IRR MATRIX

The following six (6) projects
- **are ranked from smallest to largest based on their initial cost (P);**
- **have identical lives (durations); and**
- **no $0 salvage values.**

PROJECTS	**RATES OF RETURN (%)**					
	A	**B**	**C**	**D**	**E**	**F**
A (smallest)	**26**					
B	**25**	**24**				
C	**23**	**22**	**22**			
D	**24**	**21**	**20**	**19**		
E	**20**	**19**	**18**	**17**	**20**	
F (largest)	**18**	**21**	**15**	**15**	**15**	**12**

1. **Refer to the IRR Matrix.** If A, B, C, D, E and F are mutually exclusive projects and MARR = 15%, the best project is:
   a. C
   b. E
   c. D
   d. A

2. **Refer to the IRR Matrix.** If A, B, C, D, E and F are independent projects and MARR = 23%, valid projects are
   a. A, B, C
   b. A, B
   c. A, B, C, E
   d. A

3. **Refer to the IRR Matrix.** If A, B, C, D, E and F are mutually exclusive projects and MARR = 30%, the best (valid) project is
   a. A
   b. A, B
   c. A, B, E
   d. None of the projects is "best".

4. **Refer to the IRR Matrix.** If MARR is not given (but is assumed to be positive), can you conclude that project E is better than project F?
   a. Yes
   b. No
   c. Need additional information.
   d. Projects E and F have the same present worth.

5. The arithmetic gradient interest rate factor (F/G,i%,N) is equal to
   a. (A/F,i%,N)(P/G,i%,N)
   b. (A/P,i%,N)(A/G,i%,N)
   c. (F/A,i%,N)(A/G,i%,N)
   d. (P/A,i%,N)(A/F,i%,N)

(A/G)(F/A)

6. An effective rate of interest will exceed its corresponding nominal rate of interest when
   a. the frequency of within-year compounding exceeds 1.
   b. the life of a project tends to infinity.
   c. a project has a very short life.
   d. It cannot ezxceed its nominal rate.

Decision Criteria Table

DETAILS	PROJECT A	PROJECT B
Initial cost (last year)	120,000	n.a.
Current Market Value ($)	80,000	160,000
Economic Life (years)	5	10
Annual Revenue ($)	60,000	75,000
Annual Operating Cost ($)	30,000	20,000 at EOY1 followed by annual decreases of $500 (e.g., 19,500 in year 2; 19,000 in year 3, etc.)
Salvage Value ($)	-5,000	10,000
MARR (%)	10	10
Physical Life (years)	10	15

7. **Refer to the Decision Criteria Table.** Project A's Net Future Worth (after 5 years) is given by
   a. -120,000+(60,000-30,000)(P/A,10%,5)-5,000(P/F,10%,5)
   b. -120,000(P/F,i*%,5)+(60,000-30,000)(F/P,10%,5)-5,000
   c. -80,000+(60,000-30,000)(P/A,10%,5)-5,000(P/F,i*%,5)
   d. -80,000(A/P,i*%,5)+(60,000-30,000)-5,000(A/F,i*%,5)

8. **Refer to the Decision Criteria Table.** The incremental external rate of return (i**) between projects A and B is given by
   a. -80,000(P/F,i**,5)+(60,000-30,000)(F/A,i**,5)-5,000
      = -160,000(P/F,i**,10)+55,000(F/A,10%,10)+500(F/G,i**,10)+10,000
   b. -80,000[1+(P/F,10%,5)](F/P,i**,10)+30,000)(F/A,10%,10)-5,000[1+(F/P,10%,5)]
      = -160,000(F/P,i**,10)+55,000(F/A,10%,10)+500(F/G,i**,10)+10,000
   c. -120,000(P/F,i**,5)+(60,000-30,000)(F/A,i**,5)-5,000
      = -160,000+55,000(F/A,10%,10)+500(F/G,i**,10)+10,000
   d. -80,000(A/P,i**,5)+(60,000-30,000)(F/A,i**,5)-5,000
      = -160,000(P/F,i**,10)+55,000(F/A,10%,10)+500(F/G,i**,10)+10,000

9. **Refer to the Decision Criteria Table.** The incremental internal rate of return (i**) between projects A and B is given by
   a. -120,000(P/A,i**,5)+(60,000-30,000)(P/A,i**,5)-5,000(A/F,i**,5)
      = -160,000(A/P,i**,10)+(75,000-20,000)(P/A,i**,10)+500(P/G,i**,10)+10,000(P/F,i**,10)
   b. -120,000(P/A,i**,5)+(60,000-30,000)(P/A,i**,5)-5,000(A/F,i**,5)
      = -160,000(A/P,i**,10)+(75,000-20,000)(P/A,i**,10)+500(P/G,i**,10)+10,000(P/F,i**,10)
   c. -80,000(A/P,i**,5)+(60,000-30,000)-5,000(A/F,i**,5)
      = -160,000(A/P,i**,10)+75,000-20,000+500(A/G,i**,10)+10,000(A/F,i**,10)
   d. -80,000(A/P,i**,5)+(60,000-30,000)-5,000(A/F,i**,5)
      = -160,000(A/P,i**,10)+75,000-20,000+500(A/G,i**,10)+10,000(A/F,i**,10)

