## Question #1 of 62

Question ID: 1209256

Which of the following statements about sensitivity analysis is *least* accurate?

**A)** The steeper the slope of the NPV versus the variable, the more sensitive the output variable is to a change in the input variable.

**B)** Sensitivity analysis alters a single independent variable to determine the impact on the output variable.

**C)** Sensitivity analysis starts with the best-case scenario.

**Explanation**

In sensitivity analysis, you start with the "base-case" scenario. In this case, you use the company's projected cash flows as the inputs to calculate the net present value (NPV) of a project. Hopefully, supporters of a project are providing realistic information, although it may be on the optimistic side. In a "best-case" scenario, revenues would be excessively high, while expenses would be excessively low.

(Study Session 7, Module 19.2, LOS 19.d)

**Related Material**

SchweserNotes - Book 2

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## Question #2 of 62

Question ID: 1209259

Define sensitivity analysis and Monte Carlo simulation.

| | Sensitivity analysis is: | Monte Carlo simulation |
|---|---|---|
| **A)** | when a firm looks at the sensitivity of | uses historical |
| **B)** | when a firm looks at the sensitivity of | assumes a specified distribution |
| **C)** | when a firm looks at the sensitivity of | assumes a specified distribution |

**Explanation**

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Monte Carlo simulation assumes a specified distribution to generate random samples in order to estimate true distribution parameters.

When a firm looks at the sensitivity of only one variable, holding all others constant, they are performing sensitivity analysis.

(Study Session 7, Module 19.2, LOS 19.d)

**Related Material**

SchweserNotes - Book 2

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Zelda Haggerty was recently promoted to project manager at Verban Automation, a maker of industrial machinery. Haggerty's first task as project manager is to analyze capital-spending proposals.

The first project under review is a proposal for a new factory. Verban wants to build the plant on land it already owns in India. Below are details included on a fact sheet regarding the factory project:

- The initial outlay to the builder would be $85 million for the building. Verban would spend another $20 million on specialized equipment in the first year.
- The factory would open up new markets for Verban's products. Production should begin July 1 of the second year.
- Verban's tax rate is 34 percent.
- Verban expects the factory to generate $205 million in annual sales starting in the third year, with half of that amount in the second year.
- At the end of the sixth year, Verban expects the market value and the book value of the building to be worth $35 million, and the market value and the book value of the equipment to be worth $3.25 million. The building will be depreciated over 6 years. The equipment will be depreciated over 5 years. Depreciation expense will be $8.33 million in Year 1 and $11.68 in Years 2 through 6.
- Cash fixed operating costs are expected to be $65 million a year once the factory starts production.
- Variable operating costs should be 40 percent of sales.
- New inventories are likely to boost working capital by $7.5 million in the first year of production.
- Verban's cost of capital for the factory project is 14.3 percent.

Verban's chief of operations, Max Jenkins, attached a note containing some of his thoughts about the project. His comments are listed below:

- Comment 1: "We spent $5 million up front on an exclusive, 10-year maintenance contract for all of our equipment in Asia two years ago, before an earlier project was canceled. Your budget should reflect that."

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- Comment 2: "Some Asian clients are likely to switch over to the equipment from the new factory. They account for about $5 million a year in sales for the U.S. division. Your budget should reflect that."
- Comment 3: "I expect variable costs to take a one-time hit in Year 1, as we should plan for about $1.5 million in installation expense for the manufacturing equipment."
- Comment 4: "We bought the land allocated for this factory for $30 million in 1998. That money is long spent, so don't worry about including it in the budget analysis."

Haggerty is unimpressed with the advice she received from Jenkins and calculates cash flows and net present values using numbers from the fact sheet without taking any of the advice. She assumes all inflows and outflows take place at the end of the year.

Verban is also considering building two smaller, outdated factories, projects for which the cost of capital is 14.3 percent. Both of the remodeled factories would be replaced at the end of their useful lives and their cash flows are as follows:

| Project | Initial outlay | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 |
|---|---|---|---|---|---|---|
| A | −$30 million | $15 million | $17 million | $28 million | — | — |
| B | −50 million | $12 million | $15 million | $19 million | $22 million | $32 million |

Verban is willing to pursue one of the smaller new factories but not both. Haggerty decides which project makes the most sense and prepares models and recommendations for Verban's executives. Haggerty is concerned that her budgeting calculations do not accurately reflect inflation, and would like to modify her models to reflect expected inflation over the next five years. She is uncertain, however, how this would affect WACC, IRR, and NPV.

## Question #3 - 8 of 62

Question ID: 1209249

If Haggerty decides to properly allocate the maintenance, land-purchase, and equipment-installation expenses Jenkins claimed were connected with the new factory project, which of the following numbers on the capital-budgeting model will be *least likely* to change?

**A)** Year 4 depreciation.

**B)** Working capital.

**C)** The initial outlay.

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**Explanation**

Working capital will not be affected. The maintenance contract is a sunk cost and should not be included in the calculation. However, the use of the land is an opportunity cost, and should be included in the analysis. Land is not usually depreciable, so it will not affect depreciation. However, the installation expense for the specialized machinery will be added to the cost basis of the machinery, which will affect depreciation in every year after Year 1. While the land was not purchased at the same time cash is paid to the builder, the cost of the land can only be accounted for as part of the initial outlay. While the effect of the higher cost basis for the equipment has a very small effect on the project's NPV, the addition of $30 million in land costs to the initial outlay drops the NPV from positive to negative, changing the accept/reject recommendation.

(Study Session 7, Module 19.2, LOS 19.c)

**Related Material**

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## Question #4 - 8 of 62

Question ID: 1209250

Ignoring Jenkins's comments, in the last year of the new factory project, cash flows will be *closest* to:

**A)** $88.00 million.

**B)** $90.21 million.

**C)** $95.71 million.

**Explanation**

To calculate cash flows for Year 6, we must determine both the operating cash flow and the terminal value. Based on $205 million in sales, $65 million in fixed costs, variable costs equal to 40 percent of sales, and a 34 percent tax rate, the operating cash flow = ($205 − $65 − $82) × (1 − 34%) = $38.28 million. Depreciation = ($85 million for building − $35 million salvage value) / 6 + $20 million for equipment − $3.25 million salvage value) / 5 = $11.68. Operating cash flow = cash from factory operations + (depreciation × t) = $42.25 million.

The terminal value represents the salvage value of the building and equipment, adjusted for taxes, plus the return of the $7.5 million in working capital added in Year 2. Terminal value = ($35 million for the building + $3.25 million for the equipment) + $7.5 million for working capital = $45.75 million. Since the market value and book value of the building and equipment are the same, there is no taxable gain or loss, and no need for a tax adjustment in the terminal-value calculation.

Year 6 Cash flows = 42.25 + 45.75 = $88.00 million.

(Study Session 7, Module 19.2, LOS 19.c)

**Related Material**

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## Question #5 - 8 of 62

Question ID: 1209251

Which of the following statements about the effect of inflation on the capital-budgeting process is *most* accurate?

| | |
|---|---|
| Statement 1: | Inflation is reflected in the WACC, but future cash flows should still be adjusted when calculating the NPV. |
| Statement 2: | Inflation will cause the WACC to decrease. |
| Statement 3: | Incorporating inflation in the cash flows tends to exert downward pressure on the NPV. |
| Statement 4: | Because the IRR does not depend on the WACC, inflation has no effect on it. |

**A)** Statement 1 only. ✓

**B)** Statements 3 and 4. ✗

**C)** Statements 2 and 3. ✗

**Explanation**

Inflation causes the WACC to increase, so Statement 2 is false. Because the WACC reflects inflation, future cash flows must be adjusted to avoid a downward bias, so Statement 1 is true. Both the NPV and the IRR will tend to decline if cash flows are not adjusted — Statements 3 and 4 are false.

(Study Session 7, Module 19.2, LOS 19.c)

**Related Material**

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## Question #6 - 8 of 62

Question ID: 1209252

Jenkins advice is CORRECT with respect to:

**A)** Comment 2 only. ✓

**B)** Comment 4 only. ✗

**C)** Comments 1 and 2. ✗

**Explanation**

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Potential cannibalization of sales should be reflected in the budget, so Comment 2 is correct. The maintenance contract represents a sunk cost and should not be included in any capital budgeting, so Comment 1 is incorrect. Since the land could be used for another purpose, it represents an opportunity cost. The value of the land should be reflected in the budget, so Comment 4 is incorrect. Installation costs add to the purchase price of the equipment, increasing its depreciable basis over the life of the item. They should not be charged as a variable cost, so Comment 3 is incorrect.

