Sample Problems—Capital Budgeting—part 1

1. Lloyd Enterprises has a project which has the following cash flows:

Year	Cash Flow
0	-$200,000
1	50,000
2	100,000
3	150,000
4	40,000
5	25,000

   The cost of capital is 10 percent. What is the project's discounted payback?

2. McCarver Inc. is considering the following mutually exclusive projects"

Year	Project A Cash Flow	Project B Cash Flow
0	-$5,000	-$5,000
1	200	3,000
2	800	3,000
3	3,000	800
4	5,000	200

   At what cost of capital will the net present value of the two projects be the same? (That is, what is the "crossover" rate?)

3. What is the internal rate of return for a project that has a net investment of $14,600 (Time 0 outflow) and a single net cash flow of $25,750 in 5 years?

Use the following information for the next two questions:
The director of capital budgeting for Giant Inc. has identified two mutually exclusive projects, L and S, with the following expected net cash flows:

	Expected Net Cash Flows	
Year	**Project L**	**Project S**
0	-$100	-$100
1	10	70
2	60	50
3	80	20

Both projects have a required rate of return of 10 percent.

4. What is the NPV for project S?

5. What is the crossover rate for the two projects—that is, at what interest rate will the NPVs for the two projects be equal?

6. Genuine Products Inc. requires a new machine. Two companies have submitted bids, and you have been assigned the task of choosing one of the machines. Cash flow analysis indicates the following:

Year	**Machine A**	**Machine B**
0	-$2,000	-$2,000
1	0	832
2	0	832
3	0	832
4	3,877	832

What is the internal rate of return for each machine?

Use the following information for the next two problems:
The Seattle Corporation has been presented with an investment opportunity which will yield cash flows of $30,000 per year in Years 1 through 4, $35,000 per year in Years 5 through 9 and $40,000 in Year 10. This investment will cost the firm $150,000 today, and the firm's required rate of return is 10 percent.

7. What is the payback period for this investment?

8. What is the NPV for this investment?

9. Your required return is 15%. Should you accept a project with the following cash flows?

Year	Cash Flow
0	-$85
1	30
2	35
3	40

10. You are considering an investment that has the following cash flows. If you require a 4 year payback period, should you take the investment?

Year	Cash Flow
0	-$100,000
1	10,000
2	20,000
3	25,000
4	40,000
5	40,000
6	20,000

11.

Year	Project A Cash Flow	Project B Cash Flow
0	-$100,000	-$110,000
1	60,000	20,000
2	40,000	40,000
3	20,000	40,000
4	10,000	50,000

When is Project B more lucrative than Project A? (That is, over what range of costs of capital (k) does Project B have a higher NPV than Project A?

12. Green Grocers is deciding among two mutually exclusive projects. The two projects have the following cash flows:

Year	Project A Cash Flow	Project B Cash Flow
0	-$50,000	-$50,000
1	15,625	0
2	15,625	0
3	15,625	0
4	15,625	99,500

The company's cost of capital is 10 percent. Which should be chosen?

13. Polk Products is considering an investment project with the following cash flows:

Year	Cash Flow
0	-$100,000
1	40,000
2	90,000
3	30,000
4	60,000

The company has a 10 percent cost of capital. What is the project's discounted payback?

14. Davis Corporation is faced with two independent investment opportunities. The corporation has an investment policy which requires acceptable projects to have a maximum discounted payback of 3 years. The corporation uses a cost of capital of 10 percent. The cash flows for the two projects are:

Year	Project A Cash Flow	Project B Cash Flow
0	-$100,000	-$80,000
1	40,000	50,000
2	40,000	20,000
3	40,000	30,000
4	30,000	0

Which investment project(s) does the company invest in?

Use the following information to answer the next two questions:
Bill plans to open a do-it-yourself dog bathing center in a storefront. The bathing equipment will cost $150,000. Bill expects the incremental net operating cash flows to be $35,000 annually for 5 years, after which he plans to scrap the equipment and retire to the beaches of Jamaica.

15. What is the project's payback?

16. Assume the required return is 10%. What is the project's NPV?

Use the following information for the next two questions:
Toya Motors needs a new machine for production of its 2000 models. The financial vice president has appointed you to do the capital budgeting analysis. You have identified two different machines that are capable of performing the job. You have completed the cash flow analysis, and the expected net cash flows are as follows:

	Expected Net Cash Flow	
Year	Machine B	Machine O
0	-$5,000	-$5,000
1	2,085	0
2	2,085	0
3	2,085	0
4	2,085	9,677

17. The firm's required rate of return is uncertain at this time, so you construct NPV profiles to assist in the final decision. At what discount rate do the profiles for Machines B and O cross?

18. If the required rate of return for both projects is 14 percent at the time the decision is made, which project would you choose?

19. Braun Industries is considering an investment project which has the following cash flows:

Year	Cash Flow
0	-$1,000
1	400
2	300
3	500
4	400

The company's WACC is 10 percent. What is the project's payback, internal rate or return, and net present value?

