Using the Geometric Sum Formula

Example Use the Geometric Sum Formula to add:

$$S = \frac{\$500}{(1.085)} + \frac{\$500}{(1.085)^2} + \frac{\$500}{(1.085)^3} + \cdots + \frac{\$500}{(1.085)^{30}}$$

Solution:

Write $P = \frac{500}{1.085}$ and rewrite the sum

$$S = \left(\frac{500}{1.085}\right) + \frac{1}{1.085}\left(\frac{500}{1.085}\right) + \frac{1}{(1.085)^2}\left(\frac{500}{1.085}\right) + \cdots + \frac{1}{(1.085)^{29}}\left(\frac{500}{1.085}\right)$$

$$= \left(\frac{500}{1.085}\right) + \left(\frac{1}{1.085}\right)^1\left(\frac{500}{1.085}\right) + \left(\frac{1}{1.085}\right)^2\left(\frac{500}{1.085}\right) + \cdots + \left(\frac{1}{1.085}\right)^{29}\left(\frac{500}{1.085}\right)$$

So we have $P = \frac{500}{1.085}$, $c = \frac{1}{1.085}$, and $N-1 = 29$, so $N = 30$.

Therefore, by the Geometric Sum Formula,

$$S = P\left(\frac{c^N - 1}{c - 1}\right)$$

$$= \left(\frac{500}{1.085}\right)\left(\frac{\left(\frac{1}{1.085}\right)^{30} - 1}{\frac{1}{1.085} - 1}\right)$$

$\approx \$5373.42$, rounding to the nearest penny.

Suggestion: Store the values for c and P in your calculator's memory and then compute

P * ((C ^ 30 − 1) / (C − 1)) .

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don't forget the parens!