**36.5 A group of machines are maintained under a contract which costs $50,000 this year. The contract cost will inrease by $1000 per year over the next 10 years. What is the present value of the entire 10 years of maintenance using an effctive annual interest rate of 12%.**

A. $303,000

B. $336,000

C. $352,000

D. $370,000

The present value can be represented as the sum of two cash flows: an recurring annunal cost of $50,000 and a uniform gradient of $1,000. The gradient has a value of zero in the first year, such that the first year cost is $50,000, second year is $51,000, third year is $52,000, etc. There is no initial cost reflected in year 0 as it is customary in engineering economics to reflect costs that occur throughout the year at the end of the year.

Write an expression for the present value.

$$PV = A\left(P/A, 12\%, 10\right) + G\left(P/G, 12\%, 10\right)$$

Use the 12% Factor Table to look up the cash flow factors needed to translate the cash flows into present value. Solve for the present value.

$$PV = \left(\$50,000\right)\left(5.6502\right) + \left(\$1,000\right)\left(20.2541\right) = \$302,764$$

**Answer A**