

- (10-2) **NPV** Your division is considering two investment projects, each of which requires an up-front expenditure of \$15 million. You estimate that the investments will produce the following net cash flows:

Year	Project A	Project B
1	\$ 5,000,000	\$20,000,000
2	10,000,000	10,000,000
3	20,000,000	6,000,000

What are the two projects' net present values, assuming the cost of capital is 10 percent? 5 percent? 15 percent?

- (10-3) **NPVs, IRRs, and MIRR for Independent Projects** Edelman Engineering is considering including two pieces of equipment, a truck and an overhead pulley system, in this year's capital budget. The projects are independent. The cash outlay for the truck is \$17,100, and that for the pulley system is \$22,430. The firm's cost of capital is 14 percent. After-tax cash flows, including depreciation, are as follows:

Year	Truck	Pulley
1	\$5,100	\$7,500
2	5,100	7,500
3	5,100	7,500
4	5,100	7,500
5	5,100	7,500

Calculate the IRR, the NPV, and the MIRR for each project, and indicate the correct accept/reject decision for each.

- (10-4) **NPVs and IRRs for Mutually Exclusive Projects** Davis Industries must choose between a gas-powered and an electric-powered forklift truck for moving materials in its factory. Since both forklifts perform the same function, the firm will choose only one. (They are mutually exclusive investments.) The electric-powered truck will cost more, but it will be less expensive to operate; it will cost \$22,000, whereas the gas-powered truck will cost \$17,500. The cost of capital that applies to both investments is 12 percent. The life for both types of truck is estimated to be 6 years, during which time the net cash flows for the electric-powered truck will be \$6,290 per year and those for the gas-powered truck will be \$5,000 per year. Annual net cash flows include depreciation expenses. Calculate the NPV and IRR for each type of truck, and decide which to recommend.

- (10-5) **Capital Budgeting Methods** Project S has a cost of \$10,000 and is expected to produce benefits (cash flows) of \$3,000 per year for 5 years. Project L costs \$25,000 and is expected to produce cash flows of \$7,400 per year for 5 years. Calculate the two projects' NPVs, IRRs, MIRR, and PIs, assuming a cost of capital of 12 percent. Which project would be selected, assuming they are mutually exclusive, using each ranking method? Which should actually be selected?

- (10-6) **MIRR and NPV** Your company is considering two mutually exclusive projects, X and Y, whose costs and cash flows are shown below:

Year	X	Y
0	(\$1,000)	(\$1,000)
1	100	1,000
2	300	100
3	400	50
4	700	50

The projects are equally risky, and their cost of capital is 12 percent. You must make a recommendation, and you must base it on the modified IRR (MIRR). What is the MIRR of the better project?

- (10-7) **NPV and IRR Analysis** After discovering a new gold vein in the Colorado mountains, CTC Mining Corporation must decide whether to mine the deposit. The most cost-effective method of mining gold is sulfuric acid extraction, a process that results in environmental damage. To go ahead with the extraction, CTC must spend \$900,000 for new mining equipment and pay \$165,000 for its installation. The gold mined will net the firm an estimated \$350,000 each year over the 5-year life of the vein. CTC's cost of capital is 14 percent. For the purposes of this problem, assume that the cash inflows occur at the end of the year.
- What are the NPV and IRR of this project?
 - Should this project be undertaken, ignoring environmental concerns?
 - How should environmental effects be considered when evaluating this, or any other, project? How might these effects change your decision in part b?

- (10-8) **NPV and IRR Analysis** Cummings Products Company is considering two mutually exclusive investments. The projects' expected net cash flows are as follows:

Year	EXPECTED NET CASH FLOWS	
	Project A	Project B
0	(\$300)	(\$405)
1	1387	134
2	193	134
3	100	134
4	600	134
5	600	134
6	850	134
7	180	0

- Construct NPV profiles for Projects A and B.
 - What is each project's IRR?
 - If you were told that each project's cost of capital was 10 percent, which project should be selected? If the cost of capital was 17 percent, what would be the proper choice?
 - What is each project's MIRR at a cost of capital of 10 percent? At 17%? (Hint: Consider Period 7 as the end of Project B's life.)
 - What is the crossover rate, and what is its significance?
- (10-9) **Timing Differences** The Ewert Exploration Company is considering two mutually exclusive plans for extracting oil on property for which it has mineral rights. Both plans call for the expenditure of \$10,000,000 to drill development wells. Under Plan A, all the oil will be extracted in 1 year, producing a cash flow at $t = 1$ of \$12,000,000, while under Plan B, cash flows will be \$1,750,000 per year for 20 years.
- What are the annual incremental cash flows that will be available to Ewert Exploration if it undertakes Plan B rather than Plan A? (Hint: Subtract Plan A's flows from B's.)
 - If the firm accepts Plan A, then invests the extra cash generated at the end of Year 1, what rate of return (reinvestment rate) would cause the cash flows from reinvestment to equal the cash flows from Plan B?
 - Suppose a company has a cost of capital of 10 percent. Is it logical to assume that it would take on all available independent projects (of average risk) with returns greater than 10 percent? Further, if all available projects with returns greater than 10 percent have been taken, would this mean that cash flows from past investments would have an opportunity cost of only 10 percent, because all the firm could do with these cash flows would be to replace money that has a cost of 10 percent? Finally, does this imply that the cost of capital is the correct rate to assume for the reinvestment of a project's cash flows?