

# Reading 35: Capital Budgeting

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## Question #1 of 56

Question ID: 414736

If a project has a negative cash flow during its life or at the end of its life, the project *most likely* has:

- ☐ A) a negative internal rate of return.
- ☒ B) more than one internal rate of return.
- ☐ C) multiple net present values.

### Explanation

Projects with unconventional cash flows (where the sign of the cash flow changes from minus to plus to back to minus) will have multiple internal rates of return. However, one will still be able to calculate a single net present value for the cash flow pattern.

### References

**Question From:** Session 10 > Reading 35 > LOS e

### **Related Material:**

- Key Concepts by LOS
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## Question #2 of 56

Question ID: 414739

The NPV profile is a graphical representation of the change in net present value relative to a change in the:

- ☐ A) prime rate.
- ☐ B) internal rate of return.
- ☒ C) discount rate.

### Explanation

As discount rates change the net present values change. The NPV profile is a graphic illustration of how sensitive net present values are to different discount rates. By comparison, every project has a single internal rate of return and payback period because the values are determined solely by the investment's expected cash flows.

### References

**Question From:** Session 10 > Reading 35 > LOS e

### **Related Material:**

- Key Concepts by LOS
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## Question #3 of 56

Question ID: 414695

Which of the following steps is *least likely* to be an administrative step in the capital budgeting process?

- ☐ A) Conducting a post-audit to identify errors in the forecasting process.

- X **B)** Forecasting cash flows and analyzing project profitability.
- ✓ **C)** Arranging financing for capital projects.

#### Explanation

Arranging financing is not one of the administrative steps in the capital budgeting process. The four administrative steps in the capital budgeting process are:

1. Idea generation
2. Analyzing project proposals
3. Creating the firm-wide capital budget
4. Monitoring decisions and conducting a post-audit

#### References

**Question From:** Session 10 > Reading 35 > LOS a

#### **Related Material:**

- Key Concepts by LOS

### **Question #4 of 56**

Question ID: 414725

Which of the following projects would have multiple internal rates of return (IRRs)? The cost of capital for all projects is 9.75%.

<i>Cash Flows</i>	<i>Blackjack</i>	<i>Roulette</i>	<i>Keno</i>
T <sub>0</sub>	-10,000	-12,000	-8,000
T <sub>1</sub>	10,000	7,000	4,000
T <sub>2</sub>	15,000	2,000	0
T <sub>3</sub>	-10,000	2,000	6,000

- X **A)** Projects Roulette and Keno.
- ✓ **B)** Project Blackjack only.
- X **C)** Projects Blackjack and Keno.

#### Explanation

The multiple IRR problem occurs if a project has non-normal cash flows, that is, the sign of the net cash flows changes from negative to positive to negative, or vice versa. For the exam, a shortcut to look for is the project cash flows changing signs more than once. Only Project *Blackjack* has this cash flow pattern. The 0 net cash flow in T<sub>2</sub> for Project Keno and likely negative net present value (NPV) for Project Roulette would not necessarily result in multiple IRRs.

#### References

**Question From:** Session 10 > Reading 35 > LOS e

#### **Related Material:**

- Key Concepts by LOS

## Question #5 of 56

Question ID: 414734

If the calculated net present value (NPV) is negative, which of the following must be CORRECT. The discount rate used is:

- ☐ A) less than the internal rate of return (IRR).
- ☐ B) equal to the internal rate of return (IRR).
- ☒ C) greater than the internal rate of return (IRR).

### Explanation

When the NPV = 0, this means the discount rate used is equal to the IRR. If a discount rate is used that is higher than the IRR, the NPV will be negative. Conversely, if a discount rate is used that is lower than the IRR, the NPV will be positive.

### References

**Question From:** Session 10 > Reading 35 > LOS e

### **Related Material:**

- Key Concepts by LOS

## Question #6 of 56

Question ID: 434325

An analyst has gathered the following data about a company with a 12% cost of capital:

	<i>Project P</i>	<i>Project Q</i>
Cost	\$15,000	\$25,000
Life	5 years	5 years
Cash inflows	\$5,000/year	\$7,500/year

If Projects P and Q are mutually exclusive, what should the company do?

- ☐ A) Accept Project Q and reject Project P.
- ☒ B) Accept Project P and reject Project Q.
- ☐ C) Reject both Project P and Project Q.

### Explanation

Project P:

$N = 5$ ;  $PMT = 5,000$ ;  $FV = 0$ ;  $I/Y = 12$ ;  $CPT PV = 18,024$

NPV for Project A =  $18,024 - 15,000 = 3,024$ .

Project Q:

$N = 5$ ;  $PMT = 7,500$ ;  $FV = 0$ ;  $I/Y = 12$ ;  $CPT PV = 27,036$

NPV for Project B =  $27,036 - 25,000 = 2,036$ .

For mutually exclusive projects, accept the project with the highest positive NPV. In this example the NPV for Project P (3,024) is higher than the NPV of Project Q (2,036). Therefore accept Project P.

### References

**Question From:** Session 10 > Reading 35 > LOS d

### **Related Material:**

- Key Concepts by LOS

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## Question #7 of 56

Question ID: 460659

A single independent project with a negative net present value has an initial cost of \$2.5 million and would generate cash inflows of \$1 million in each of the next three years. The discount rate the company used when evaluating this project is *closest* to:

- ✓ **A)** 10%.
- X **B)** 8%.
- X **C)** 9%.

### Explanation

Given that the NPV is negative, the discount rate used by the company evaluating the project must be greater than the IRR (the discount rate for which the NPV equals zero). On a financial calculator:  $CF_0 = -2.5$ ;  $CF_j = 1$ ;  $N_j = 3$ ; CPT IRR = 9.7%. Since the discount rate used for this project is greater than 9.7%, it must be closer to 10% than to either of the other answer choices.

### References

**Question From:** Session 10 > Reading 35 > LOS d

### **Related Material:**

- Key Concepts by LOS
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## Question #8 of 56

Question ID: 414724

Which of the following statements about independent projects is *least* accurate?