(Study Session 7, Module 19.2, LOS 19.c)

**Related Material**

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## Question #7 - 8 of 62

Question ID: 1209253

Ignoring Jenkins's comments, in Year 2 of the new factory project, cash flows will be *closest* to:

**A)** $15.61 million.

**B)** $23.32 million.

**C)** $19.35 million.

**Explanation**

Verban begins selling products in the second half of Year 2, so sales and expenses are half of what is projected on an annual basis. $102.5 million in sales, $32.5 million in fixed costs and (102.5 × 0.4) = $41 million in variable expenses yield pretax cash flows of $29 million and after-tax cash flows of $19.14 million.

Depreciation = $11.68 million (given)

In Year 2, the first year of production, Verban also adds $7.5 million in working capital.

Cash flow = cash from factory operations + depreciation × t − additions to working capital = $15.61 million.

(Study Session 7, Module 19.2, LOS 19.c)

**Related Material**

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## Question #8 - 8 of 62

Question ID: 1209254

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Haggerty is using the equivalent annual annuity method, depending only on data from the cash-flow estimates for the remodeling projects. Which project should Haggerty recommend, and which of the following is closest to the difference between that project's EAA and that of the other project?

| | Project | EAA difference |
|---|---|---|
| **A)** | A | $0.88 million |
| **B)** | B | $1.23 million |
| **C)** | A | $2.34 million |

**Explanation**

In order to answer this question, we must determine the NPV for both projects:

Project A: NPV = 14.8865

Project B: NPV = 13.9963

Project A: PV = 14.8865; N = 3; I = 14.3; EAA= PMT = 6.44

Project B: PV = 13.9963; N = 5; I = 14.3; EAA = PMT = 4.10

(Study Session 7, Module 19.2, LOS 19.c)

**Related Material**

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## Question #9 of 62

Question ID: 1209262

If central bank actions caused the risk-free rate to increase, what is the *most* likely change to cost of debt and equity capital?

**A)** Both decrease.

**B)** Both increase.

**C)** One increase and one decrease.

**Explanation**

An increase in the risk-free rate will cause the cost of equity to increase. It would also cause the cost of debt to increase. In either case, the nominal cost of capital is the risk-free rate plus the appropriate premium for risk.

(Study Session 7, Module 19.2, LOS 19.e)

**Related Material**

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## Question #10 of 62

Question ID: 1209247

Jayco, Inc. is evaluating two mutually exclusive investment projects. Assume both projects can be repeated indefinitely. Printer A has a net present value (NPV) of $20,000 over a three-year life and Printer B has a NPV of $25,000 over a five-year life. The project types are equally risky and the firm's cost of capital is 12%. What is the equivalent annual annuity (EAA) of Project A and B?

| | Project A | Project B |
|---|---|---|
| **A)** | $8,327 | $5,326 |
| **B)** | $8,327 | $6,935 |
| **C)** | $7,592 | $6,935 |

**Explanation**

Printer A: PV = 20,000, N = 3, I = 12, FV = 0, Compute PMT = 8,327

Printer B: PV = 25,000, N = 5, I = 12, FV = 0, Compute PMT = 6,935.

(*Note: take the highest EAA, Printer A in this example*)

(Study Session 7, Module 19.2, LOS 19.c)

**Related Material**

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## Question #11 of 62

Question ID: 1209257

Which of the following statements about Monte Carlo simulation is *least* accurate? Monte Carlo simulation:

**A)** is capable of using probability distributions for variables as input data.

**B)** is the most accurate risk analysis tool because it is based on real data.

**C)** can be useful for estimating the stand-alone risk of a project.

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**Explanation**

Monte Carlo uses computer simulated data not real data to estimate risk. It can be a very useful tool when there is a very small sample size for analysis.

(Study Session 7, Module 19.2, LOS 19.d)

**Related Material**

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## Question #12 of 62

Question ID: 1209258

Which of the following statements about risk analysis techniques is *least* accurate?

**A)** Scenario analysis is a risk analysis technique that considers both the sensitivity of the dependent variable to changes in the independent variables and the

**B)** Sensitivity analysis is incomplete, because it fails to consider the probability distributions of the independent variables.

**C)** In sensitivity analysis, the dependent variable is plotted on the y-axis and the independent variable on the x-axis. The steeper the slope on the resulting line

**Explanation**

In sensitivity analysis, the dependent variable is plotted on the y-axis and the independent variable on the x-axis. The steeper the slope on the resulting line the *more* sensitive the dependent variable is to changes in the independent variable.

(Study Session 7, Module 19.2, LOS 19.d)

**Related Material**

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Liu is the proprietor of a small chain of print shops called Quik Printz, that has grown rapidly over the last few years. Much of the growth of Quik Printz has come from Liu's ability to provide a quick turnaround on fairly complex orders and from a dedicated staff of graphic designers.

Liu is considering replacing his current offset printing machine with a new cutting edge printing machine that would allow him to expand his range. The new machine would cost £200,000 and be used for a four-year period. If Liu decided to opt for the new machine the old machine could be sold on for £50,000 immediately. If Liu decides not to go ahead with the project the old machine would continue to be used for the next four years before finally being scrapped for £10,000.

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Liu uses straight-line depreciation for tax and accounting purposes and assumes no salvage value for accounting purposes. The old machine cost £80,000 and was originally expected to have an 8 year life. The old machine is now 4 years old and has a book value of £40,000. Liu expects the new machine to allow him to produce the 8-fold booklets which can fit in standard sized mailing envelopes. Liu has spent £5,000 on market research that has established that there is a significant market for this product. As a result of the machine Liu expects his yearly sales to be £1,250,000, where as if he continued to use the old machine sales would only be £950,000 per annum.

Naturally Liu expects this increase in revenues to have an impact on his cost base. Liu expects to have to invest a further £40,000 in working capital if he decided to adopt the new machine. Additionally the new machine will result in incremental cash operating expenses of £120,000 per annum.

At the end of its four-year operating life the new machine could be sold for £25,000.

Quik Printz is currently paying tax at a 40% rate and has a cost of capital of 15%. Liu assumes that the new machine will have similar risk to the firm and will be funded using the existing mix of debt and equity.

Liu makes a couple of comments to you regarding the impact of inflation on capital budgeting:

| | |
|---|---|
| Comment 1: | "In my estimates of operating cash flows I have included the impact of inflation on cash flows. Since I have used nominal cash flows I can discount them using a cost of capital that excludes inflation, such as a real rate" |
| Comment 2: | "The impact of inflation on the depreciation tax shield is that, while it is constant in nominal terms, it's likely to be reduced in real terms" |

Liu also wants to consider the stand-a-lone risk of the project and has decided to undertake Monte Carlo simulation. Liu asks you to help him clarify his understanding of the process and makes two comments:

| | |
|---|---|
| Comment 1: | "The whole process seems to be driven by assumed distributions for each of the inputs of the NPV calculation. The results I get from Monte Carlo are therefore likely to be affected by the mean and standard deviation that I assume for each of my inputs" |
| Comment 2: | "The process of randomly picking values for each input from their associated distribution is repeated many times with each simulation being used to calculate an NPV. After I've run the simulation many times I should then calculate the |

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mean of all possible NPVs and the standard deviation around that mean"

## Question #13 - 18 of 62

Question ID: 1209230

What would be the initial outlay at t=0 for the replacement project?

**A)** £240,000

**B)** £194,000

**C)** £190,000

**Explanation**

| | |
|---|---|
| New Machine (outflow) | −£200,000 |
| Scrap value of old machine (inflow) | + £50,000 |
| Tax on old machine (outflow) | − £4,000 |
| Working capital investment (outflow) | − £40,000 |
| Net cash flow | −£194,000 |

Note: Tax on old machine = 0.4 x (£50,000 - £40,000)

(Study Session 7, Module 19.1, LOS 19.a)

**Related Material**

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## Question #14 - 18 of 62

Question ID: 1209231

The after-tax operating cash flow for year 1 is *closest* to:

**A)** £124,000

**B)** £128,000

**C)** £222,000

**Explanation**

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After tax operating cash flows:

(S-C)(1-T) + (D x T)

Incremental cash sales – incremental operating expenses:

£300,000 - £120,000 = £180,000

Incremental depreciation:

New machine = £200,000/4 = £50,000 p.a.

Old machine = £80,000/8 = £10,000 p.a.

Incremental depreciation = £40,000

OCF = £180,000 (1-0.4) + (£40,000 x 0.4) = £124,000

(Study Session 7, Module 19.1, LOS 19.a)

**Related Material**

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## Question #15 - 18 of 62

Question ID: 1209232

The terminal year after-tax non-operating cash flow is *closest* to:

**A)** £49,000

**B)** £55,000

**C)** £69,000

**Explanation**

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| | |
|---|---|
| Terminal non-operating cash flows: | |
| Scrap value on new machine (inflow) | + £25,000 |
| Lost scrap on old machine (outflow) | − £10,000 |
| Return of working capital (inflow) | + £40,000 |
| Tax on sale of new machine (outflow) | − £10,000 |
| Saved tax on scrap of old machine (inflow) | + £4,000 |
| Terminal non-operating CF | £49,000 |

Note: If the project is accepted, the old machine is scrapped at t=0 and as a result we forgo the end of life scrap proceeds (and any tax issues).

