Answer on Question #54442 – Math – Algebra

Question

XYZ company purchased a new machine in March at $50,000 and is using the profits to pay it off. Profits in March were $7,876. If the profits increase 2% from the previous month, in what month will the machine be completely paid off?

Solution

Rough estimation: $\frac{\$50,000}{\$7,876} \approx 6.35$

We have only few values to calculate, so let us make a table of profits.

Month	March	April	May	June	July	August	September
Profit	$7,876.00	$8,033.52	$8194.19	$8358.07	$8525.23	$8695.73	$8869.64
Total profit	$7,876.00	$15909.52	$24103.71	$32461.78	$40987.01	$49682.74	$58552.38

Explanation of the construction of the table:

Month: enumeration of 7 months, starting from March. In numerical representation use correspondence: March $= 0$, April $= 1$, May $= 2$ and so on.

Profit: take the profit from previous month, make an increase of 2% and round to the nearest cent.

Formula: $Profit[i] = round(Profit[i-1] * 1.02, digits = 2), i \in \mathbb{N}; Profit[0] = \$7{,}876.$

Total profit is the cumulative sum of profits.

Formula: $Total\ profit[i] = \sum_{k=0}^{i} Profit[k].$

We are looking in table for the first month, when total profit is greater than $\$50{,}000$. Easy to see that it is September.

Answer: $September$.