- X **A)** If the internal rate of return is less than the cost of capital, reject the project.
- ✓ **B)** The internal rate of return and net present value methods can yield different accept/reject decisions for independent projects.
- X **C)** The net present value indicates how much the value of the firm will change if the project is accepted.

### Explanation

For independent projects the IRR and NPV give the same accept/reject decision. For mutually exclusive projects the IRR and NPV techniques can yield different accept/reject decisions.

### References

**Question From:** Session 10 > Reading 35 > LOS e

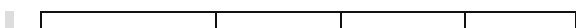
### **Related Material:**

- Key Concepts by LOS
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## Question #9 of 56

Question ID: 414738

Which of the following projects would *most likely* have multiple internal rates of return (IRRs)? The cost of capital for all projects is 10.0%.



<i>Cash Flows</i>	<i>South</i>	<i>East</i>	<i>West</i>
CF <sub>0</sub>	-15,000	-12,000	-8,000
CF <sub>1</sub>	10,000	7,000	4,000
CF <sub>2</sub>	-1,000	2,000	0
CF <sub>3</sub>	15,000	2,000	6,000

- ☐ **A)** Projects South and West.  
☐ **B)** Projects East and West.  
☒ **C)** Project South only.

#### Explanation

The multiple IRR problem occurs if a project has an unconventional cash flow pattern, that is, the sign of the cash flows changes more than once (from negative to positive to negative, or vice-versa). Only Project South has this cash flow pattern. Neither the zero cash flow for Project West nor the likely negative net present value for Project East would result in multiple IRRs.

#### References

**Question From:** Session 10 > Reading 35 > LOS e

#### **Related Material:**

- Key Concepts by LOS

## Question #10 of 56

Question ID: 414699

One of the basic principles of capital budgeting is that:

- ☐ **A)** cash flows should be analyzed on a pre-tax basis.  
☒ **B)** decisions are based on cash flows, not accounting income.  
☐ **C)** opportunity costs should be excluded from the analysis of a project.

#### Explanation

The five key principles of the capital budgeting process are:

1. Decisions are based on cash flows, not accounting income.
2. Cash flows are based on opportunity costs.
3. The timing of cash flows is important.
4. Cash flows are analyzed on an after-tax basis.
5. Financing costs are reflected in the project's required rate of return.

#### References

**Question From:** Session 10 > Reading 35 > LOS b

#### **Related Material:**

- Key Concepts by LOS

## Question #11 of 56

Question ID: 414730

Which of the following statements about the internal rate of return (IRR) and net present value (NPV) is *least* accurate?

- ✓ **A)** For mutually exclusive projects, if the NPV rankings and the IRR rankings give conflicting signals, you should select the project with the higher IRR.
- X **B)** The IRR is the discount rate that equates the present value of the cash inflows with the present value of the outflows.
- X **C)** The discount rate that causes the project's NPV to be equal to zero is the project's IRR.

### Explanation

The NPV method is always preferred over the IRR, because the NPV method assumes cash flows are reinvested at the cost of capital. Conversely, the IRR assumes cash flows can be reinvested at the IRR. The IRR is not an actual market rate.

### References

**Question From:** Session 10 > Reading 35 > LOS e

### **Related Material:**

- Key Concepts by LOS
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## Question #12 of 56

Question ID: 460661

A firm is evaluating two mutually exclusive projects of the same risk class, Project X and Project Y. Both have the same initial cash outlay and both have positive NPVs. Which of the following is a sufficient reason to choose Project X over Project Y?

- X **A)** Project Y has a lower internal rate of return than Project X.
- ✓ **B)** Project Y has a lower profitability index than Project X.
- X **C)** Project X has both a shorter payback period and a shorter discounted payback period compared to Project Y.

### Explanation

The correct method of choosing between two mutually exclusive projects is to choose the one with the higher NPV. The profitability index is calculated as the present value of the future cash flows divided by the initial outlay for the project. Because both projects have the same initial cash outlay, the one with the higher profitability index has both higher present value of future cash flows and the higher NPV. Ranking projects on their payback periods or their internal rates of return can lead to incorrect ranking.

### References

**Question From:** Session 10 > Reading 35 > LOS e

### **Related Material:**

- Key Concepts by LOS
- 

## Question #13 of 56

Question ID: 414698

Ashlyn Lutz makes the following statements to her supervisor, Paul Ulring, regarding the basic principles of capital budgeting:

Statement 1: The timing of expected cash flows is crucial for determining the profitability of a capital budgeting project.

Statement 2: Capital budgeting decisions should be based on the after-tax net income produced by the capital project.

Which of the following regarding Lutz's statements is *most* accurate?

<u>Statement 1</u>	<u>Statement 2</u>
--------------------	--------------------

- |                       |           |
|-----------------------|-----------|
| ✓ <b>A)</b> Correct   | Incorrect |
| X <b>B)</b> Incorrect | Correct   |
| X <b>C)</b> Correct   | Correct   |

#### Explanation

Lutz's first statement is correct. The timing of cash flows is important for making correct capital budgeting decisions. Capital budgeting decisions account for the time value of money. Lutz's second statement is incorrect. Capital budgeting decisions should be based on incremental after-tax cash flows, not net (accounting) income.

#### References

**Question From:** Session 10 > Reading 35 > LOS b

#### **Related Material:**

- Key Concepts by LOS
- 

### **Question #14 of 56**

Question ID: 414732

For a project with cash outflows during its life, the least preferred capital budgeting tool would be:

- X **A)** profitability index.
- ✓ **B)** internal rate of return.
- X **C)** net present value.

#### Explanation

The IRR encounters difficulties when cash outflows occur throughout the life of the project. These projects may have multiple IRRs, or no IRR at all. Neither the NPV nor the PI suffer from these limitations.

#### References

**Question From:** Session 10 > Reading 35 > LOS e

#### **Related Material:**

- Key Concepts by LOS
- 

### **Question #15 of 56**

Question ID: 414715

Which of the following statements about NPV and IRR is *least* accurate?

- ✓ **A)** For mutually exclusive projects you should use the IRR to rank and select projects.
- X **B)** For independent projects if the IRR is > the cost of capital accept the project.

- ☒ **C)** The NPV method assumes that all cash flows are reinvested at the cost of capital.