Tax on new machine

(Sales Price – Book value) x 40%

(£25,000 - £0) x 0.4 = £10,000

Saved tax on old machine

(£10,000 - £0) x 0.4 = £4,000

$TNOCF = (Sal_{TNew} - Sal_{TOld}) + NWCInv - T[(Sal_{TNew} - B_{TNew}) - (Sal_{TOld} - B_{TOld})]$

= (£25,000 – £10,000) + £40,000 – 40%[(£25,000  £0) – (£10,000  £0)]

(Study Session 7, Module 19.1, LOS 19.a)

**Related Material**

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## Question #16 - 18 of 62

Question ID: 1209233

The NPV of Liu's replacement project is *closest* to:

**A)** £125,283

**B)** £188,033

**C)** £109,432

**Explanation**

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| | T0 | T1 | T2 | T3 | T4 |
|---|---|---|---|---|---|
| Outlay | (194,000) | | | | |
| Operating CF | | 124,000 | 124,000 | 124,000 | 124,000 |
| TNOCF | | | | | 49,000 |
| Totals | (194,000) | 124,000 | 124,000 | 124,000 | 173,000 |

Discounting these cash flows using a 15% discount rate gives an NPV of $188,033.23

(Study Session 7, Module 19.1, LOS 19.a)

**Related Material**

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## Question #17 - 18 of 62

Question ID: 1209234

Regarding Liu's statements about inflation and capital budgeting:

**A)** Both statements are correct

**B)** Both statements are incorrect

**C)** One statement is correct

**Explanation**

Statement 1 is false. If inflation is included in cash flows (nominal cash flows) then the discount rate should include inflation too (a nominal discount rate). If inflation is excluded from cash flows then inflation should be stripped out of the discount rate by using a real discount rate.

Statement 2 is correct. The depreciation tax shield is based on the historic cost of the assets and therefore does not increase with inflation. Most of the other cash flows will inflate and as a result the depreciation tax shield is proportionally smaller (i.e., it has decreased in real terms).

(Study Session 7, Module 19.1, LOS 19.a)

**Related Material**

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## Question #18 - 18 of 62

Question ID: 1209235

Regarding Liu's statements about Monte Carlo simulation:

**A)** One statement is correct

**B)** Both statements are incorrect

**C)** Both statements are correct

**Explanation**

Statement 1 is correct. For Monte Carlo simulations, key inputs are assumed distribution and their mean/standard deviation.

Statement 2 is correct. In a Monte Carlo simulation, large number of simulations are generated with each simulation based off of randomly generated input variables (from their underlying assumed distributions). For each simulation, a single point estimate NPV is computed. We can the calculate the mean NPV value and its standard deviation (as a measure of risk).

(Study Session 7, Module 19.1, LOS 19.a)

**Related Material**

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## Question #19 of 62

Question ID: 1209263

Takamura Motors is evaluating a new piece of equipment that will automatically install power windows in cars coming off the production line. The equipment cost is $3.5 million, and the firm estimates that the present value of the annual cost savings from installing the equipment is $2.8 million. The production manager is also considering purchasing a module that will allow the equipment to be used for Takamura's SUV production. The additional module represents a real option with a cost of $1.1 million dollars. The production manager estimates that adding the module would give Takamura cost savings of an additional $2.0 million.

What is the profitability of the project before and after considering the real option?

| | Before | After |
|---|---|---|
| **A)** | -$700,000 | $1,800,000 |
| **B)** | $1,300,000 | $200,000 |
| **C)** | -$700,000 | $200,000 |

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**Explanation**

The profitability of the project before considering the real option is the difference between the cost savings and the cost of the equipment, or 2.8 – 3.5 = -$700,000.

The profitability of the project after considering the real option = NPV (based on project alone) – cost of option + value of option. The cost of the option is $1.1 million, while the value of the option is $2.0 million. Profitability after option = -0.7 -1.1 + 2.0 = $200,000.

(Study Session 7, Module 19.3, LOS 19.f)

**Related Material**

SchweserNotes - Book 2

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## Question #20 of 62

Question ID: 1209241

Norine Benson is studying for the Level I CFA examination and is having difficulty with the broader concepts of capital budgeting. Her study partner, Henri Manz, tests her understanding by asking her to identify which of the following statements is *most* accurate?

**A)** An analyst can ignore inflation since price level expectations are built into the weighted average cost of capital (WACC).

**B)** Replacement decisions involve mutually exclusive projects.

**C)** For mutually exclusive projects, the decision rule is to pick the project that has the highest internal rate of return (IRR).

**Explanation**

Because replacement decisions involve either keeping the old asset *or* replacing the old asset, the projects are mutually exclusive.

The decision rule for mutually exclusive projects is to pick the project with the highest *positive* NPV. Only projects with positive NPV add to the company's value. If neither project has a positive NPV, neither project should be chosen. Because the WACC is adjusted for inflation, the analyst *must* adjust project cash flows upward to reflect inflation. If the cash flows are not adjusted for inflation, the NPV will be biased downward. (Reverse the preceding logic for deflation.)

(Study Session 7, Module 19.1, LOS 19.b)

**Related Material**

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## Question #21 of 62

Question ID: 1209267

Rachel Moore, an analyst with Dawson Corporation, is discussing a potential capital project with her colleague, Phillip Cora. The project involves producing a new product that will be sold in discount retail stores. If sales for the new product are favorable, Dawson has the ability to purchase new equipment for the existing production facility that will expand production to double its current rate. However, Moore is concerned that other companies may easily replicate the product and that low barriers to entry will reduce Dawson's profitability. If sales for the new product are disappointing after the first two years, Dawson has a potential buyer that will pay $2 million for the production facility. Moore explains these facts to Cora and asks him for help in computing an accurate net present value (NPV) for the project. Cora replies with the following statements:

| | |
|---|---|
| Statement 1: | You cannot compute a dollar value for the project that includes both the expansion option and the abandonment option, since only one of them can actually be exercised. |
| Statement 2: | Since you do not have any control over what is going on at other companies, you should not factor in the creation of competing products from other companies into your analysis, and focus totally on the incremental cash flows generated from our production of the product. |

How should Moore respond to Cora's statements?

**A)** Agree with neither.

**B)** Agree with one only.

**C)** Agree with both

**Explanation**

Moore should disagree with both of Cora's statements. Even though both the option to double production and the option to sell the production facility cannot be exercised simultaneously, they both add value to the project and should be both be considered in any analysis. Even if it is difficult to compute an exact dollar value for each option's contribution to the project, Moore can compute the value for the project without the options, and if the project does not already have a positive NPV, she can estimate whether the option values are enough to make the NPV positive. Cora's second statement is also incorrect. The reaction from competitors has a definite impact on the potential profitability of the project and must be considered in the analysis.

(Study Session 7, Module 19.3, LOS 19.g)

**Related Material**

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## Question #22 of 62

Question ID: 1209277

Firehouse Company is investing in a €300 million project that is being depreciated on a straight-line basis to zero over a two-year life with no salvage value. The project will generate operating earnings of €130 million each year for the two years. The Firehouse's weighted average cost of capital and required rate of return for the project is 10%. Firehouse's tax rate is 30%. What is Firehouse's economic profit for years 1 and 2?

| | Year 1 | Year 2 | |
|---|---|---|---|
| **A)** | €61 | €76 | ✓ |
| **B)** | €20 | €20 | ✗ |
| **C)** | €42 | €22 | ✗ |

**Explanation**

Note that this question is asking about economic profit, not economic income.