10. **Refer to the Decision Criteria Table.** Project B's Internal Rate of Return (i*) is given by
    a. Answers b. and c.
    b. -160,000(A/P,i*%,10)+(75,000-20,000)-500(A/G,i*%,10)-5,000(A/F,i*%,10) = 0
    c. -160,000(A/P,i*%,10)+(75,000-20,000)+500(A/G,i*%,10)-5,000(A/F,i*%,10) = 0
    d. -160,000+(75,000-20,000)(P/A,i*%,10)+500(P/G,i*%,10)-5,000(P/F,i*%,10) = 0

11. **Refer to the Decision Criteria Table.** Based on the Simple Payback Method, project B's opportu cost in the second year is
    a. 10,500
    b. 5,000
    c. 20,000

d. $0

12. **Refer to the Decision Criteria Table.** Project B's Annual Equivalent Worth (AEW) is given by
   a. -160,000(A/F,10%,10)+(75,000-20,000)-500(A/G,10%,10)-10,000(A/P,10%,10)
   b. -160,000(A/P,10%,10)+(75,000-20,000)-500(A/G,10%,10)+10,000(A/F,10%,10)
   c. -160,000(A/P,10%,10)+(75,000-20,000)+500(A/G,10%,10)+10,000(A/F,10%,10)
   d. -160,000+(75,000-20,000)(P/A,10%,10)-500(P/G,10%,10)+10,000(P/F,10%,10)

13. **Refer to the Decision Criteria Table.** Based on the Discounted Payback Method, project B's "project balance" at the end of the first year is
   a. -210,000
   b. $-121,000
   c. -55,000
   d. -160,000

14. **Refer to the Decision Criteria Table.** Based on the Simple Payback Method, project A's "project balance" at EOY2 is
   a. -60,000
   b. --120,000
   c. $-80,000
   d. -20,000

15. **Refer to the Decision Criteria Table.** Project A's External Rate of Return (i*) is given by
   a. -120,000(A/P,i*%,5)+(60,000-30,000)-5,000(A/F,i*%,5) = 0
   b. -120,000(F/P,i*%,5)+(60,000-30,000)(F/A,10%,5)-5,000 = 0
   c. -80,000(A/P,i*%,5)+(60,000-30,000)-5,000(A/F,i*%,5) = 0
   d. -80,000(F/P,i*%,5)+(60,000-30,000)(F/A,10%,5)-5,000(A/F,i*%,5) = 0

16. **Refer to the Decision Criteria Table.** Project B's Net Present Worth is given by
   a. -160,000(A/P,10%,10)+(75,000-20,000)+500(P/G,i*%,10)-5,000(P/F,i*%,10) = 0
   b. -160,000+(75,000-20,000)(P/A,10%,10)+500(P/G,i*%,10)-5,000(P/F,i*%,10) = 0
   c. -160,000(F/P,i*%,10)+(75,000-20,000)-500(P/A,i*%,10)-5,000(P/F,i*%,10) = 0
   d. -160,000+(75,000-20,000)(A/P,10%,10)+500(P/G,i*%,10)-5,000(P/F,i*%,10) = 0

17. What nominal rate of interest compounded quarterly is equivalent to a nominal rate of 24% compounded monthly (3rd decimal, no rounding)?
   a. 24.488%
   b. 26.824%
   c. 24.000%
   d. None of these nominal interest rates

18. If a rate of interest is 24% compounded quarterly, the effective (annual) rate of interest (2nd decimal, no rounding) is
   a. 26.24%
   b. 24.00%
   c. 6.00%

19. Assume a world without risk and inflation. You bought a financial asset for $20,000 which has a 10-year life and a rate of interest of 10% compounded annually. If you can reinvest the asset's annual interest income at 10% and your $20,000 investment is fully reimbursed after 5 years, the net present worth ($) of your investment is given by
   a. 20,000(F/P,10%,10)-20,000+20,000(0.10)(P/A,10%,10) = $20,000
   b. 20,000(A/P,10%,10)-20,000+20,000(0.10) = MARR
   c. 20,000(P/F,10%,10)-20,000+20,000(0.1)(P/A,10%,10) = $0
   d. 20,000(F/P,10%,10)-20,000+20,000(0.10) = MARR

20. The project analysis that focuses exclusively on a project's cash inflows (revenues) and outflows (expenses) is known as
   a. Multi-criteria Analysis
   b. Cost Effectiveness
   c. Financial Analysis
   d. Economic Analysis