#### Explanation

For mutually exclusive projects you should use *NPV* to rank and select projects.

#### References

**Question From:** Session 10 > Reading 35 > LOS d

#### **Related Material:**

- Key Concepts by LOS
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### **Question #16 of 56**

Question ID: 485785

A company is considering two mutually exclusive investment projects. The firm's cost of capital is 12%. Each project costs \$7 million and the after-tax cash flows for each are as follows:

	<u>Project One</u>	<u>Project Two</u>
Year 1	\$6.6 million	\$3.0 million
Year 2	\$1.5 million	\$3.0 million
Year 3	\$0.1 million	\$3.0 million

Indicate which project should be accepted and whether the IRR and NPV methods would lead to the same decision.

Project accepted? Same decision?

- ☒ **A)** Project Two      Yes
- ☒ **B)** Project Two      No
- ☒ **C)** Project One      No

#### Explanation

The NPVs for Project One and Project Two are \$0.160 million and \$0.206 million, respectively, thus, Project Two should be selected. The IRRs for Projects One and Project Two are 14.2% and 13.7%, respectively. NPV is considered a superior method for ranking mutually exclusive projects.

#### References

**Question From:** Session 10 > Reading 35 > LOS e

#### **Related Material:**

- Key Concepts by LOS
- 

### **Question #17 of 56**

Question ID: 414742

The effect of a company announcement that they have begun a project with a current cost of \$10 million that will generate future cash flows with a present value of \$20 million is *most likely* to:

- ☒ **A)** increase the value of the firm's common shares by \$20 million.



- ✓ **B)** only affect value of the firm's common shares if the project was unexpected.
- X **C)** increase value of the firm's common shares by \$10 million.

#### Explanation

Stock prices reflect investor expectations for future investment and growth. A new positive-NPV project will increase stock price only if it was not previously anticipated by investors.

#### References

**Question From:** Session 10 > Reading 35 > LOS f

#### **Related Material:**

- Key Concepts by LOS

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### Question #18 of 56

Question ID: 414709

Which of the following statements about the discounted payback period is *least* accurate? The discounted payback:

- X **A)** method can give conflicting results with the NPV.
- ✓ **B)** period is generally shorter than the regular payback.
- X **C)** frequently ignores terminal values.

#### Explanation

The discounted payback period calculates the present value of the future cash flows. Because these present values will be less than the actual cash flows it will take a longer time period to recover the original investment amount.

#### References

**Question From:** Session 10 > Reading 35 > LOS d

#### **Related Material:**

- Key Concepts by LOS

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### Question #19 of 56

Question ID: 414731

Two projects being considered by a firm are mutually exclusive and have the following projected cash flows:

Year	Project 1 Cash Flow	Project 2 Cash Flow
0	-\$4.0	?
1	\$3.0	\$1.7
2	\$5.0	\$3.2
3	\$2.0	\$5.8

The crossover rate of the two projects' NPV profiles is 9%. What is the initial cash flow for Project 2?

- ✓ **A)** -\$4.22.

X B) -\$5.70.

X C) -\$4.51.

#### Explanation

The crossover rate is the rate at which the NPV for two projects is the same. That is, it is the rate at which the two NPV profiles cross. At a discount rate of 9%, the NPV of Project 1 is:  $CF_0 = -4$ ;  $CF_1 = 3$ ;  $CF_2 = 5$ ;  $CF_3 = 2$ ;  $I = 9\%$ ;  $CPT \rightarrow NPV = \$4.51$ . Now perform the same calculations except that we need to set the unknown  $CF_0 = 0$ . The remaining entries are:  $CF_1 = 1.7$ ;  $CF_2 = 3.2$ ;  $CF_3 = 5.8$ ;  $I = 9\%$ ;  $CPT \rightarrow NPV = \$8.73$ . Since by definition the crossover rate produces the same NPV for both projects, we know that both projects should have an  $NPV = \$4.51$ . Since the NPV of Project 2 (with  $CF_0 = 0$ ) is  $\$8.73$ , the unknown cash flow must be a large enough negative amount to reduce the NPV for Project 2 from  $\$8.73$  to  $\$4.51$ . Thus the unknown initial cash flow for Project 2 is determined as  $\$4.51 = \$8.73 + CF_0$ , or  $CF_0 = -\$4.22$ .

#### References

**Question From:** Session 10 > Reading 35 > LOS e

#### **Related Material:**

- Key Concepts by LOS
- 

### **Question #20 of 56**

Question ID: 460657

The greatest amount of detailed capital budgeting analysis is typically required when deciding whether to:

- X A) replace a functioning machine with a newer model to reduce costs.
- ✓ B) introduce a new product or develop a new market.
- X C) expand production capacity.

#### Explanation

Introducing a new product or entering a new market involves sales and expense projections that can be highly uncertain. Expanding capacity or replacing old machinery involves less uncertainty and analysis.

#### References

**Question From:** Session 10 > Reading 35 > LOS a

#### **Related Material:**

- Key Concepts by LOS
- 

### **Question #21 of 56**

Question ID: 414710

Landen, Inc. uses several methods to evaluate capital projects. An appropriate decision rule for Landen would be to invest in a project if it has a positive:

- X A) internal rate of return (IRR).
- X B) profitability index (PI).
- ✓ C) net present value (NPV).

#### Explanation

The decision rules for net present value, profitability index, and internal rate of return are to invest in a project if NPV > 0, IRR > required rate of return, or PI > 1.

#### References

**Question From:** Session 10 > Reading 35 > LOS d

**Related Material:**

- Key Concepts by LOS
- 

### Question #22 of 56

Question ID: 414701

The CFO of Axis Manufacturing is evaluating the introduction of a new product. The costs of a recently completed marketing study for the new product and the possible increase in the sales of a related product made by Axis are best described (respectively) as:

- ☐ A) opportunity cost; externality.
- ☐ B) externality; cannibalization.
- ☒ C) sunk cost; externality.

#### Explanation

The study is a sunk cost, and the possible increase in sales of a related product is an example of a positive externality.