Economic profit is calculated as NOPAT - $WACC = EBIT(1-T) - $WACC

NOPAT = EBIT (1-Tax Rate) = €130 (1 - 0.3) = €91

$WACC Year 1 = 0.10 × €300 = €30

$WACC Year 2 = 0.10 × €150 = €15

Economic profit (Year 1) = €91 - €30 = €61

Economic profit (Year 2) = €91 - €15 = €76

(Study Session 7, Module 19.3, LOS 19.i)

**Related Material**

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## Question #23 of 62

Question ID: 1209213

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Karen Feasey, the Plant Manager of Industrial Coatings, is trying to decide whether to replace the old coatings machine with a new computerized machine. Her executive assistant gathers the following information:

*Company Assumptions:*

- Tax rate: 40%
- Weighted average cost of capital (WACC): 13%

*New Machine Assumptions:*

- Cost of (includes shipping and installation): $150,000
- Salvage value at end of year 5: $35,000
- Depreciation Schedule: MACRS 7-year, with depreciation rates in years 1-5 of 14%,25%, 17%, 13%, and 9%, respectively
- Purchase will initially increase current assets by $15,000 and will increase current liabilities by $10,000
- Impact on Operating Cash Flows Years 1-5 (includes depreciation and taxes): $28,000 (assume equal amount each year for simplicity)

*Old Machine Assumptions:*

- Sell old machine for current market value: $25,000
- Book value: $15,000

During the process of making the decision whether or not to replace the old machine, Feasey calculates the initial cash outlay as approximately:

**A)** $134,000. ✓

**B)** $155,000. ✗

**C)** $130,000. ✗

**Explanation**

The initial investment outlay is calculated as follows:

> cost of new machine + proceeds/loss from old machine + change in net working capital (NWC) = -$150,000 + $25,000 - $4,000 - $5,000 = **-$134,000***(cash outflow)*

Details of calculation:

- Cost of new machine = $150,000 *outflow*
- Sale of Old Machine:
  - Sales price = $25,000 *inflow*
  - Tax/tax credit: $4,000 *outflow*
    - = (Sales price – book value)*(tax rate) = (25,000 – 15,000)*0.4
- Change in NWC = $5,000 *outflow*
  - Δ NWC = Δ current assets - Δ current liabilities = 15,000 – 10,000 = 5,000

(Study Session 7, Module 19.1, LOS 19.a)

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**Related Material**

SchweserNotes - Book 2

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## Question #24 of 62

Question ID: 1209238

With respect to capital budgeting, expected inflation is accounted for in a net present value calculation by:

**A)** Using a nominal WACC and excluding inflation from expected cash flows.

**B)** Adjusting expected cash flows and using a nominal WACC in response to changes in inflation.

**C)** Excluding inflation from the calculation of the WACC and instead inflating the expected cash flows.

**Explanation**

A nominal WACC includes effects of inflation so the cash flows should also be adjusted for inflation (i.e., should be nominal cash flows).

(Study Session 7, Module 19.1, LOS 19.b)

**Related Material**

SchweserNotes - Book 2

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## Question #25 of 62

Question ID: 1209269

Which of the following is *most likely* to cause a problem when evaluating a capital budgeting project?

**A)** Including overhead costs in the total cost of a capital project.

**B)** Avoiding the use of IRR when evaluating mutually exclusive projects.

**C)** Taking on the pet projects of management without going through the complete capital budgeting process.

**Explanation**

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Pet projects that influential managers want the company to invest in will ideally receive the same scrutiny received by other investments. Another potential concern with management's pet projects is that overly optimistic projections will make the project appear more profitable than it really is. Note that using IRR for mutually exclusive projects will tend to steer management toward smaller, short term projects with high IRRs and may not lead management to the same decision as the more appropriate NPV method. Overhead costs are often difficult to estimate, but should be included in the cost of a capital project.

(Study Session 7, Module 19.3, LOS 19.g)

**Related Material**

SchweserNotes - Book 2

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## Question #26 of 62

Question ID: 1209260

Which of the following statements is *most* accurate?

**A)** A company that does not adjust the discount rate for differences in project risk is likely to accept an excessive number of low risk projects.

**B)** In a graphical depiction of sensitivity analysis, the project with the steeper line would be considered most risky, because a small error in estimating a variable,

**C)** The financial manager of a large corporation should view stand alone risk as most important because of its impact on debt capacity, credit worthiness, and

**Explanation**

The steeper the sensitivity analysis profile, the more important it is to accurately forecast that variable's true level. Financial managers are typically most sensitive to corporate, or within firm risk. Those companies not reducing required returns for projects with lower risk will end up accepting a higher number of *high risk* projects.

(Study Session 7, Module 19.2, LOS 19.d)

**Related Material**

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## Question #27 of 62

Question ID: 1209255

Which of the following simulation techniques computes as many as 1,000 net present values, based on multiple values for each cash flow?

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**A)** Sensitivity analysis.

**B)** Scenario analysis.

**C)** Monte Carlo simulation.

**Explanation**

Through the computation of multiple net present values, Monte Carlo simulation provides insight to the possible distribution of net present values arising from a project. Scenario analysis, on the other hand focuses on the worst case, best case, and base case. Sensitivity analysis inputs could be modified 1,000 times, but typically only one variable is changed at a time from the base case scenario.

(Study Session 7, Module 19.2, LOS 19.d)

**Related Material**

SchweserNotes - Book 2

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## Question #28 of 62

Question ID: 1209272

The *most* appropriate definition of economic income is:

**A)** cash flow minus economic depreciation.

**B)** accounting income minus economic depreciation.

**C)** cash flow.

**Explanation**

economic income = cash flow − economic depreciation

where:

economic depreciation = (beginning market value − ending market value)

Economic income is not the same as economic profit.

(Study Session 7, Module 19.3, LOS 19.h)

**Related Material**

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## Question #29 of 62

Question ID: 1209245

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In the absence of capital rationing, a firm should take on the most profitable investments first and keep expanding their investments to the point where the marginal:

**A)** return of the last investment equals the marginal cost of capital.

**B)** cost of debt equals the marginal cost of equity.

**C)** return of the last investment equals the risk free rate.

**Explanation**

The firm will generally invest in the most profitable projects first. Subsequent projects will have lower expected returns. As the amount of capital increases, the marginal cost of capital tends to rise. The firm should invest in new projects until the expected return is equal to the marginal cost of capital.

(Study Session 7, Module 19.2, LOS 19.c)

**Related Material**

SchweserNotes - Book 2

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## Question #30 of 62

Question ID: 1209214

Given the following information, what is the initial cash outflow?

| | |
|---|---|
| Purchase price of the new machine | 8,000 |
| Shipping and Installation charge | $2,000 |
| Sale price of old machine | $6,000 |
| Book value of old machine | $2,000 |
| Inventory increases if installed | $3,000 |
| Accounts payable increase if installed | $1,000 |
| Tax rate on Capital Gains | 25% |

**A)** -$7,000.

**B)** -$10,000.

**C)** -$3,000.

**Explanation**

-$10,000 for purchase price plus shipping and handling costs

+ 6,000 from cash sale of old machine

- 1,000 for capital gains taxes on old machine [(6,000 – 2,000)*.25]

- 2,000 cash outflow for change in Net Working Capital (-3,000 Inv+1,000 AP)

-$7,000

(Study Session 7, Module 19.1, LOS 19.a)

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**Related Material**

SchweserNotes - Book 2

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## Question #31 of 62

Question ID: 1209266

Sharon Kelley and Joyce Wening are discussing potential capital projects for the Flagstaff Corporation. Kelley is concerned about making errors in the capital budgeting decision making process and wants to take necessary steps to avoid such errors. In response to Kelley's concerns, Wening makes the following statements:

| | |
|---|---|
| Statement 1: | We should avoid including factors such as management time and information technology support since these are sunk costs that should not be attributed to the project. |
| Statement 2: | Once we have determined a set of profitable project options, we should stop considering other alternatives in order to focus our resources on making sure that we are not omitting relevant cash flows or double counting cash flows for our existing set of projects. |

**A)** Both are correct.

**B)** Both are incorrect.

**C)** Only one is correct.

**Explanation**

Wening's first statement is incorrect. Overhead costs are difficult quantify, but project costs should include any overhead costs that are attributable to a project. Wening's second statement is also incorrect. Failure to consider investment alternatives is a major capital budgeting pitfall. Generating good investment ideas is the most important step in the capital budgeting process. Managers need to make sure they are not avoiding the consideration of "better" projects simply because the existing project under consideration is "good."

(Study Session 7, Module 19.3, LOS 19.g)

**Related Material**

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## Question #32 of 62

Question ID: 1209265

Spencer Charlson, Executive Vice President for PWK Design, is considering purchasing a new computer system for the firm. Charlson believes that PWK would benefit from purchasing the system now, but also is aware that Macroware, a software developer is coming out with a new operating system that will available in three months. Charlson is unsure whether or not the new operating system would help PWK and decides to wait until the new operating system comes out before making a purchase. The computer system project Charlson is evaluating would be *best* described as having a(n):

**A)** flexibility option.

**B)** timing option.

**C)** fundamental option.

**Explanation**

Timing options allow a company to delay an investment with the hope of having better information in the future. Delaying an investment and basing the decision on the better information gained by waiting may improve the NPV of the overall project.

(Study Session 7, Module 19.3, LOS 19.f)

**Related Material**

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Jayco, Inc. is considering the purchase of a new machine for $60,000 that will reduce manufacturing costs by $5,000 annually.

