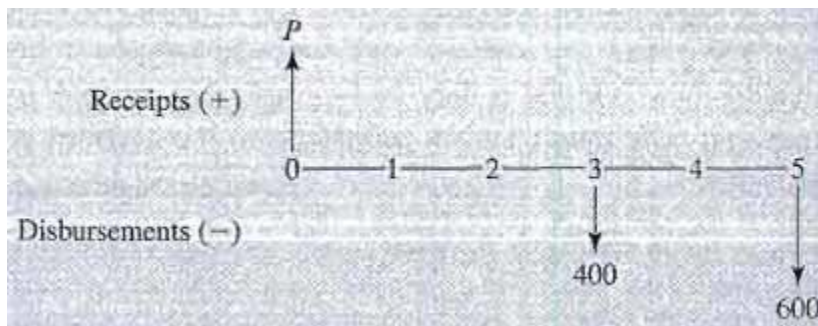


Example: Equivalence Calculations - Solve P.

Consider the following situation:

Year	Cash Flow
0	+P
1	0
2	0
3	-400
4	0
5	-600

Solve for P assuming a 12% interest rate and using the compound interest tables. Recall that receipts have a plus sign and disbursements or payments have a negative sign. Thus, the diagram is:



SOLUTION

$$\begin{aligned}
 P &= 400(P/F, 12\%, 3) + 600(P/F, 12\%, 5) \\
 &= 400(0.7118) + 600(0.5674) \\
 &= \$625.16
 \end{aligned}$$

It is important to understand just what the solution, \$625.16, represents. We can say that \$625.16 is the amount of money that would need to be invested at 12% annual interest to allow for the withdrawal of \$400 at the end of 3 years and \$600 at the end of 5 years.

Let's examine the computations further.

If \$625.16 is invested for one year at 12% interest, it will increase to $[625.16 + 0.12(625.16)] = \700.18 . If for the second year the \$700.18 is invested at 12%, it will increase to $[700.18 + 0.12(700.18)] = \784.20 . And if this is repeated for another year, $[784.20 + 0.12(784.20)] = \878.30 .

We are now at the end of Year 3. The original \$625.16 has increased through the addition of interest to \$878.30. It is at this point that the \$400 is paid out. Deducting \$400 from \$878.30 leaves \$478.30.

The \$478.30 can be invested at 12% for the fourth year and will increase to $[478.30 + 0.12(478.30)] = \535.70 . And if left at interest for another year, it will increase to $[535.70 + 0.12(535.70)] = \600 . We are now at the end of Year 5; with a \$600 payout; there is money remaining in the account.

In other words, the \$625.16 was just enough money, at a 12% interest rate, to exactly provide for a \$400 disbursement at the end of Year 3 and also a \$600 disbursement at the end of Year 5. We end up neither short of money or with money left over: this is an illustration of equivalence. The initial \$625.16 is equivalent to the combination of a \$400 disbursement at the end of Year 3 and a \$600 disbursement at the end of Year 5.

Source:

<http://engineeringandeconomicanalysis.blogspot.com/2012/10/example-equivalence-calculations-solve-p.html>