#### References

**Question From:** Session 10 > Reading 35 > LOS b

**Related Material:**

- Key Concepts by LOS
- 

### Question #23 of 56

Question ID: 414733

When a company is evaluating two mutually exclusive projects that are both profitable but have conflicting NPV and IRR project rankings, the company should:

- ☐ A) accept the project with the higher internal rate of return.
- ☐ B) use a third method of evaluation such as discounted payback period.
- ☒ C) accept the project with the higher net present value.

#### Explanation

Net present value is the preferred criterion when ranking projects because it measures the firm's expected increase in wealth from undertaking a project.

#### References

**Question From:** Session 10 > Reading 35 > LOS e

**Related Material:**

- Key Concepts by LOS

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## Question #24 of 56

Question ID: 414702

If two projects are mutually exclusive, a company:

- ☐ A) can accept one of the projects, both projects, or neither project.
- ☒ B) can accept either project, but not both projects.
- ☐ C) must accept both projects or reject both projects.

### Explanation

Mutually exclusive means that out of the set of possible projects, only one project can be selected. Given two mutually exclusive projects, the company can accept one of the projects or reject both projects, but cannot accept both projects.

### References

**Question From:** Session 10 > Reading 35 > LOS c

### **Related Material:**

- Key Concepts by LOS
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## Question #25 of 56

Question ID: 414743

Polington Aircraft Co. just announced a sale of 30 aircraft to Cuba, a project with a net present value of \$10 million. Investors did not anticipate the sale because government approval to sell to Cuba had never before been granted. The share price of Polington should:

- ☐ A) not necessarily change because new contract announcements are made all the time.
- ☐ B) increase by the  $\text{NPV} \times (1 - \text{corporate tax rate})$  divided by the number of common shares outstanding.
- ☒ C) increase by the project NPV divided by the number of common shares outstanding.

### Explanation

Since the sale was not anticipated by the market, the share price should rise by the NPV of the project per common share. NPV is already calculated using after-tax cash flows.

### References

**Question From:** Session 10 > Reading 35 > LOS f

### **Related Material:**

- Key Concepts by LOS
- 

## Question #26 of 56

Question ID: 414696

Which of the following types of capital budgeting projects are *most likely* to generate little to no revenue?

- ☒ A) Regulatory projects.
- ☐ B) New product or market development.

- X **C)** Replacement projects to maintain the business.

#### Explanation

Mandatory regulatory or environmental projects may be required by a governmental agency or insurance company and typically involve safety-related or environmental concerns. The projects typically generate little to no revenue, but they accompany other new revenue producing projects and are accepted by the company in order to continue operating.

#### References

**Question From:** Session 10 > Reading 35 > LOS a

#### **Related Material:**

- Key Concepts by LOS
- 

### **Question #27 of 56**

Question ID: 414723

Which of the following is the *most* appropriate decision rule for mutually exclusive projects?

- X **A)** If the net present value method and the internal rate of return method give conflicting signals, select the project with the highest internal rate of return.
- X **B)** Accept both projects if their internal rates of return exceed the firm's hurdle rate.
- ✓ **C)** Accept the project with the highest net present value, subject to the condition that its net present value is greater than zero.

#### Explanation

The project that maximizes the firm's value is the one that has the highest positive NPV.

#### References

**Question From:** Session 10 > Reading 35 > LOS e

#### **Related Material:**

- Key Concepts by LOS
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### **Question #28 of 56**

Question ID: 414737

Which of the following statements about the internal rate of return (IRR) for a project with the following cash flow pattern is CORRECT?

- Year 0: -\$ 2,000
  - Year 1: \$10,000
  - Year 2: -\$ 10,000
- ✓ **A)** It has two IRRs of approximately 38% and 260%.
- X **B)** No IRRs can be calculated.
- X **C)** It has a single IRR of approximately 38%.

#### Explanation

The number of IRRs equals the number of changes in the sign of the cash flow. In this case, from negative to positive and then back to negative. Although 38% seems appropriate, one should not automatically discount the value of 260%.

Check answers by calculation:

$$10,000 \div 1.38 - 10,000 \div 1.38^2 = 1995.38$$

And:

$$10,000 \div 3.6 - 10,000 \div 3.6^2 = 2006.17$$

Both discount rates give NPVs of approximately zero and thus, are IRRs.

#### References

**Question From:** Session 10 > Reading 35 > LOS e

#### **Related Material:**

- Key Concepts by LOS

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### Question #29 of 56

Question ID: 414706

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 cost of capital is 10%. The payback period for this investment is *closest* to:

- X **A)** 6.12 years.
- ✓ **B)** 4.86 years.
- X **C)** 5.23 years.

#### Explanation

Years	0	1	2	3	4	5
Cash Flows	-\$150,000	\$30,000	\$30,000	\$30,000	\$30,000	\$35,000

\$150,000

$$\underline{120,000} (4 \text{ years})(30,000/\text{year})$$

\$30,000

With \$30,000 unrecovered cost in year 5, and \$35,000 cash flow in year 5;  $\$30,000 / \$35,000 = 0.86$  years

$$4 + 0.86 = 4.86 \text{ years}$$

#### References

**Question From:** Session 10 > Reading 35 > LOS d

#### **Related Material:**

- Key Concepts by LOS
-

## Question #30 of 56

Question ID: 414728

Which of the following statements regarding the net present value (NPV) and internal rate of return (IRR) is *least* accurate?

- ✓ **A)** For mutually exclusive projects, you must accept the project with the highest NPV regardless of the sign of the NPV calculation.
- ✗ **B)** For independent projects, the internal rate of return IRR and the NPV methods always yield the same accept/reject decisions.
- ✗ **C)** The NPV tells how much the value of the firm will increase if you accept the project.

### Explanation

If the NPV for two mutually exclusive projects is negative, both should be rejected.

### References

**Question From:** Session 10 > Reading 35 > LOS e

### **Related Material:**

- Key Concepts by LOS

## Question #31 of 56

Question ID: 434326

An analyst has gathered the following data about a company with a 12% cost of capital:

	<i>Project P</i>	<i>Project Q</i>
Cost	\$15,000	\$25,000
Life	5 years	5 years
Cash inflows	\$5,000/year	\$7,500/year

If the projects are independent, what should the company do?