- Jayco will use the MACRS accelerated method (5 year asset) to depreciate the machine, and expects to sell the machine at the end of its 6-year operating life for $10,000. (The percentages for the 5-year MACRS class are, beginning with year 1 and ending with year 6, 20%, 32%, 19%, 12%, 11%, and 6%.)
- The firm expects to be able to reduce net working capital by $15,000 when the machine is installed, but required working capital will return to the original level when the machine is sold after 6 years.
- Jayco's marginal tax rate is 40%, and the firm uses a 12% cost of capital to evaluate projects of this nature.

## Question #33 - 38 of 62

Question ID: 1209216

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What is the first year's modified accelerated cost recovery system (MACRS) depreciation?

**A)** $10,000.

**B)** $15,000.

**C)** $12,000.

**Explanation**

The first year MACRS depreciation equals 60,000 × 20%, or 60,000 × 0.2 = $12,000.

(Study Session 7, Module 19.1, LOS 19.a)

**Related Material**

SchweserNotes - Book 2

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## Question #34 - 38 of 62

Question ID: 1209217

The first year's incremental operating cash flow is *closest* to?

**A)** $3,000.

**B)** $4,800.

**C)** $7,800.

**Explanation**

The first year's incremental cash flow equals the after-tax impact of the $5,000 operating savings and the depreciation tax shield, or (5,000)(0.6) + (60,000)(0.2)(0.4) = 3,000 + 4,800 = 7,800.

(Study Session 7, Module 19.1, LOS 19.a)

**Related Material**

SchweserNotes - Book 2

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## Question #35 - 38 of 62

Question ID: 1209218

The initial cash outlay is *closest* to:

**A)** $57,000.

**B)** $75,000.

**C)** $45,000.

**Explanation**

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Initial cash outlay = up-front costs (including cost of the machine) and changes in working capital. Here, the price of the machine is 60,000 and the working capital initially decreases by 15,000 (which is a source of funds). Thus, the initial cash outlay = 60,000 cost − 15,000 working capital = 45,000.

(Study Session 7, Module 19.1, LOS 19.a)

**Related Material**

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## Question #36 - 38 of 62

Question ID: 1209219

What is the project's terminal year after-tax non-operating cash flow?

**A)** ($4,000).

**B)** $21,000.

**C)** ($9,000).

**Explanation**

Terminal cash flow = [salvage price] − (tax rate) × [salvage price − book value] ± reversal of change in working capital.

$$= 10{,}000 - (0.40) \times (10{,}000 - 0) - 15{,}000 = 10{,}000 - 4{,}000 - 15{,}000 = -9{,}000.$$

(Study Session 7, Module 19.1, LOS 19.a)

**Related Material**

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## Question #37 - 38 of 62

Question ID: 1209220

If the NPV using MACRS depreciation rates for this project is negative, changing the depreciation to a straight-line method will result in the sign of the computed NPV being:

**A)** different; as the NPV increases and the NPV is now positive.

**B)** the same; depreciation is non-cash and does not affect the NPV computation.

**C)** the same; as the NPV decreases and is less than the NPV computed under for tthe MACRS method.

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**Explanation**

An accelerated depreciation method such as the MACRS will result in a higher NPV compared to the NPV using a straight-line depreciation method due to higher tax savings in the earlier years. If MACRS depreciation results in a negative NPV for the project, straight-line depreciation would have made the NPV even lower and hence it will remain negative.

(Study Session 7, Module 19.1, LOS 19.a)

**Related Material**

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## Question #38 - 38 of 62

Question ID: 1209221

The *most* appropriate discount rate to be used for capital budgeting would be:

**A)** yield to maturity on the bonds issued to finance the project.

**B)** the firm's WACC.

**C)** the project's hurdle rate.

**Explanation**

Project's hurdle rate is the appropriate discount rate reflecting the project's risk. Firm's WACC reflects the firm's risk and not the project's risk. Cost of debt issued to finance the project reflects the overall risk of the firm and hence would also be inappropriate.

(Study Session 7, Module 19.1, LOS 19.a)

**Related Material**

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Alias, Inc. is a maker of plastic containers for the food and beverage industry. Bruce Atkinson, Alias' director of operations, is looking at upgrading the firm's manufacturing capacity in an effort to improve the firm's competitive position.

Atkinson is being assisted by Linda Ralston, a financial analyst recently hired by Alias. Over the last three months, Ralston and Atkinson have been going to trade shows and conducting other research on different machines and processes used in the plastic container industry. Ralston estimates that travel and hotel costs expended as a result of their research amounted to $8,000. Atkinson considers the money well spent because he now had two great ideas for improving Alias' competitiveness in the industry.

The first of these ideas is that Atkinson is considering replacing a bottle blow molding machine. This machine was purchased for $50,000 3 years ago and is being depreciated for

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tax purposes over 5 years to a zero salvage value using straight-line depreciation. The firm has 2 years of depreciation remaining on the old machine.

If Atkinson decides to make the replacement, the old machine can be sold today for $10,000. The new machine will cost the firm $100,000. According to Ralston's projections, the new machine will increase revenue by $40,000 per year for 3 years but will also increase costs by $5,000 per year. The machine will be depreciated over a modified accelerated cost recovery system (MACRS) 3-year class life. At the end of year 3, the equipment will be sold for $20,000. The firm's tax rate is 35%.

Atkinson is also considering an investment in a new silk screen labeling machine that can put labels on Alias plastic bottles as part of the manufacturing process. Ralston estimates that the new labeling machine will cost $50,000, and that shipping and installation costs will be $7,500. The addition of the labeling machine will require a $2,000 investment in spare parts inventory at the inception of the project, but these parts can be resold for $2,000 at the project's end. Compared with the manual process that Alias used to use for putting on labels, Ralston estimates that the new machine will reduce costs by $25,000 per year for 4 years. The labeling machine will be depreciated over a MACRS 5-year class life. At the end of year 4, the equipment will be sold for $8,000.

Depreciation schedules under MACRS are shown in the exhibit below:

| **Ownership Year** | **Class of Investment** | | | |
|---|---|---|---|---|
| | **3-Year** | **5-Year** | **7-Year** | **10-Year** |
| 1 | 33% | 20% | 14% | 10% |
| 2 | 45% | 32% | 25% | 18% |
| 3 | 15% | 19% | 17% | 14% |
| 4 | 7% | 12% | 13% | 12% |
| 5 | | 11% | 9% | 9% |
| 6 | | 6% | 9% | 7% |
| 7 | | | 9% | 7% |
| 8 | | | 4% | 7% |
| 9 | | | | 7% |
| 10 | | | | 6% |
| 11 | | | | 3% |
| | 100% | 100% | 100% | 100% |

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Before making the final calculations, Atkinson and Ralston discuss net present value analysis for the projects they are considering. Ralston tells Atkinson, "when calculating the net present value of the two new projects, we also need to account for the costs expended as a result of researching the project options." Atkinson makes a note on his legal pad and says to Ralston, "There is no need to make any adjustments for inflation in our estimations of future project cash flows because inflation is included as part of the expected returns used to calculate our weighted average cost of capital." After their conversation, Ralston and Atkinson prepare their report to present to Alias' CEO.

## Question #39 - 44 of 62

Question ID: 1209223

The initial investment outlay for purchasing the new bottle blow molding machine is *closest* to:

**A)** −$90,000.

**B)** −$100,000.

**C)** −$86,500.

**Explanation**

The initial outlay is the cost of the new machine minus the market value of the old machine plus/minus any tax consequences that arise from selling the old machine. The new machine's cost is $100,000.

The old machine can be sold for $10,000, however considering that the machine's initial cost was $50,000 and has 3 years of accumulated straight-line depreciation, the book value of the old machine is $50,000 − (3 × 10,000) = $20,000. This means that the sale of the machine will result in a (10,000 − 20,000) = −10,000 loss. The loss will result in tax savings for Alias equal to 0.35 × 10,000 = $3,500.

The total initial investment outlay for the new machine is:

−$100,000 + 10,000 + 3,500 = −$86,500

(Study Session 7, Module 19.1, LOS 19.a)

**Related Material**

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## Question #40 - 44 of 62

Question ID: 1209224

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The year 1 operating cash flow for the new bottle blow molding machine is *closest* to:

**A)** $34,300.

**B)** $22,750.

**C)** $30,800.

**Explanation**

The operating cash flows equal the after-tax benefit plus the tax savings from depreciation. In the case of a replacement project, you must take the difference between the additional depreciation from the new asset minus the lost depreciation from the old asset. The firm gave up $10,000 per year for of depreciation on the old asset for years 1 and 2 of the new asset's life.

$$CF1 = (\text{revenue} - \text{cost})1 \times (1 - \text{tax rate}) + \text{net depreciation}1 \times (\text{tax rate})$$

$$((40{,}000 - 5{,}000) \times 0.65) + [((0.33 \times 100{,}000) - 10{,}000) \times (0.35)] = \$30{,}800$$

(Study Session 7, Module 19.1, LOS 19.a)

**Related Material**

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## Question #41 - 44 of 62

Question ID: 1209225

The total cash flow from the bottle blow molding machine in year 3 is *closest* to:

**A)** $48,000.

**B)** $43,450.

**C)** $28,000.

**Explanation**

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The total cash flow for the terminal year is equal to the operating cash flow plus the non-operating (or terminating) cash flow.