20. When is Project B more lucrative than Project A? (Hint, calculate the NPV profile cross-over rate)

	Project A	Project B
Year	Cash Flow	Cash Flow
0	-$100,000	-$110,000
1	60,000	20,000
2	40,000	40,000
3	20,000	40,000
4	10,000	50,000

21. Polk Products is considering an investment project with the following cash flows:

Year	Cash Flow
0	-$100,000
1	40,000
2	90,000
3	30,000
4	60,000

The company has a 10 percent cost of capital. What is the project's discounted payback?

22. An investment project costs $8,000 and has annual cash flows of $1,900 for six years. Calculate payback and discounted payback for this project assuming a cost of capital of 10%.

23. The director of capital budgeting for Giant Inc. has identified two mutually exclusive projects, L and S, with the following expected net cash flows:

	Expected Net Cash Flows	
Year	**Project L**	**Project S**
0	-$100	-$100
1	10	70
2	60	50
3	80	20

The company's cost of capital is 8%. Which should be chosen?

24. Bumble's Bees, Inc. has identified the following two mutually exclusive projects:

Year	Project A Cash flow	Project B Cash flow
0	-$5,000	-$5,000
1	1,700	3,000
2	2,500	2,000
3	3,000	1,975

When is project B more lucrative than Project A? (That is, over what range of costs of capital does Project B have a higher NPV than Project A?)

25. The director of capital budgeting for Giant Inc. has identified two mutually exclusive projects, L and S, with the following expected net cash flows:

	Expected Net Cash Flows	
Year	**Project L**	**Project S**
0	-$100	-$100
1	10	70
2	60	50
3	80	20

The company's cost of capital is 10%. Which should be chosen?

26. Bumble's Bees, Inc. has identified the following two mutually exclusive projects:

Year	Project A Cash flow	Project B Cash flow
0	-$5,000	-$5,000
1	1,680	3,000
2	2,500	2,000
3	3,000	1,975

When is project B more lucrative than Project A? (That is, over what range of costs of capital does Project B have a higher NPV than Project A?)

27. An investment project has the following annual cash inflows:

Year	Cash Flow
1	$7,000
2	7,500
3	8,000
4	8,500

The cost of capital is 12 percent. What is the project's discounted payback if the initial cost of the project is $13,000?

28. Green Grocers is deciding among two mutually exclusive projects. The two projects have the following cash flows:

Year	Project A Cash Flow	Project B Cash Flow
0	-$4,000	-$4,000
1	2,500	1,870
2	1,500	2,030
3	1,800	1,980

What is the crossover rate of the two projects?

29. A project costs $300 and has cash flows of $75 for the first three years and $50 in each of the project's last three years. If the discount rate is 15%, what is the discounted payback period?

30. Darby & Davis, LLC, has identified the following two mutually exclusive projects:

Year	**Project A Cash flow**	**Project B Cash flow**
0	-$17,000	-$17,000
1	8,000	2,000
2	7,000	5,000
3	5,000	9,000
4	3,000	9,500
NPV	$1,520.71	

If the required return is 11%, what is the NPV for project B? Which project will you choose?

31. M. Ellis Company is presented with the following two mutually exclusive projects. What is the crossover rate for these two projects?

Year	**Project A Cash flow**	**Project B Cash flow**
0	-$700	-$950
1	300	400
2	300	400
3	300	450

32. Coughlin Motors is considering a project with the following expected cash flows:

Year	Project Cash Flow
0	-$700 million
1	200 million
2	370 million
3	225 million
4	700 million

The project's WACC is 10 percent. What is the project's discounted payback?

33. Hudson Hotels is considering two mutually exclusive projects, Project A and Project B. The cash flows from the projects are summarized below:

Year	Project A Cash Flow	Project B Cash Flow
0	-$100,000	-$200,000
1	25,000	50,000
2	25,000	50,000
3	50,000	80,000
4	50,000	100,000

The two projects have the same risk. At what cost of capital would the two projects have the same net present value?

34. Martin Manufacturers has a WACC of 12 percent. The company is considering a project with the following expected cash flows: What is the MIRR of the project?

Year	Project Cash Flow
0	-$100,000
1	$25,000
2	$25,000
3	$50,000
4	$50,000
5	$50,000

35. A firm with a WACC of 10 percent is considering the following mutually exclusive projects:

Year	Project A Cash Flow	Project B Cash Flow
0	-$400	-$600
1	55	300
2	55	300
3	55	50
4	225	50
5	225	50

Calculate the discounted payback of each project. Which (if either) project should be accepted according to the discounted payback criterion?

36. Damon Electronics Company is considering the following mutually exclusive projects:

Year	Project X Cash Flow	Project Y Cash Flow
0	-$10,000	-$10,000
1	6,500	3,500
2	3,000	3,500
3	3,000	3,500
4	1,000	3,500

At what cost of capital will the net present value of the two projects be the same? (Do not simply put down a number, you must show your work in order to receive credit.)

37. Your division is considering two investment projects, each of which requires an up-front expenditure of $25 million. You estimate the cost of capital is 10 percent and that the investments will produce the following after-tax cash flow (in millions of dollars):

Year	Project A	Project B
1	$5	$20
2	10	10
3	15	8
4	20	6

If the cost of capital is 10 percent, what is the modified IRR (MIRR) of each project?