- ✓ **A)** Accept both Project P and Project Q.
- ✗ **B)** Accept Project P and reject Project Q.
- ✗ **C)** Reject both Project P and Project Q.

### Explanation

Project P:  $N = 5$ ;  $PMT = 5,000$ ;  $FV = 0$ ;  $I/Y = 12$ ;  $CPT \rightarrow PV = 18,024$ ; NPV for Project A =  $18,024 - 15,000 = 3,024$ .

Project Q:  $N = 5$ ;  $PMT = 7,500$ ;  $FV = 0$ ;  $I/Y = 12$ ;  $CPT \rightarrow PV = 27,036$ ; NPV for Project B =  $27,036 - 25,000 = 2,036$ .

For independent projects the NPV decision rule is to accept all projects with a positive NPV. Therefore, accept both projects.

### References

**Question From:** Session 10 > Reading 35 > LOS d

### **Related Material:**

- Key Concepts by LOS

## Question #32 of 56

Question ID: 414719

A company is considering the purchase of a copier that costs \$5,000. Assume a cost of capital of 10 percent and the following cash flow schedule:

- Year 1: \$3,000
- Year 2: \$2,000
- Year 3: \$2,000

Determine the project's payback period and discounted payback period.

<u>Payback Period</u>	<u>Discounted Payback Period</u>
✓ <b>A)</b> 2.0 years	2.4 years
X <b>B)</b> 2.0 years	1.6 years
X <b>C)</b> 2.4 years	1.6 years

#### Explanation

Regarding the regular payback period, after 1 year, the amount to recover is \$2,000 (\$5,000 - \$3,000). After the second year, the amount is fully recovered.

The discounted payback period is found by first calculating the present values of each future cash flow. These present values of future cash flows are then used to determine the payback time period.

$$3,000 / (1 + .10)^1 = 2,727$$

$$2,000 / (1 + .10)^2 = 1,653$$

$$2,000 / (1 + .10)^3 = 1,503.$$

Then:

$$5,000 - (2,727 + 1,653) = 620$$

$$620 / 1,503 = .4.$$

$$\text{So, } 2 + 0.4 = 2.4.$$

#### References

**Question From:** Session 10 > Reading 35 > LOS d

**Related Material:**

- Key Concepts by LOS

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## Question #33 of 56

Question ID: 460658

The effects that the acceptance of a project may have on other firm cash flows are *best* described as:

- X **A)** pure plays.
- ✓ **B)** externalities.
- X **C)** opportunity costs.

#### Explanation



Externalities refer to the effects that the acceptance of a project may have on other firm cash flows. Cannibalization is one example of an externality.

#### References

**Question From:** Session 10 > Reading 35 > LOS b

**Related Material:**

- Key Concepts by LOS
- 

### Question #34 of 56

Question ID: 414741

Garner Corporation is investing \$30 million in new capital equipment. The present value of future after-tax cash flows generated by the equipment is estimated to be \$50 million. Currently, Garner has a stock price of \$28.00 per share with 8 million shares outstanding. Assuming that this project represents new information and is independent of other expectations about the company, what should the effect of the project be on the firm's stock price?

- ☐ A) The stock price will increase to \$34.25.
- ☒ B) The stock price will increase to \$30.50.
- ☐ C) The stock price will remain unchanged.

#### Explanation

In theory, a positive NPV project should provide an increase in the value of a firm's shares.

NPV of new capital equipment = \$50 million - \$30 million = \$20 million

Value of company prior to equipment purchase = 8,000,000 × \$28.00 = \$224,000,000

Value of company after new equipment project = \$224 million + \$20 million = \$244 million

Price per share after new equipment project = \$244 million / 8 million = \$30.50

Note that in reality, changes in stock prices result from changes in expectations more than changes in NPV.

#### References

**Question From:** Session 10 > Reading 35 > LOS f

**Related Material:**

- Key Concepts by LOS
- 

### Question #35 of 56

Question ID: 496831

A company is considering a \$10,000 project that will last 5 years.

- Annual after tax cash flows are expected to be \$3,000
- Cost of capital = 9.7%

What is the project's net present value (NPV)?

- ☐ A) -\$1,460.
- ☐ B) +\$11,460.
- ☒ C) +\$1,460.

### Explanation

Calculate the PV of the project cash flows

$$N = 5, PMT = -3,000, FV = 0, I/Y = 9.7, CPT \rightarrow PV = 11,460$$

Calculate the project NPV by subtracting out the initial cash flow

$$NPV = \$11,460 - \$10,000 = \$1,460$$

### References

**Question From:** Session 10 > Reading 35 > LOS d

**Related Material:**

- Key Concepts by LOS
- 

## Question #36 of 56

Question ID: 414708

Lincoln Coal is planning a new coal mine, which will cost \$430,000 to build, with the expenditure occurring next year. The mine will bring cash inflows of \$200,000 annually over the subsequent seven years. It will then cost \$170,000 to close down the mine over the following year. Assume all cash flows occur at the end of the year. Alternatively, Lincoln Coal may choose to sell the site today. What minimum price should Lincoln set on the property, given a 16% required rate of return?

- ✓ **A)** \$280,913.
- X **B)** \$325,859.
- X **C)** \$376,872.

### Explanation

The key to this problem is identifying this as a NPV problem even though the first cash flow will not occur until the following year. Next, the year of each cash flow must be properly identified; specifically:  $CF_0 = \$0$ ;  $CF_1 = -430,000$ ;  $CF_{2-8} = +\$200,000$ ;  $CF_9 = -\$170,000$ . One simply has to discount all of the cash flows to today at a 16% rate.  $NPV = \$280,913$ .

### References

**Question From:** Session 10 > Reading 35 > LOS d

**Related Material:**

- Key Concepts by LOS
- 

## Question #37 of 56

Question ID: 414705

Project sequencing is *best* described as:

- ✓ **A)** an investment in a project today that creates the opportunity to invest in other projects in the future.
- X **B)** prioritizing funds to achieve the maximum value for shareholders, given capital limitations.

- X **C)** arranging projects in an order such that cash flows from the first project fund subsequent projects.

