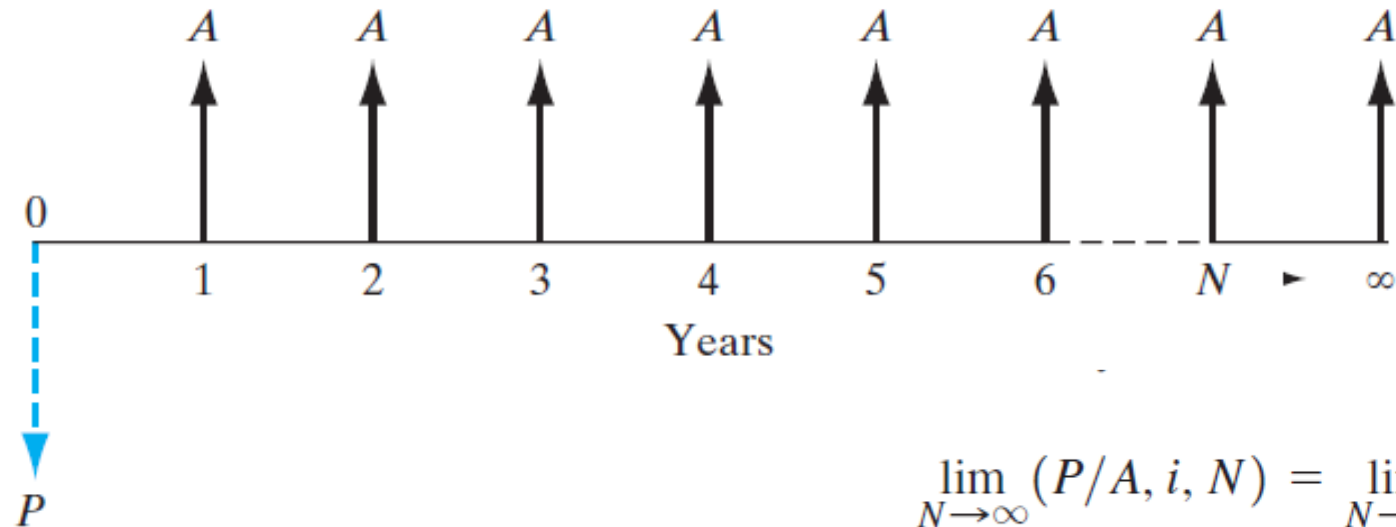


CAPITALIZED EQUIVALENT METHOD

Capitalized Cost represents the amount of money that must be invested today to yield a certain return A at the end of each and every period forever, assuming an interest rate of ' i '.



$$\lim_{N \rightarrow \infty} (P/A, i, N) = \lim_{N \rightarrow \infty} \left[\frac{(1 + i)^N - 1}{i(1 + i)^N} \right] = \frac{1}{i}.$$

$$PW(i) = A(P/A, i, N \rightarrow \infty) = \frac{A}{i}.$$

CAPITALIZED EQUIVALENT METHOD

Steps in finding Capitalized cost

- Draw the cash flow diagram showing all non recurring cash flow and at least two cycles of all recurring cash flows.
- Find the present worth of all non recurring cash flows using the single payment present worth relationships.
- Find the equivalent uniform annual amount for one cycle of all recurring cash flows and divide that amount by the interest rate to get the capitalized cost of recurring cash flows.
- Divide all uniform cash flows occurring from year 1 to ∞ by the interest rate to get the capitalized cost of those uniform cash flows.
- Add all the values obtained in above steps to get the total capitalized worth of the investment.

CAPITALIZED EQUIVALENT METHOD

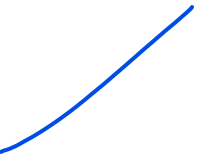
- The cash flows (costs or receipts) in a capitalized cost calculation are usually of two types: ***recurring***, also called ***periodic***, and ***nonrecurring***.
- An annual operating cost of \$50,000 and a rework cost estimated at \$40,000 every 12 years are examples of recurring cash flows.
- Examples of nonrecurring cash flows are the initial investment amount in year 0 and one-time cash flow estimates at future times, for example, \$500,000 in royalty fees 2 years hence.

A group of concerned citizens has established a trust fund that pays 6% interest, compounded monthly, to preserve a historical building by providing annual maintenance funds of \$30,000 forever. Compute the capitalized equivalent amount for these building maintenance expenses.

Ans:486223.66

A patriotic group of firefighters is raising money to erect a permanent (i.e., infinite life) monument in New York City to honor those killed in the line of duty. The initial cost of the monument will be \$150,000, and the annual maintenance will cost \$5000. There will be an additional one-time cost of \$20,000 in 2 years to add names of those who were missed initially. At an interest rate of 6% per year, how much money must they raise now in order to construct and maintain the monument forever?

Ans:251133



Find the capitalized cost of a present cost of \$300,000, annual costs of \$35,000, and periodic costs every 5 years of \$75,000. Use an interest rate of 12% per year.

Ans: -690048



To decrease the costs of operating a lock in a large river, a new system of operation is proposed. The system will cost \$650,000 to design and build. It is estimated that it will have to be reworked every 10 years at a cost of \$100,000. In addition, an expenditure of \$50,000 will have to be made at the end of the fifth year for a new type of gear that will not be available until then. Annual operating costs are expected to be \$30,000 for the first 15 years and \$35,000 a year thereafter. Compute the capitalized cost of perpetual service at $i = 8\%$.

