = 4$ ,  $d = 6$ ,  $n = 5$ , a calculator icon,  $a_n = 28$ , and  $S_n = 80$ . A save icon is also present.

To see the built problem



To save the problem in a text file.