#### Explanation

Projects are often sequenced through time so that investing in a project today may create the opportunity to invest in other projects in the future. Note that funding from the first project is not a requirement for project sequencing.

#### References

**Question From:** Session 10 > Reading 35 > LOS c

#### **Related Material:**

- Key Concepts by LOS

### **Question #38 of 56**

Question ID: 414729

Apple Industries, a firm with unlimited funds, is evaluating five projects. Projects A and B are independent and Projects C, D, and E are mutually exclusive. The projects are listed with their rate of return and NPV. Assume that the applicable discount rate is 10%.

<i>Project</i>	<i>Status</i>	<i>Rate of Return</i>	<i>Net Present Value</i>
A	Independent	14%	\$10,500
B	Independent	12%	\$13,400
C	Mutually Exclusive	11%	\$16,000
D	Mutually Exclusive	15%	\$14,000
E	Mutually Exclusive	12%	\$11,500

Rank the projects the firm should select.

- X **A)** Project A, Project B, and Project D.
- ✓ **B)** Project A, Project B, and Project C.
- X **C)** All projects should be selected.

#### Explanation

When it comes to independent projects, financial managers should select all with positive NPVs, resulting in inclusion of Project A and Project B. Remember that projects with positive NPVs will increase the value of the firm. Among mutually exclusive projects, financial managers would select the one with the highest NPV, in this case Project C. Although all projects have positive NPVs, only one of the latter three can be chosen. If the selection were based upon the internal rate of return, Project D would be chosen instead of Project C. This shows why NPV is the superior decision criteria because Project C is the investment that will cause the greatest increase to the value of the firm.

#### References

**Question From:** Session 10 > Reading 35 > LOS e

#### **Related Material:**

- Key Concepts by LOS

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### Question #39 of 56

Question ID: 414704

The Chief Financial Officer of Large Closeouts Inc. (LCI) determines that the firm must engage in capital rationing for its capital budgeting projects. Which of the following describes the *most likely* reason for LCI to use capital rationing? LCI:

- ☐ A) must choose between projects that compete with one another.
- ☒ B) has a limited amount of funds to invest.
- ☐ C) would like to arrange projects so that investing in a project today provides the option to accept or reject certain future projects.

#### Explanation

Capital rationing exists when a company has a fixed (maximum) amount of funds to invest. If profitable project opportunities exceed the amount of funds available, the firm must ration, or prioritize its funds to achieve the maximum value for shareholders given its capital limitations.

#### References

**Question From:** Session 10 > Reading 35 > LOS c

#### **Related Material:**

- Key Concepts by LOS

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### Question #40 of 56

Question ID: 414707

The process of evaluating and selecting profitable long-term investments consistent with the firm's goal of shareholder wealth maximization is known as:

- ☐ A) monitoring.
- ☒ B) capital budgeting.
- ☐ C) financial restructuring.

#### Explanation

In the process of capital budgeting, a manager is making decisions about a firm's earning assets, which provide the basis for the firm's profit and value. Capital budgeting refers to investments expected to produce benefits for a period of time greater than one year. Financial restructuring is done as a result of bankruptcy and monitoring is a critical assessment aspect of capital budgeting.

#### References

**Question From:** Session 10 > Reading 35 > LOS d

#### **Related Material:**

- Key Concepts by LOS

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### Question #41 of 56

Question ID: 414703

Rosalie Woischke is an executive with ColaCo, a nationally known beverage company. Woischke is trying to determine the firm's optimal capital budget. First, Woischke is analyzing projects Sparkle and Fizz. She has determined that both Sparkle and Fizz

are profitable and is planning on having ColaCo accept both projects. Woischke is particularly excited about Sparkle because if Sparkle is profitable over the next year, ColaCo will have the opportunity to decide whether or not to invest in a third project, Bubble. Which of the following terms *best* describes the type of projects represented by Sparkle and Fizz as well as the opportunity to invest in Bubble?

Sparkle and Fizz

Opportunity to invest in Bubble

- |   |                    |
|---|--------------------|
| X <b>A)</b> Independent projects        | Add-on project     |
| X <b>B)</b> Mutually exclusive projects | Project sequencing |
| ✓ <b>C)</b> Independent projects        | Project sequencing |

Explanation

Independent projects are projects for which the cash flows are independent from one another and can be evaluated based on each project's individual profitability. Since Woischke is accepting both projects, the projects must be independent. If the projects were mutually exclusive, only one of the two projects could be accepted. The opportunity to invest in Bubble is a result of project sequencing, which means that investing in a project today creates the opportunity to decide to invest in a related project in the future.

References

**Question From:** Session 10 > Reading 35 > LOS c

**Related Material:**

- Key Concepts by LOS

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**Question #42 of 56**

Question ID: 414700

Mason Webb makes the following statements to his boss, Laine DeWalt about the principles of capital budgeting.

Statement 1: Opportunity costs are not true cash outflows and should not be considered in a capital budgeting analysis.

Statement 2: Cash flows should be analyzed on an after-tax basis.

Should DeWalt agree or disagree with Webb's statements?

Statement 1

Statement 2

- |                      |          |
|----------------------|----------|
| X <b>A)</b> Agree    | Agree    |
| X <b>B)</b> Disagree | Disagree |
| ✓ <b>C)</b> Disagree | Agree    |

Explanation

DeWalt should disagree with Webb's first statement. Cash flows are based on opportunity costs. Any cash flows that the firm gives up because a project is undertaken should be charged to the project. DeWalt should agree with Webb's second statement. The impact of taxes must be considered when analyzing capital budgeting projects.

References

**Question From:** Session 10 > Reading 35 > LOS b

**Related Material:**

- Key Concepts by LOS
- 

**Question #43 of 56**

Question ID: 414716

As the director of capital budgeting for Denver Corporation, an analyst is evaluating two mutually exclusive projects with the following net cash flows:

Year	Project X	Project Z
0	-\$100,000	-\$100,000
1	\$50,000	\$10,000
2	\$40,000	\$30,000
3	\$30,000	\$40,000
4	\$10,000	\$60,000

If Denver's cost of capital is 15%, which project should be chosen?