The operating cash flow equals:

CF3 = (revenue − cost)3 × (1 − tax rate) + net depreciation3 × (tax rate)

((40,000 – 5,000) × 0.65) + [((0.15 × 100,000) − 0) × 0.35)] = $28,000

The non-operating cash flow equals the market or salvage value plus/minus tax consequences of selling it. The new machine will be sold for $20,000. The book value after 3 years of depreciation is $100,000 × (1.00 - 0.33 - 0.45 - 0.15) = $7,000. So, the gain equals $20,000 – $7,000 = $13,000.

The firm will pay taxes on the gain of:

13,000 × 0.35 = $4,550

Total terminal year cash flow = $28,000 + $20,000 – $4,550 = $43,450

~~Note: Once we have the~~ project's estimated cash flows, the next step in the process would be to calculate the net present value and internal rate of return for the project.

(Study Session 7, Module 19.1, LOS 19.a)

**Related Material**

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## Question #42 - 44 of 62

Question ID: 1209226

The initial cash flow for the labeling machine is *closest* to:

**A)** −$57,500.

**B)** −$59,500.

**C)** −$50,000.

**Explanation**

The initial outlay is the cost of the labeling machine, the shipping and installation costs, and the increase in net working capital (in this case the increase in spare parts inventory):

(−$50,000) + (−$7,500) + (−$2,000) = −$59,500.

(Study Session 7, Module 19.1, LOS 19.a)

**Related Material**

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## Question #43 - 44 of 62

Question ID: 1209227

The year 2 operating cash flow for the labeling machine is *closest* to:

**A)** $34,650.

**B)** $22,690.

**C)** $21,040.

**Explanation**

The operating cash flows equal the after-tax benefit plus the tax savings from depreciation.

$$CF2 = Benefit2 \times (1 - \text{tax rate}) + depreciation2 \times (\text{tax rate})$$

$$(\$25{,}000 \times 0.65) + (\$57{,}500 \times 0.32 \times 0.35) = \$22{,}690$$

Note that the shipping and installation costs are part of the depreciable basis for the machine.

(Study Session 7, Module 19.1, LOS 19.a)

**Related Material**

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## Question #44 - 44 of 62

Question ID: 1209228

With regard to the conversation between Ralston and Atkinson concerning NPV analysis:

**A)** Ralston's statement is incorrect; Atkinson's statement is incorrect.

**B)** Ralston's statement is correct; Atkinson's statement is incorrect.

**C)** Ralston's statement is incorrect; Atkinson's statement is correct.

**Explanation**

The hotel and travel costs expended to research the projects would be expended whether Alias decided to take on the projects or not. The research costs are a sunk cost, which is a cash outflow that has previously been committed or has already occurred. Since these costs are not incremental, they should not be included as part of the analysis. Therefore Ralston's statement is incorrect.

Atkinson's statement is also incorrect. Although it is true that the expected inflation is built into the expected returns used to calculate the weighted average cost of capital, Atkinson and Ralston still need to adjust the project cash flows upward to account for inflation. If no adjustments are made to the project cash flows to account for inflation, the NPV will be biased downward.

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(Study Session 7, Module 19.1, LOS 19.a)

**Related Material**

## Question #45 of 62

Question ID: 1209264

Michael Fullen is discussing the evaluation of capital budgeting projects with his coworker, Katina Katzenmoyer. During conversation, Katzenmoyer makes the following statements regarding the determination of real option values:

| | |
|---|---|
| Statement 1: | For independent projects, an analyst must determine a value for the real option that is separate from the project regardless of the profitability of the project. |
| Statement 2: | Abandonment options can be valuable, but should only be exercised when the abandonment value is greater than the discounted present value of the remaining cash flows of the project. |

Are the statements made by Katzenmoyer correct?

**A)** Only one is correct.

**B)** Both are correct.

**C)** Both are incorrect.

**Explanation**

Fullen should disagree with Katzenmoyer's first statement. The value of a real option is always positive. For an independent project, if the project is already profitable, a manager can accept the project simply knowing that the real option will simply add to the profitability without determining a separate value for the option.

Fullen should agree with Katzenmoyer's second statement. An abandonment option should be exercised when the abandonment value for a project is greater than the discounted present value of the remaining cash flows from the project.

(Study Session 7, Module 19.3, LOS 19.f)

**Related Material**

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## Question #46 of 62

Question ID: 1209271

Which of the following expressions is the *least* accurate calculation for economic income?

**A)** Economic income = cash flow - dollar weighted average cost of capital.

**B)** Economic income = cash flow - (beginning market value - ending market value).

**C)** Economic income = cash flow + change in market value.

**Explanation**

Economic income is defined as the after tax cash flow plus the change in market value of an investment. The change in market value can also be expressed as economic depreciation. Note that the dollar weighted average cost of capital is a term associated with economic profit, which is a different concept from economic income.

(Study Session 7, Module 19.3, LOS 19.h)

**Related Material**

SchweserNotes - Book 2

## Question #47 of 62

Question ID: 1209276

Paul Ulring, Chief Executive Officer of Arlington Machinery, has asked Sara Trafer about the benefits of using a variety of valuation models for evaluating capital projects. In response to Ulring's questions, Trafer makes the following statements:

| | |
|---|---|
| Statement 1: | The economic profit, residual income, and claims valuation methods of valuation should all result in the same valuation for an asset or project, despite the use of different discounts rates in the calculations. |
| Statement 2: | The claims valuation and economic profit valuation models both include cash flows that will flow to debt holders, and the cost of debt is a factor in both calculations. |

Which is CORRECT regarding Trafer's statements?

**A)** Only one is correct.

**B)** Both are incorrect.

**C)** Both are correct.

**Explanation**

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Trafer's first statement is correct. In theory, all three of the different valuation approaches should lead to the same result, despite the economic profit method using the WACC, the residual income method using the cost of equity, and the claims valuation approach separately using the cost of debt and cost of equity as discount rates. Trafer's second statement is also correct. The claims valuation approach looks at cash flows to equity holders and debt holders separately, while the economic profit method looks at cash flows from the perspective of all suppliers of capital, so debt holders' concerns are included in both methods. Also, the discount rate used with the economic profit method is the WACC, while the claims valuation approach considers the cost of equity and the cost of debt separately, so the cost of debt is a factor in both calculations.

(Study Session 7, Module 19.3, LOS 19.i)

**Related Material**

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## Question #48 of 62

Question ID: 1209274

Jackson Huang is an analyst for Oswald Technologies. Huang is considering a $150 million capital project that is expected to produce operating earnings before interest and taxes of $80 million per year for all three years of the project's life. The project is being depreciated on a straight-line basis and at the end of 3 years the project will have zero salvage value. Huang believes the project is an average risk project for the firm and is planning to apply Oswald's weighted average cost of capital (WACC) of 8% and tax rate of 30% to the project. Huang's supervisor has asked him to use both the economic income and economic profit approaches to analyze the project. After completing his analysis, Huang makes the following statements to his supervisor.

| | |
|---|---|
| Statement 1: | In the first year of the project's life, the economic income exceeds the economic profit generated from the project. |
| Statement 2: | The discount rate applied to the economic profit to calculate the project's net present value (NPV) will be identical to the economic rate of return earned by the project each year. |

How should Huang's supervisor respond to his statements?

**A)** Agree with neither.

**B)** Agree with both.

**C)** Agree with one only.

**Explanation**

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To answer the first question, we need to calculate the economic income and economic profit for the first year of the project. Economic income is the after-tax cash flow plus the change in market value for an investment.

> Cash flow = operating income (1 − T) + depreciation = $80(1 − 0.30) + $50 = $106 million.

Next determine the current market value of the project as: (106 / 1.08) + (106 / $1.08^2$) + (106 / $1.08^3$) = $273.17 million. The value after Year 1 = (106 / 1.08) + (106 / $1.08^2$) = $189.03 million. The change in market value = (273.17 − 189.03) = $84.4 million. The economic income is $106 − $84.4 = $21.86 million.

> Economic profit = NOPAT − $WACC = EBIT(1 − T) − $WACC

> Economic profit (Year 1) = $80(1 − 0.30) − 0.08($150) = $44 million

Huang's supervisor should disagree with the first statement as the economic profit of $44 million exceeds the economic income of $22 million.