Ans:1165019/1164950/1164965

CAPITALIZED EQUIVALENT METHOD

Maintenance money for a new building has been sought. Mr. Kendall would like to make a donation to cover all future expected maintenance costs for the building. These maintenance costs are expected to be \$50,000 each year for the first 5 years, \$70,000 each year for years 6 through 10, and \$90,000 each year after that. (The building has an indefinite service life.)

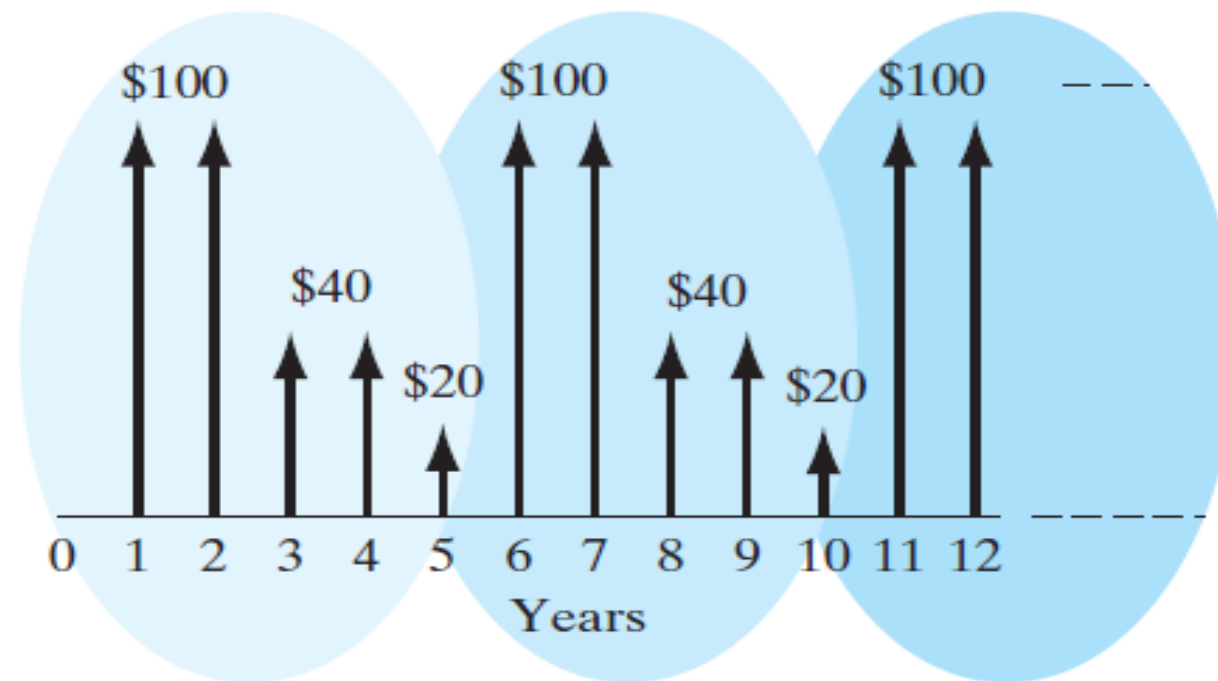
- (a) If the money is placed in an account that will pay 13% interest compounded annually, how large should the gift be?
- (b) What is the equivalent annual maintenance cost over the infinite service life of the building?

(a) 513453

(b) 66748

CAPITALIZED EQUIVALENT METHOD

Consider an investment project, the cash flow pattern of which repeats itself every five years forever as shown in the accompanying diagram. At an interest rate of 14%, compute the capitalized equivalent amount for this project.



Ans: \$470

CAPITALIZED EQUIVALENT METHOD

Two methods of carrying away surface runoff water from a new subdivision are being evaluated:

Method A. Dig a ditch. The first cost would be \$60,000, and \$25,000 of redigging and shaping would be required at five-year intervals forever.

Method B. Lay concrete pipe. The first cost would be \$150,000, and a replacement would be required at 50-year intervals at a net cost of \$180,000 forever.

At $i = 12\%$, which method is the better one?

Ans:

92791

150625

CAPITALIZED EQUIVALENT METHOD

The property appraisal district for Marin County has just installed new software to track residential market values for property tax computations. The manager wants to know the total equivalent cost of all future costs incurred when the three county judges agreed to purchase the software system. If the new system will be used for indefinite future, find the equivalent value (a) now and (b) for each year hereafter. The system has an installed cost of \$150,000 and an additional cost of \$50,000 after 10 years. The annual software maintenance contract cost is \$5000 for the first 4 years and \$8000 thereafter. In addition, there is expected to be a recurring major upgrade cost of \$15,000 every 13 years. Assume that $i = 5\%$ per year for county funds.

CAPITALIZED EQUIVALENT METHOD

Using capitalized cost, determine which type of road surface is preferred on a particular section of highway. Use 12% interest rate.

	<i>A</i>	<i>B</i>
Initial cost	\$500,000	\$700,000
Annual maintenance	35,000	25,000
Periodic resurfacing	350,000	450,000
Resurfacing interval	10 years	15 years