- ☐ A) Project X, since it has the higher net present value (NPV).
- ☒ B) Neither project.
- ☐ C) Project X, since it has the higher IRR.

Explanation

NPV for Project X =  $-100,000 + 50,000 / (1.15)^1 + 40,000 / (1.15)^2 + 30,000 / (1.15)^3 + 10,000 / (1.15)^4$   
=  $-100,000 + 43,478 + 30,246 + 19,725 + 5,718 = -833$

NPV for Project Z =  $-100,000 + 10,000 / (1.15)^1 + 30,000 / (1.15)^2 + 40,000 / (1.15)^3 + 60,000 / (1.15)^4$   
=  $-100,000 + 8,696 + 22,684 + 26,301 + 34,305 = -8,014$

Reject both projects because neither has a positive NPV.

References

**Question From:** Session 10 > Reading 35 > LOS d

**Related Material:**

- Key Concepts by LOS
- 

**Question #44 of 56**

Question ID: 414711

Which of the following statements about the payback period is NOT correct?

- ☐ A) The payback period provides a rough measure of a project's liquidity and risk.
- ☐ B) The payback period is the number of years it takes to recover the original cost of the investment.
- ☒ C) The payback method considers all cash flows throughout the entire life of a project.

### Explanation

The payback period does not take any cash flows after the payback point into consideration.

### References

**Question From:** Session 10 > Reading 35 > LOS d

#### **Related Material:**

- Key Concepts by LOS
- 

## **Question #45 of 56**

Question ID: 414717

Tapley Acquisition, Inc., is considering the purchase of Tangent Company. The acquisition would require an initial investment of \$190,000, but Tapley's after-tax net cash flows would increase by \$30,000 per year and remain at this new level forever. Assume a cost of capital of 15%. Should Tapley buy Tangent?

- ✓ **A)** Yes, because the NPV = \$10,000.
- X **B)** No, because  $k > IRR$ .
- X **C)** Yes, because the NPV = \$30,000.

### Explanation

This is a perpetuity.

$$PV = PMT / I = 30,000 / 0.15 = 200,000$$

$$200,000 - 190,000 = 10,000$$

### References

**Question From:** Session 10 > Reading 35 > LOS d

#### **Related Material:**

- Key Concepts by LOS
- 

## **Question #46 of 56**

Question ID: 414740

When using net present value (NPV) profiles:

- ✓ **A)** one should accept all independent projects with positive NPVs.
- X **B)** one should accept all mutually exclusive projects with positive NPVs.
- X **C)** the NPV profile's intersection with the vertical y-axis identifies the project's internal rate of return.

### Explanation

Where the NPV intersects the vertical y-axis you have the value of the cash inflows less the cash outflows, assuming an absence of money having a time value (i.e., the discount rate is zero). Where the NPV intersects the *horizontal x-axis* you have the project's internal rate of return. At this cost of financing, the cash inflows and cash outflows offset each other. The NPV profile is a tool that graphically plots the project's NPV as calculated using different discount rates. Assuming an appropriate discount rate,

one should accept all projects with positive net present values, if the projects are independent. If projects are mutually exclusive select the one with the higher NPV at any given level of the cost of capital.

## References

**Question From:** Session 10 > Reading 35 > LOS e

## Related Material:

- Key Concepts by LOS

## Question #47 of 56

Question ID: 434324

Lane Industries has a project with the following cash flows:

Year	Cash Flow
0	-\$200,000
1	60,000
2	80,000
3	70,000
4	60,000
5	50,000

The project's cost of capital is 12%. The discounted payback period is *closest* to:

- X **A)** 3.4 years.
- ✓ **B)** 3.9 years.
- X **C)** 2.9 years.

## Explanation

The discounted payback period method discounts the estimated cash flows by the project's cost of capital and then calculates the time needed to recover the investment.

Year	Cash Flow	Discounted Cash Flow	Cumulative Discounted Cash Flow
0	-\$200,000	-\$200,000.00	-\$200,000.00
1	60,000	53,571.43	-146,428.57
2	80,000	63,775.51	-82,653.06
3	70,000	49,824.62	-32,828.44
4	60,000	38,131.08	5,302.64
5	50,000	28,371.30	33,673.98

discounted payback period = number of years until the year before full recovery +  $\frac{\text{unrecovered cost at the start of the last year}}{\text{discounted cash flow during the last year}}$

$$\text{Discounted payback} = 3 + \frac{32,828.44}{38,131.08} = 3.86 \text{ years}$$

## References

**Question From:** Session 10 > Reading 35 > LOS d



**Related Material:**

- Key Concepts by LOS
- 

**Question #48 of 56**

Question ID: 414735

Which of the following statements regarding the internal rate of return (IRR) is *most* accurate? The IRR:

- ☐ A) can lead to multiple IRR rates if the cash flows extend past the payback period.
- ☒ B) and the net present value (NPV) method lead to the same accept/reject decision for independent projects.
- ☐ C) assumes that the reinvestment rate of the cash flows is the cost of capital.

Explanation

NPV and IRR lead to the same decision for independent projects, not necessarily for mutually exclusive projects. IRR assumes that cash flows are reinvested at the IRR rate. IRR does not ignore time value of money (the payback period does), and the investor may find multiple IRRs if there are sign changes after time zero (i.e., negative cash flows after time zero).

References

**Question From:** Session 10 > Reading 35 > LOS e

**Related Material:**

- Key Concepts by LOS
- 

**Question #49 of 56**

Question ID: 414697

Financing costs for a capital project are:

- ☐ A) subtracted from the net present value of a project.
- ☒ B) captured in the project's required rate of return.
- ☐ C) subtracted from estimates of a project's future cash flows.

Explanation

Financing costs are reflected in a project's required rate of return. Project specific financing costs should not be included as project cash flows. The firm's overall weighted average cost of capital, adjusted for project risk, should be used to discount expected project cash flows.

References

**Question From:** Session 10 > Reading 35 > LOS b

**Related Material:**

- Key Concepts by LOS
- 

**Question #50 of 56**

Question ID: 460660

In a net present value (NPV) profile, the internal rate of return is represented as the:

- ☐ **A)** intersection of the NPV profile with the vertical axis.
- ☐ **B)** point where two NPV profiles intersect.
- ☒ **C)** intersection of the NPV profile with the horizontal axis.