Huang's supervisor should agree with the second statement. The discount rate applied to the economic profit to determine the project's NPV is the WACC. The economic rate of return using the economic income approach will be equal to the WACC, so the rates are identical. We can take the first year's economic income divided by the market value of the project and see that the economic rate of return is the same as the WACC. ($22 / $273) = 0.08, or 8%.

(Study Session 7, Module 19.3, LOS 19.h)

**Related Material**

SchweserNotes - Book 2

## Question #49 of 62

Question ID: 1209270

Firehouse Company is investing in a €300 million project that is being depreciated on a straight-line basis over a two-year life with no salvage value. The project will generate operating earnings of €130 million each year for the two years. The required rate of return for the project is 10% and Firehouse's tax rate is 30%. What is Firehouse's economic income for years 1 and 2?

| | Year 1 | Year 2 |
|---|---|---|
| **A)** | €61 | €76 |
| **B)** | €42 | €22 |
| **C)** | -€20 | -€20 |

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**Explanation**

Note that this question is asking about economic income, not economic profit.

First, determine the after-tax cash flow for Years 1 and 2 as:

Cash flow = operating income (1-T) + depreciation = €130 (1 - 0.30) + 150 = €241

Next, determine the current market value of the project as:

Market value = $(241 / 1.10^2) + (241 / 1.10^1)$ = €418; market value after year 1 = $(241 / 1.10^1)$ = €219

Constructing a table, we see that the economic income for years 1 and 2 are €42 and €22 respectively. Note also that the economic rate of return is equal to the required return on the project.

| | ***Year 1*** | ***Year 2*** |
|---|---|---|
| Beginning market value | €418 | €219 |
| Ending market value | 219 | 0 |
| Change in market value | -199 | -219 |
| After-tax cash flow | 241 | 241 |
| Economic income | €42 | €22 |
| Economic rate of return | 10% | 10% |

(Study Session 7, Module 19.3, LOS 19.h)

**Related Material**

SchweserNotes - Book 2

## Question #50 of 62

Question ID: 1209240

With respect to capital budgeting and measuring net present value, to avoid biases from an increase in expected inflation, an analyst should revise:

**A)** both weighted average cost of capital (WACC) and cash flows up.

**B)** weighted average cost of capital (WACC) down and cash flows up.

**C)** weighted average cost of capital (WACC) up and cash flows down.

**Explanation**

Required rates of return on investments generally exceed inflation. An increase in expected inflation will generally increase the required return on equity and debt; therefore, the WACC will rise as inflation rises. To avoid a downward bias on net present value, cash flows should be adjusted up to reflect inflation effects.

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(Study Session 7, Module 19.1, LOS 19.b)

**Related Material**

SchweserNotes - Book 2

## Question #51 of 62

Question ID: 1209244

Suppose that a firm cannot invest in all of the projects that have a higher return than the associated required rate of return. The firm must engage in:

**A)** cannibalization.

**B)** capital rationing.

**C)** top-down investing.

**Explanation**

If a firm cannot invest in all the profitable projects available, the managers must engage in capital rationing and allocate available funds to the best projects. Cannibalization occurs when sales of one product of a company take customers or sales away from another product of the company. Top-down investing is an approach to investing that begins with macroeconomic forecasts.

(Study Session 7, Module 19.2, LOS 19.c)

**Related Material**

SchweserNotes - Book 2

## Question #52 of 62

Question ID: 1209275

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Charles Waller, a financial analyst for Vandon Pharmaceuticals, is evaluating a potential capital project for the firm. Waller's favorite capital budgeting approach is the residual income method, which he decides to use for this project. In order to help with his analysis, Waller has compiled financial information concerning the project for 2006.

**Project Income Statement 2006**

| | |
|---|---|
| Revenues | $56,000 |
| Variable Expenses | $25,800 |
| Fixed expenses | $6,000 |
| Depreciation | $8,000 |
| EBIT | $16,200 |
| Interest expense | $5,000 |
| EBT | $11,200 |
| Taxes (40%) | $4,480 |
| **Net Income** | **$6,720** |

**Project Balance Sheet 2005**

| | |
|---|---|
| Cost of Project | $80,000 |
| **Total Assets** | **$80,000** |
| *Project Financing* | |
| Debt | $32,000 |
| Equity | $48,000 |
| **Total Liabilities and Equity** | **$80,000** |

Vandon Pharmaceuticals has an after-tax cost of debt of 6.0% and a cost of equity of 12.0%. Vandon's target capital structure is 60% equity and 40% debt. Based on Waller's information, what is the residual income for 2006, and what is the proper discount for Waller to use when finding the NPV of the investment?

| | Residual income | Proper discount rate |
|---|---|---|
| **A)** | $5,760 | 9.6% |
| **B)** | $960 | 12.0% |
| **C)** | $960 | 9.6% |

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**Explanation**

Residual income = Net income – equity charge

where:

equity charge = required return on equity × beginning book value of equity.

$RI = NI - k_e BV_{equity} = \$6{,}720 - (0.12 \times \$48{,}000) = \$6{,}720 - 5{,}760 = \$960$

The residual income method concentrates on returns to equity holders. As such, the proper discount rate to use when determining the project NPV is the required return on equity.

(Study Session 7, Module 19.3, LOS 19.i)

**Related Material**

SchweserNotes - Book 2

## Question #53 of 62

Question ID: 1209243

A firm is unable to raise the necessary funding for all projects that have positive expected net present values. Therefore, to maximize wealth this firm should *most* appropriately:

**A)** maximize the amount of capital deployed in positive IRR projects.

**B)** determine the optimal set of projects by selecting the projects with the highest IRRs first.

**C)** use IRR only as a secondary criteria for selecting projects.

**Explanation**

When a firm is unable to fund all projects that have positive expected net present values, the firm must engage in capital rationing. IRRs are not a suitable guide to choosing projects under capital rationing because high-IRR projects may have low NPVs. The NPV criterion should be used to maximize wealth.

(Study Session 7, Module 19.2, LOS 19.c)

**Related Material**

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## Question #54 of 62

Question ID: 1209246

Which of the following statements about the equivalent annual annuity approach for capital budgeting is *least* accurate?

**A)** The replacement chain approach assumes that it is possible to make continuous replacements each time the asset's life ends.

**B)** When comparing mutually exclusive projects with unequal lives, replacement chain analysis yields the same decision as the equivalent annual annuity

**C)** A 5-year project has a NPV of $2,000, if the firm's cost of capital is 10% the equivalent annual annuity is $725.

**Explanation**

Calculating EAA results in [i = 10, n = 5, PV = –2,000] PMT = 528, not 725.

(Study Session 7, Module 19.2, LOS 19.c)

**Related Material**

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## Question #55 of 62

Question ID: 1209237

An increase in expected inflation will generally:

**A)** leave weighted average cost of capital (WACC) unchanged.

**B)** decrease the weighted average cost of capital (WACC).

**C)** increase the weighted average cost of capital (WACC).

**Explanation**

Required rates of return on investments generally exceed inflation. An increase in expected inflation will generally increase the required return on equity and debt; therefore, the WACC will rise as inflation rises.

(Study Session 7, Module 19.1, LOS 19.b)

**Related Material**

SchweserNotes - Book 2

## Question #56 of 62

Question ID: 1209239

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Which of the following statements regarding inflation is CORRECT? Inflation:

**A)** is already present in the future cash flows therefore they need no further adjustment.

**B)** causes the weighted average cost of capital (WACC) to increase and the present value of the cash flows to increase.

**C)** is built into the weighted average cost of capital (WACC) and thus the net present value (NPV) is adjusted for expected inflation.

**Explanation**

Inflation is built into the WACC and thus the NPV is adjusted for expected inflation. An increase in inflation causes the WACC to increase and the present value of the cash flows to decrease. Future cash flows such as sales revenues should be adjusted upward to reflect the effect of inflation on future prices otherwise the NPV calculation will be biased downward.

(Study Session 7, Module 19.1, LOS 19.b)

**Related Material**

SchweserNotes - Book 2

## Question #57 of 62

Question ID: 1209273

James Case and Erica Gallardo are considering differences between accounting income and economic income when evaluating capital projects. Case makes the following statements to Gallardo:

| | |
|---|---|
| Statement 1: | One of the main reasons why accounting income and economic income will differ is that interest expense is subtracted when calculating accounting income, but is not considered when computing economic income. |
| Statement 2: | Another reason why accounting income and economic income may differ is that accounting depreciation is based on original costs while economic depreciation is based on market values. |

Gallardo considers both of Case's statements. Gallardo would find which statements *CORRECT*?

**A)** Both are correct.

**B)** Only one is correct.

**C)** Neither are correct.

**Explanation**

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Case has accurately described the two major differences between accounting income and economic income. Accounting depreciation is based on the original cost of an investment, while economic depreciation is based on the market value of the asset. Also, the interest expense that is subtracted from accounting income is not considered when computing economic income because interest expenses are implicit in the required rate of return used to calculate the asset's market value.