21. The type of analysis that focuses on a project's impact on the economic well-being of a specific (predetermined) target population is known as
   a. Financial analysis
   b. Multi-criteria Analysis
   c. Economic analysis
   d. Cost effectiveness

22. The simple and discounted payback methods focus on a project's
   a. Profitability
   b. Fluidity
   c. Liquidity
   d. Equity

23. During calendar year 2019, project A generated net cash flows of $500 at the end of each quarter (each 3-month period). If the rate of interest was 12% compounded quarterly, the dollar value of the cash flows on January 1, 2019 would be given by

   a. 500(P/A,3%,4)
   b. 500(P/A,3%,4)(A/P,12%/3,12)
   c. 500(4)(P/A,12%,4)
   d. 500(4)

24. If a project's annual equivalent worth (AEW) is $0, its External Rate of Return (ERR) will be

   a. There is no relationship between a project's PW and its IRR.
   b. < MARR
   c. > MARR
   d. = MARR

25. The incremental IRR method is used to determine the better of valid projects A and B. Why should you select the "bigger" of projects A and B? Because

   a. the rate of return on the incremental cost of the "bigger" project < MARR.
   b. the rate of return on the incremental cost of the "bigger" project = MARR.
   c. the rate of return on the incremental cost of the "bigger" project = MARR.

26. If two (2) projects have equal recovery periods using the simple payback method, they must have the same net future worth (NFW).

   a. True
   b. False

27. The baseline for accepting or rejecting a project using the discounted payback method is

   a. MARR (%)
   b. 1
   c. Industry standard or threshold for the project.
   d. $0

28. If a rate of interest is 24% compounded monthly, the nominal annual rate of interest (2nd decimal, no rounding) is

   a. 26.82%
   b. 24.00%
   c. 2.00%
   d. 18.67%

29. The effective rate of interest

   a. increases with the frequency of within-year compounding.
   b. is insensitive to the frequency of within-year compounding.
   c. decreases with the frequency of within-year compounding.
   d. is sensitive to the duration (life) of a project.

30. The External Rate of Return (ERR) method assumes that a project's net cash inflows are reinvested at a predetermined interest rate (such as MARR).

   a. True
   b. False

31. *During calendar year 2019, project A generated uniform end-of-month (12) cash flows (12) of $2,000 beginning at the end of January. If the rate of interest was 24% compounded quarterly, the dollar value of project A's cash flows on January 1, 2019 would be given by*

   a. *2,000(4)(P/A,24%,4)*
   b. *2,000(P/A,x%,12) where "x%" is the effective monthly interest rate*
   c. 2,000(P/A,x%,4) where "x%" is the effective quarterly interest rate
   d. 2,000(P/A,x%,1) where "x%" is the effective annual interest rate

32. *You must use a common period of analysis with the Annual Equivalent Worth (AEW) method to determine the better of two valid projects with unequal lives.*

   a. *True*
   b. False

33. The opportunity cost recorded in the discounted payback method reflects

   a. the forgone expense due to the unrecovered first cost of a project.
   b. the investment income from the recovered first cost of a project.
   c. the forgone (lost) investment income from the unrecovered first cost of a project.
   d. the forgone expense due to the recovered first cost of a project.

34. The Discounted Payback Method is used to determine the better of projects A & B for which the industry threshold is 4 years. Your analysis shows that project A's recovery is 5 years and project B's recovery is 5.5 years. Which project would you select?

   a. Both A and B.
   b. A
   c. B
   d. Neither A nor B.

35. A project can have multiple external rates of return (ERR) but only one internal rate of return (IRR).

a. False

b. True

36. During calendar year 2019, project A generated uniform end-of-month (12) cash flows (12) of $2,000 beginning on January 31. If the rate of interest was 24% compounded annually, the dollar value of project A's cash flows on January 1, 2019 would be given by

2000 (P/A

a. 2,000(P/A,x%,12) where "x%" is the effective monthly interest rate
b. 2,000(P/A,24%,12)
c. 2,000(12)(P/A,24%,12)
d. 2,000(P/A,x%,1) where "x%" is the effective annual interest rate

37. If a project's IRR and MARR are equal, then MARR=IRR=ERR.
a. Depends on the project's pattern of annual cash flows.
b. Never.
c. Only if the project is of infinite duration (life).
d. Always

38. If MARR is positive (> 0%), a project's recovery period will
a. be shorter for the simple payback method than for the discounted method.
b. be longer for the simple payback method than for the discounted method.
c. depend on the project's salvage value.
d. be the same for the simple and discounted payback methods.

39. If a project's ERR > MARR, its Net Present Worth must exceed $0.
a. True
b. False

40. If a project's IRR > MARR, then IRR > ERR.
a. Only if the project is of infinite duration (life).
b. Never.
c. Depends on the project's pattern of annual cash flows.
d. Always

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IRR > MARR