#### Explanation

The internal rate of return is the rate of discount at which the NPV of a project is zero. On an NPV profile, this is the point where the profile intersects the horizontal axis.

#### References

**Question From:** Session 10 > Reading 35 > LOS e

#### **Related Material:**

- Key Concepts by LOS
- 

### **Question #51 of 56**

Question ID: 412846

Jack Smith, CFA, is analyzing independent investment projects X and Y. Smith has calculated the net present value (NPV) and internal rate of return (IRR) for each project:

Project X: NPV = \$250; IRR = 15%

Project Y: NPV = \$5,000; IRR = 8%

Smith should make which of the following recommendations concerning the two projects?

- ☒ **A)** Accept both projects.
- ☐ **B)** Accept Project X only.
- ☐ **C)** Accept Project Y only.

#### Explanation

The projects are independent, meaning that either one or both projects may be chosen. Both projects have positive NPVs, therefore both projects add to shareholder wealth and both projects should be accepted.

#### References

**Question From:** Session 10 > Reading 35 > LOS d

#### **Related Material:**

- Key Concepts by LOS
- 

### **Question #52 of 56**

Question ID: 414720

Edelman Engineering is considering including an overhead pulley system in this year's capital budget. The cash outlay for the pulley system is \$22,430. The firm's cost of capital is 14%. After-tax cash flows, including depreciation are \$7,500 for each of the next 5 years.

Calculate the internal rate of return (IRR) and the net present value (NPV) for the project, and indicate the correct accept/reject decision.

	<u>NPV</u>	<u>IRR</u>	<u>Accept/Reject</u>
X <b>A)</b>	\$15,070	14%	Accept
✓ <b>B)</b>	\$3,318	20%	Accept
X <b>C)</b>	\$15,070	14%	Reject

#### Explanation

Using the cash flow keys:

CF<sub>0</sub> = -22,430; CF<sub>j</sub> = 7,500; N<sub>j</sub> = 5; Calculate IRR = 20%

I/Y = 14%; Calculate NPV = 3,318

Because the NPV is positive, the firm should accept the project.

#### References

**Question From:** Session 10 > Reading 35 > LOS d

#### **Related Material:**

- Key Concepts by LOS

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## Question #53 of 56

Question ID: 414726

Which of the following statements about NPV and IRR is NOT correct?

- ✓ **A)** The NPV will be positive if the IRR is less than the cost of capital.
- X **B)** The IRR can be positive even if the NPV is negative.
- X **C)** When the IRR is equal to the cost of capital, the NPV equals zero.

#### Explanation

This statement should read, "The NPV will be positive if the IRR is *greater than* the cost of capital. The other statements are correct. The IRR can be positive (>0), but less than the cost of capital, thus resulting in a negative NPV. One definition of the IRR is the rate of return for which the NPV of a project is zero.

#### References

**Question From:** Session 10 > Reading 35 > LOS e

#### **Related Material:**

- Key Concepts by LOS

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## Question #54 of 56

Question ID: 414727

The underlying cause of ranking conflicts between the net present value (NPV) and internal rate of return (IRR) methods is the underlying assumption related to the:

- X **A)** cash flow timing.
- ✓ **B)** reinvestment rate.
- X **C)** initial cost.

#### Explanation

The IRR method assumes all future cash flows can be reinvested at the IRR. This may not be feasible because the IRR is not based on market rates. The NPV method uses the weighted average cost of capital (WACC) as the appropriate discount rate.

#### References

**Question From:** Session 10 > Reading 35 > LOS e

#### **Related Material:**

- Key Concepts by LOS

## **Question #55 of 56**

Question ID: 414718

A firm is reviewing an investment opportunity that requires an initial cash outlay of \$336,875 and promises to return the following irregular payments:

Year 1: \$100,000  
Year 2: \$82,000  
Year 3: \$76,000  
Year 4: \$111,000  
Year 5: \$142,000

If the required rate of return for the firm is 8%, what is the net present value of the investment? (You'll need to use your financial calculator.)

- X **A)** \$99,860.
- ✓ **B)** \$64,582.
- X **C)** \$86,133.

#### Explanation

In order to determine the net present value of the investment, given the required rate of return; we can discount each cash flow to its present value, sum the present value, and subtract the required investment.

Year	Cash Flow	PV of Cash flow at 8%
0	-336,875.00	-336,875.00
1	100,000.00	92,592.59
2	82,000.00	70,301.78
3	76,000.00	60,331.25
4	111,000.00	81,588.31
5	142,000.00	96,642.81
Net Present Value		64,581.74

#### References

Question From: Session 10 > Reading 35 > LOS d

Related Material:

- Key Concepts by LOS

Question #56 of 56

Question ID: 414712

A company is considering the purchase of a copier that costs \$5,000. Assume a cost of capital of 10 percent and the following cash flow schedule:

- Year 1: \$3,000
- Year 2: \$2,000
- Year 3: \$2,000

Determine the project's NPV and IRR.

	<u>NPV</u>	<u>IRR</u>
X A)	\$243	20%
✓ B)	\$883	20%
X C)	\$883	15%

Explanation

To determine the NPV, enter the following:

PV of \$3,000 in year 1 = \$2,727, PV of \$2,000 in year 2 = \$1,653, PV of \$2,000 in year 3 = \$1,503. NPV = (\$2,727 + \$1,653 + \$1,503) – \$5,000 = 883.

You know the NPV is positive, so the IRR must be greater than 10%. You only have two choices, 15% and 20%. Pick one and solve the NPV. If it is not close to zero, then you guessed wrong; select the other one.

$[3000 \div (1 + 0.2)^1 + 2000 \div (1 + 0.2)^2 + 2000 \div (1 + 0.2)^3] - 5000 = 46$  This result is closer to zero (approximation) than the \$436 result at 15%. Therefore, the approximate IRR is 20%.

References

Question From: Session 10 > Reading 35 > LOS d

Related Material:

- Key Concepts by LOS