(Study Session 7, Module 19.3, LOS 19.h)

**Related Material**

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## Question #58 of 62

Question ID: 1209268

Which of the following is *least likely* to cause a problem when analyzing a capital budgeting project?

**A)** Incorporating actions taken by competitors in the capital budgeting analysis.

**B)** Basing investment decisions on the impact on earnings per share.

**C)** Using the firm's weighted average cost of capital for the discount rate on all projects.

**Explanation**

One of the common pitfalls when analyzing capital projects is not incorporating economic responses from competitors. Economic responses to an investment often affect profitability.

Note that managers who make decisions based on short-term EPS considerations may fail to consider projects that do not boost accounting numbers in the short-run, but are in the best long term interests of the business. The discount rate for a project should be adjusted for the project's risk.

(Study Session 7, Module 19.3, LOS 19.g)

**Related Material**

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## Question #59 of 62

Question ID: 1209261

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Wanda Brunner, CFA, is working on a capital project valuation and needs to determine the appropriate discount rate. She has the following information available:

Risk-free-rate = 8%

Market Beta = 1.0

Company Beta = 1.1

Project Beta = 1.2

Expected market return = 13%

Trailing 12-months market return = 12%

Which of the following is closest to the *most* appropriate discount rate?

**A)** 13.5%.

**B)** 14.0%.

**C)** 13.0%.

**Explanation**

Project discount rate = $R_F + \beta_{project} (E(R_{MKT}) - R_F)$

Project discount rate = 8% + 1.2(13% − 8%)

(Study Session 7, Module 19.2, LOS 19.e)

**Related Material**

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## Question #60 of 62

Question ID: 1209236

Financial leverage would NOT be increased if a firm financed its next project with:

**A)** bonds with embedded call options.

**B)** preferred stock.

**C)** common stock.

**Explanation**

Financial leverage is the result of financing assets with fixed income securities such as bonds or preferred stock. Each of these alternatives has a required payment component that increases the risk of the firm beyond that arising solely from business risk.

(Study Session 7, Module 19.1, LOS 19.b)

**Related Material**

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## Question #61 of 62

Question ID: 1209242

Which of the following statements about mutually exclusive projects with unequal lives is *least* accurate?

**A)** Mutually exclusive projects sometimes have long and different lives, which makes applying the replacement chain method difficult because the lowest

**B)** For comparing mutually exclusive projects with unequal lives, replacement chain analysis leads to the same decision as obtained by calculating the equivalent

**C)** In comparing mutually exclusive projects with unequal lives, you should always choose the project which has the highest NPV.

**Explanation**

In comparing mutually exclusive projects, replacement chain or equivalent annual annuity analysis should be used if the projects have unequal lives and can be replicated. Therefore, you will not always choose the project that has the highest NPV, if a project with a lower NPV can be replicated and results in a higher NPV over the same period of time as the project that has a longer time period.

(Study Session 7, Module 19.2, LOS 19.c)

**Related Material**

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## Question #62 of 62

Question ID: 1209212

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Erwin DeLavall, the Plant Manager of Patch Grove Cabinets, is trying to decide whether or not to replace the old manual lathe machine with a new computerized lathe. He thinks the new machine will add value, but is not sure how to quantify his opinion. He asks his colleague, Terri Wharten, for advice. Wharten's son just happens to be a Level II CFA candidate. DeLavall and Wharten provide the following information to Wharten's son:

*Company Assumptions:*

Tax rate: 40%
Weighted average cost of capital (WACC): 13%

*New Machine Assumptions:*

Cost of (includes shipping and installation): $90,000
Salvage value at end of year 5: $15,000
Depreciation Schedule: MACRS 7-year, with depreciation rates in years 1-5 of 14%, 25%, 17%, 13%, and 9%, respectively
Purchase will initially increase current assets by $20,000 and will increase current liabilities by $25,000
Impact on Operating Cash Flows Years 1- 5 (includes depreciation and taxes): $16,800 (assume equal amount each year for simplicity)

*Old Machine Assumptions:*

Current Value: $30,000
Book value: $13,000. Book value and market value will be zero at the end of five years.

Which of the following choices is *most* correct? Patch Grove Cabinets should:

**A)** replace the old lathe with the new lathe because the new one will add $3,760 to the firm's value.

**B)** not replace the old lathe with the new lathe because the new one will decrease the firm's value by $5,370.

**C)** replace the old lathe with the new lathe because the new one will add $10,316 to the firm's value.

**Explanation**

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The valuation method that shows the project's impact on the value of the firm is net present value (NPV). To calculate NPV, we need to determine the initial investment outlay, the operating cash flows, and the terminal year cash flows. Then, we discount the cash flows at the WACC. The calculations are as follows:

*Step 1: Initial Investment Outlay:*

= cost of new machine + proceeds/loss from old machine + change in net working capital (NWC)

= -$90,000 + $30,000 - $6,800 + $5,000 = **-$61,800** (cash outflow)

Details of calculation:

Cost of new lathe = $90,000 *outflow*
Sale of Old Machine:
Sales price = $30,000 *inflow*
Tax/tax credit: $6,800 *outflow*
= (Sales price – book value)*(tax rate) = (30,000 – 13,000)*0.4
Change in NWC = $5,000 *inflow*
ΔNWC = Δ current assets - Δ current liabilities = 20,000 – 25,000 = -5,000 (a decrease in working capital is a source of funds)

*Step 2: Operating Cash Flows (years 1-4)*: Given as **$16,800***inflow*

*Step 3: Terminal Value:*

= year 5 cash flow + return/use of NWC + proceeds/loss from disposal of new machine + tax/tax credit

= $16,800 - $5,000 + $15,000 + $1,920 = **$28,720***inflow*

Details of calculation:

Year 5 cash flow (given) = $16,800 *inflow*
Working capital (reverse 5,000 initial inflow) = $5,000 *outflow*
Sale of New Lathe:
Sales price = $15,000 *inflow*
Tax/tax credit: $1,920 *inflow*
= (Sales price – book value)*(tax rate)
Here, the Book value = Purchase price – depreciated amount. Using MACRS we have depreciated 78% of the value, or have 22% remaining.
0.22 * 90,000 = 19,800
Tax effect = (15,000 – 19,800)*(0.4) = -1,920, or a tax credit

*Step 4*: Calculate NPV:

NPV = -$61,800 + ($16,800 / $1.13^1$) + ($16,800 / $1.13^2$) +($16,800 / $1.13^3$) +($16,800 / $1.13^4$) +($28,720 / $1.13^5$) = **$3,759**.

**Since the NPV is positive, Patch Grove should replace the old lathe with the new one, because the new lathe will increase the firm's value by the amount of the NPV, or $3,759.**

You may also solve this problem quickly by using the cash flow (CF) key on your calculator.

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## Calculating $NPV_A$ with the HP12C®

| Key Strokes | Explanation | Display |
|---|---|---|

| | | |
|---|---|---|
| [f]→[FIN]→[f]→[REG] | Clear Memory Registers | 0.00000 |
| [f]→[5] | Display 5 decimals – you only need to do this once. | 0.00000 |
| 61,800→[CHS]→[g]→[CF0] | Initial Cash Outlay | -61,800.00000 |
| 16,800→[g]→[CFj] | Period 1 Cash flow | 16,800.00000 |
| 4→[g]→[Nj] | Cash Flow Occurs for 4 periods | 4.00000 |
| 28,720→[g]→[CFj] | Period 5 Cash flow | 28,720.00000 |
| 13→[i] | WACC | 13.00000 |
| [f]→[NPV] | Calculate NPV | 3,759.18363 |

**Calculating $NPV_A$ with the TI Business Analyst II Plus→**

| Key Strokes | Explanation | Display |
|---|---|---|
| [2nd]→[Format]→[5]→[ENTER] | Display 5 decimals – you only need to do this once. | DEC= 5.00000 |
| [CF]→[2nd]→[CLR WORK] | Clear Memory Registers | CF0 = 0.00000 |
| 61,800®[+/-]→[ENTER] | Initial Cash Outlay | CF0 = -61,800.00000 |
| [↓]→16,800→[ENTER] | Period 1 Cash Flow | C01 = 16,800.00000 |
| [↓] 4 [ENTER] | Frequency of Cash Flow 1 | F01 = 4.00000 |
| [↓]→28,720→[ENTER] | Period 2 Cash Flow | C02 = 28,720.00000 |
| [↓] | Frequency of Cash Flow 2 | F02 = 1.00000 |
| [NPV]→13→[ENTER] | WACC | I = 13.00000 |
| [↓]→[CPT] | Calculate NPV | NPV = 3,759.18363 |

(Study Session 7, Module 19.1, LOS 19.a)

**Related Material**

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