

ANNUAL WORTH METHOD:

1. A consulting firm proposes to provide training for clerks who works with insurance claims. The program lasts 1 year, costs \$2000 per month, and professes to improve quality while reducing clerical time. A potential user of the program estimates that savings in the first month should amount to \$800 and increase by \$400 per month for rest of the year. However, the operational confusion and work interference are expected to boost clerical costs by \$1200 the first month, but this amount should subsequently decline in equal increments at the rate of \$100 per month. If the required return on money is 12 percent compounded monthly and there is a stipulation that the program must pay for itself within 1 year, should the consultants be hired?
2. A cement plant has been ordered by the government to limit the pollutants released in the cement-making process or else the plant will have to be closed. The quarry has an expected remaining life of 15 years, doing nothing is not a viable alternative. The plant has an agreement with the government that one of the following three possibilities will satisfy the pollution regulating agency.
 - i. Enclose all the existing material conveyors at a first cost of \$385,000 with annual maintenance cost of \$3500. It is expected major retrofitting will be required at 5 year intervals: \$35,000 at 5 years and \$65,000 at 10 years?
 - ii. Provide filtration equipment on the material silos with an initial investment of \$271,000 with annual operating costs of \$8000.
 - iii. Upgrade the cement kilns. The initial cost of doing this will be \$380,000 and lost production during installation will cost the plant \$43,000.

The plant manager will choose the alternative which provides the least annual costs over the quarry life of 15 years. With an interest rate of 10%, suggest the best alternative to the manager.

3. A short concrete canal can be constructed as part of a flood control project; the placement of a large galvanized culvert will serve the same function. The cost of the canal which will last indefinitely, is \$75,000; and maintenance costs will average \$400 per year. A culvert, which will have to be replaced every 30 years, will cost \$40,000 and will have an annual maintenance cost of \$700. Salvage values are negligible for both alternatives, and the government interest rate is 6 percent. Which alternative has the lower equivalent annual cost?
4. Sunbelt Corporation, an investment company, is considering building a 50-unit apartment complex in a growing area near Tucson, Arizona. Since the long-term growth potential of the town is excellent, it is believed that the company could average 85 percent full occupancy for the complex each year. If the following financial data are reasonably accurate estimates, determining the minimum monthly rent that should be charged if a 15 percent rate of return is desired:
 - Land investment cost = \$1,000,000
 - Building investment cost = \$2,500,000
 - Annual upkeep cost = \$150,000
 - Property taxes and insurance = 5 percent of total initial investment
 - Study period = 25 years
 - Salvage value = Only the land cost can be recovered in full

5. IRR Method:

1. A parcel of land adjacent to a proposed freeway exit is deemed likely to increase in value. It can be purchased now for \$80,000 and is expected to be worth \$150,000 within 5 years. During that period it can be rented for pasture at \$1,500 per year. Annual taxes are presently \$850, and will likely remain constant. What rate of return will be earned on the investment if the estimates are accurate?
2. An old hotel was recently damaged by fire. Since it has desirable location in the old part of the city, it will be rebuilt or renovated as either an office building or modern apartment building. Estimated receipts and disbursements for the 30 year life of the refurbished structure is given below. If the required rate of return is 12%, which renovation plan is preferable? Use IRR method

(\$)	Offices	Apartments
First cost	340,000	490,000
Increase in salvage value from renovation	120,000	190,000
Annual receipts	212,000	251,200
Annual disbursements	59,100	88,000
Present value of fire damaged building	485,000	485,000
Expected salvage after 30 years	266,000	266,000

3. John Covington, a college student, wants to start as small scale painting business during his off-school hours. He has 2 mutually exclusive options. Do most of the painting by himself by limiting his business to residential painting jobs or purchase more painting equipment and hire some helpers to do both residential and commercial painting jobs. In either case, John expects to foldup the business in 3 years. Use incremental IRR method. The cash flows are as follows:

n	B1(\$) 25%	B2 (\$) 17.43%
0	-3,000	-12000
1	1,350	4,200
2	1,800	6225
3	1,500	6330

4. Consider the following two mutually exclusive investment projects that require the same amount of investment. Which project would you select on the basis is of incremental IRR, assuming MARR = 12%.

n	C1(\$)	C2(\$)
0	-9000	-9000
1	480	5800
2	3700	3250
3	6550	2000
4	3780	1561
IRR	18%	20%

5. Consider the following sets of mutually exclusive alternatives. Which project would you select on the basis is of incremental IRR, assuming MARR = 15%

n	D1(\$)	D2(\$)	D3(\$)
0	-2000	-1000	-3000
1	1500	800	1500
2	1000	500	2000
3	800	500	1000
IRR	34.37%	40.76%	24.81%